

*Introduction to*

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# FIRE PREVENTION PLANS



# OSHAcademy Course 718 Study Guide

## Fire Prevention Plans

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This study guide is designed to be reviewed off-line as a tool for preparation to successfully complete OSHAcademy Online Course 718.

Read each module, answer the quiz questions, and return online to submit the quiz. Print the quiz response screen which will contain the correct answers to the questions.

The final exam will contain questions taken from each module quiz. I hope you enjoy the course and if you have any questions, feel free to email or call:

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# ■ Course Introduction

Statistics tell it all!

Each year in the U.S., 70,000-80,000 workplaces experience a serious fire. Property losses from workplace fires exceed \$2 Billion annually. According to the Bureau of Labor Statistics' Census of Fatal Occupational Injuries Charts, 1992-2007, fires and explosions accounted for 3% of workplace fatalities in 2007.

Fire safety becomes everyone's job at a worksite. Employers should train workers about fire hazards in the workplace and about what to do in a fire emergency. If you want your workers to evacuate, you should train them on how to escape. If you expect your workers to use firefighting equipment, you should give them appropriate equipment and train them to use the equipment safely.

This course provides valuable reference materials for prevention of fire-related injuries in all workplaces.

### MODULE 1: BASIC QUESTIONS

#### What is the purpose of a Fire Prevention Plan (FPP)?

The purpose of this Fire Prevention Plan is to eliminate the causes of fire, prevent loss of life and property by fire, and to comply with the Occupational Safety and Health Administration's (OSHA) standard on fire prevention, 29 CFR 1910.39. It provides employees with information and guidelines that will assist them in recognizing, reporting, and controlling fire hazards.

It describes the fuel sources (hazardous or other materials) on site that could initiate or contribute both to the spread of a fire, as well as the building systems, such as fixed fire extinguishing systems and alarm systems, in place to control the ignition or spread of a fire.

#### What does the Fire Prevention Plan do for your company?

This Fire Prevention Plan serves to reduce the risk of fires at your workplace in the following ways:

1. The FPP identifies materials that are potential fire hazards and their proper handling and storage procedures.
2. It distinguishes potential ignition sources and the proper control procedures of those materials.
3. The plan describes fire protection equipment and/or systems used to control fire hazards.
4. It identifies persons responsible for maintaining the equipment and systems installed to prevent or control ignition of fires.
5. The FPP identifies persons responsible for the control and accumulation of flammable or combustible material.
6. It describes good housekeeping procedures necessary to insure the control of accumulated flammable and combustible waste material and residues to avoid a fire emergency.
7. The plan provides training to employees with regard to fire hazards to which they may be exposed.

#### What are management and employee FPP responsibilities?

Fire safety is everyone's responsibility. All employees should know how to prevent and respond to fires, and are responsible for adhering to company policy regarding fire emergencies.

Management. Management determines fire prevention and protection policies. Managers should provide adequate hazard controls to provide a safe workplace. Managers should also provide adequate resources and training to employees to encourage fire prevention and the safest possible response in the event of a fire emergency.

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Plan Administrator. This person maintains all records pertaining to the plan. The Plan Administrator should also:

1. Develop and administer the Company Name fire prevention training program.
2. Ensure that fire control equipment and systems are appropriate and properly maintained.
3. Control fuel source hazards in the workplace.
4. Conduct fire risk surveys and make recommendations for improvement.

Supervisors. Supervisors ensure that employees receive appropriate fire safety training. Supervisors should notify the Plan Administrator when changes in operation increase the risk of fire. They are also responsible for enforcing fire prevention and protection policies.

Employees. All employees should complete all required training before working without supervision. It's important that employees also:

1. Conduct operations safely to limit the risk of fire.
2. Report potential fire hazards to their supervisors.
3. Follow fire emergency procedures.

### What are some FPP implementation tips?

#### Good Housekeeping

To limit the risk of fires, good housekeeping is critical. All employees should take the following precautions:

1. Minimize the storage of combustible materials.
2. Make sure that doors, hallways, stairs, and other exit routes are kept free of obstructions.
3. Dispose of combustible waste in covered, airtight, metal containers.
4. Use and store flammable materials in well-ventilated areas away from ignition sources.
5. Use only nonflammable cleaning products.
6. Keep incompatible (i.e., chemically reactive) substances away from each other.
7. Perform "hot work" (i.e., welding or working with an open flame or other ignition sources) in controlled and well-ventilated areas.
8. Keep equipment in good working order (i.e., inspect electrical wiring and appliances regularly and keep motors and machine tools free of dust and grease).
9. Ensure that heating units are safeguarded.
10. Report all gas leaks immediately. Responsible Person shall ensure that all gas leaks are repaired immediately upon notification.
11. Repair and clean up flammable liquid leaks immediately.
12. Keep work areas free of dust, lint, sawdust, scraps, and similar material.

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13. Do not rely on extension cords if wiring improvements are needed, and take care not to overload circuits with multiple pieces of equipment.
14. Ensure that required hot work permits are obtained.
15. Turn off electrical equipment when not in use.

### How do we make sure the FPP works?

Of course, everyone should be properly trained, and the plan should be exercised regularly. Another key component is to make sure FPP equipment is properly maintained.

The Plan Administrator or another assigned person should ensure that all tools, equipment and machinery are maintained according to manufacturers' specifications.

Management should ensure everyone complies with the requirements of the National Fire Protection Association (NFPA) codes for specific equipment. Only properly trained individuals should perform maintenance work.

The following equipment is subject to the maintenance, inspection, and testing procedures:

1. equipment installed to detect fuel leaks, control heating, and control pressurized systems;
2. portable fire extinguishers, automatic sprinkler systems, and fixed extinguishing systems;
3. detection systems for smoke, heat, or flame;
4. fire alarm systems; and
5. emergency backup systems and the equipment they support.

### What are the components of the written plan?

A fire prevention plan must be in writing, be kept in the workplace, and be made available to employees for review. However, according to OSHA, if you have 10 or fewer employees you may communicate the plan orally to employees.

At a minimum, your fire prevention plan must include:

- A list of all major fire hazards, proper handling and storage procedures for hazardous materials, potential ignition sources and their control, and the type of fire protection equipment necessary to control each major hazard
- Procedures to control accumulations of flammable and combustible waste materials
- Procedures for regular maintenance of safeguards installed on heat-producing equipment to prevent the accidental ignition of combustible materials
- The name or job title of employees responsible for maintaining equipment to prevent or control sources of ignition or fires
- The name or job title of employees responsