



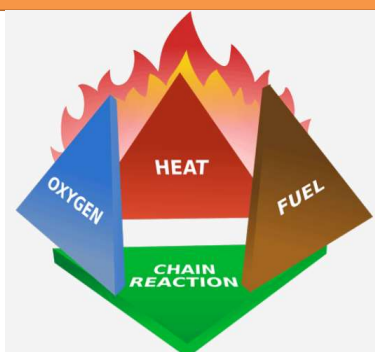
FPST 1213 Fire and Safety Hazard Recognition

Portable Fire Extinguishers
and Special Agents

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Fire Tetrahedron



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Fuel Classification



- Class A Fires:
 - Ordinary combustible materials such as wood, cloth, paper, rubber and many plastics
- Class B Fires:
 - Flammable Liquids, combustible liquids, petroleum greases, tars, oils, paints, solvents, lacquers, alcohols and flammable gases
- Class C Fires:
 - Involves live electrical equipment
- Class D Fires:
 - Involve combustible metals, such as magnesium, titanium, zirconium, sodium, lithium and potassium
- Class K Fires:
 - Involve cooking appliances that involve combustible cooking media (vegetable or animal oils/fats)



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Portable Fire Extinguishers



- Purpose
 - To control or extinguish small or incipient stage fires
 - OSHA – ...controlled or extinguished by portable fire extinguishers...
 - NFPA – ...use of thermal protective clothing...is required...
 - To protect evacuation routes that a fire may block directly or indirectly with smoke or burning/smoldering materials. Proper installation has extinguishers by exits.
- Standards/Regulations
 - NFPA 10 – *Standard for Portable Fire Extinguishers*
 - OSHA 1910.157 (g) – Portable Fire Extinguishers Training and Education
 - Fire extinguishers should be appropriately matched to work environment

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Fire Class & Symbol	Pictogram	Types of Fires
		Ordinary solid combustibles (paper, wood, cardboard and most plastics)

Labeling

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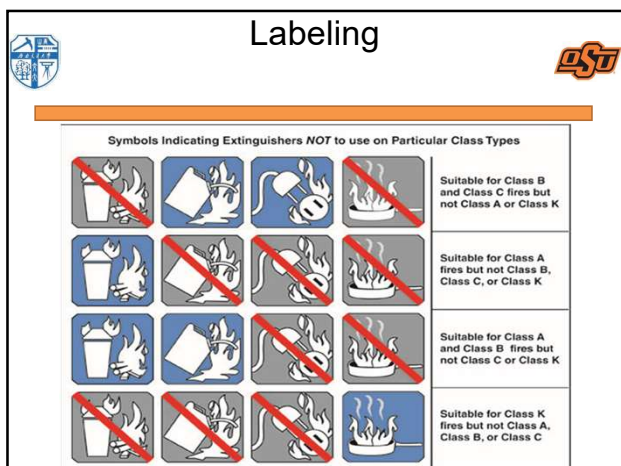
Fire Class & Symbol	Pictogram	Types of Fires
		Ordinary solid combustibles (paper, wood, cardboard and most plastics)
		Flammable liquids and gases (gasoline, kerosene, grease or oil)
		Energized electrical equipment (appliances, wiring, circuit breakers or outlets)
	Not Commonly Used	Combustible metals found in labs (magnesium, titanium, potassium or sodium)
		Oils and fats (cooking oils, trans-fats, or fats in cooking appliances)

Labeling

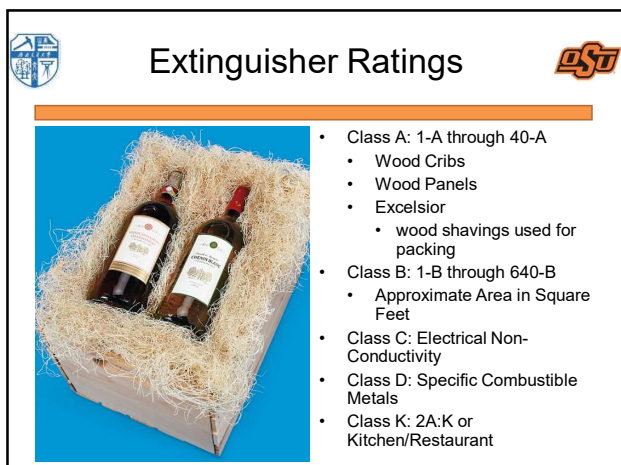
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Water




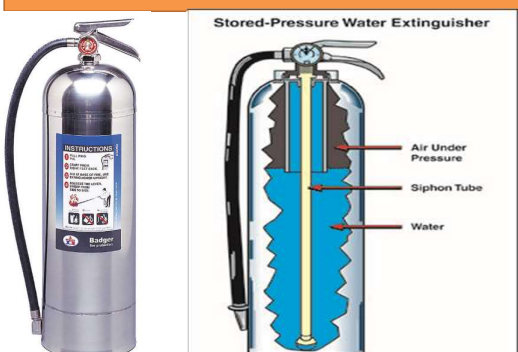
- Class A fire
 - Cools
- Advantages
 - Inexpensive
 - Abundant
 - Effective
 - Non-toxic
- Disadvantages
 - Freezes
 - Conducts electricity (Class C)
 - Combustible metals (Class D)
 - Combustible and flammable liquids (Class B)

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Water Extinguisher







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Carbon Dioxide



- Class B and C fires
 - Smothers (removes oxygen)
- Advantages
 - Inert (i.e. nonreactive)
 - Displaces oxygen
 - No residue
 - Creates its own pressure for delivery
- Disadvantages
 - Combustible metals (Class D)
 - Low cooling capacity
 - Re-ignition (Class A)
 - Asphyxiate



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Dry Chemical



- Class A, B and/or C fires
 - Monoammonium phosphate ("Multipurpose" Class A, B & C)
 - Sodium bicarbonate (baking soda Class B & C)
- Advantages
 - Monoammonium phosphate
 - Melts and coats interrupting the chain reaction
- Disadvantages
 - Irritant
 - Slightly corrosive

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Dry Chemical Extinguisher



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Dry Powder

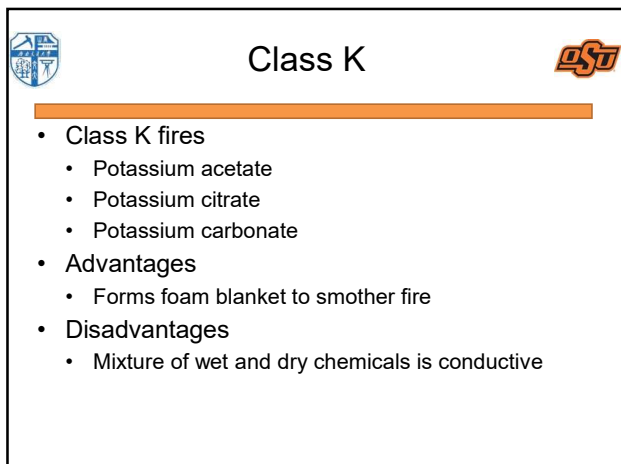


- Class D fires
 - Heat causes agent to cake and form a crust which excludes air and dissipates heat from burning metal
- Advantages
 - Many types of agents
- Disadvantages
 - Class D only

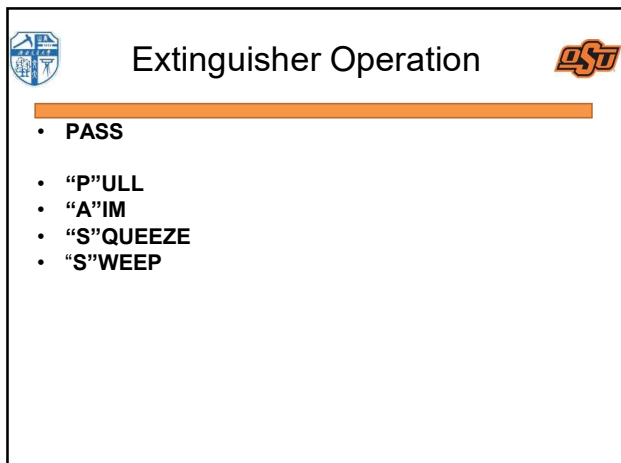
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PASS







- "P"ULL
 - Pull pin to break tamper seal

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PASS







- "A"IM
 - Aim at the base of the fire

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PASS







- "S"QUEEZE
 - Squeeze handle to release agent

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PASS




- "S" WEEP
 - Sweep from side to side



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Extinguisher Location




- NFPA 10 Occupancy Hazard Classifications
 - Light-hazard occupancy
 - Ordinary-hazard occupancy
 - Extra-hazard occupancy
- Required maximum travel distances to an extinguisher based on hazard


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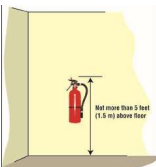


Inspection



- Monthly visuals
- Must be readily visible and accessible
- Securely mounted
- Weight < 40 pounds
 - Top \leq 5 feet above floor
 - Bottom \geq 4 inches from floor





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Inspection



- Extinguisher in its designated place?
- No obstruction (physically or visibility)?
- Pressure gauge reading in operable range?



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Monthly Visual Inspection



- Cylinder Shell
 - Corrosion
 - Mechanical damage (dent abrasion)
 - Broken hanger attachment
 - Broken handle



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Monthly Visual Inspection



- Name Plate, Instructions and Pull Ring
 - Illegible
 - Face outward
 - Missing safety tamper seals
- Nozzle or Horn
 - Damaged
 - Blocked opening



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Maintenance



- Annually
 - Utilize a 3rd party
- Pressure testing
 - "Hydrostatic" testing
 - NFPA 10 sets intervals based on cylinder type
 - Utilize a 3rd party
- Retain records of all inspections and maintenance

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Special Agent Extinguishing Systems

Carbon Dioxide
Dry Chemical
Wet Chemical
Clean Agent

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Typical System Components



- Storage tank for expellant gas and agent
 - Exception: CO₂
- Piping to carry the gas and agent
- Nozzles to disperse the agent
- Actuating mechanism
 - Automatic or manual

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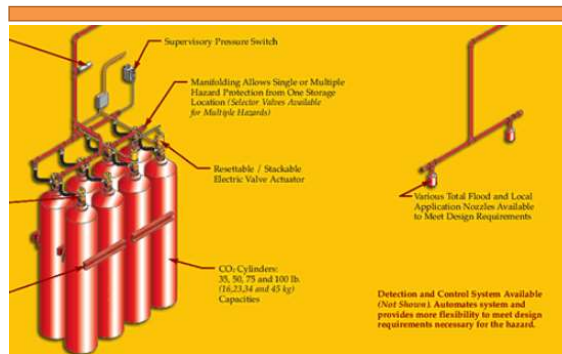


Carbon Dioxide System

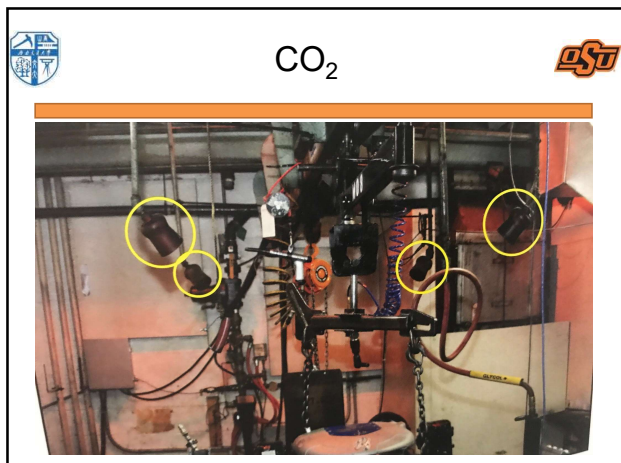


- Methods of Application
 - Total flooding
 - Local application
 - Hand hose lines
 - Trained personnel


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Inspection and Maintenance

- Verify carbon dioxide supply weekly
- Verify operations status monthly
- Full system annual inspection or maintenance
 - Typically done by a third party

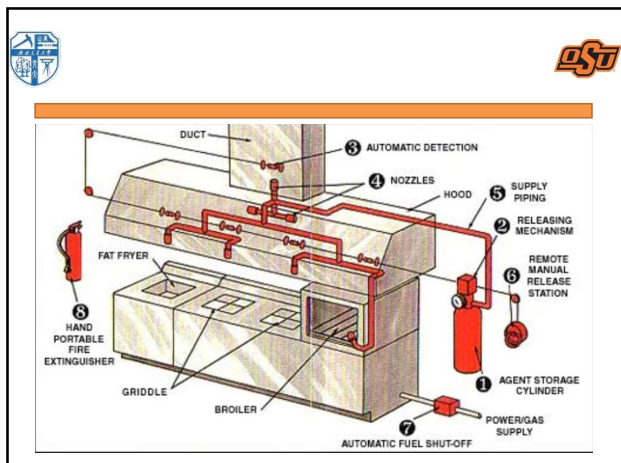
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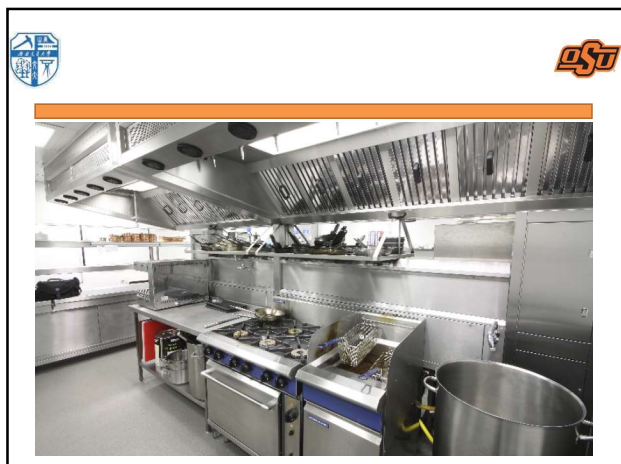
Wet and Dry Chemical Systems

- Same chemicals as portable extinguishers
 - Dip tanks
 - Paint spray booths
 - Exhaust dust systems
 - Commercial cooking equipment
- Local application
- Minimize splashing
- Makes a mess
 - Not recommended for area that contains sensitive electronic equipment

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Inspections and Maintenance

- Inspections
 - Has hazard expanded outside system coverage?
 - Grease buildup on system components
- Maintenance
 - Usually conducted by a third party

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Clean Agents

- Types
 - CO₂
 - Halogenated ("halon")
 - Interrupts chemical chain reaction
 - Inert gas
- Advantages
 - Very effective
 - Noncorrosive
 - No residue (hence the word "clean" agent)
- Disadvantages
 - Environmental harm. Ozone depletion

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Halon Alternatives

- Two types
 - Compounds
 - Halotron
 - FM 200
 - Inert gas mixtures
 - Primary components are fluorine, chlorine, bromine, or iodine

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Inspections and Maintenance



Complete test required annually



Semiannually verify agent quantity and/or
pressure test



Typically conducted by a 3rd party
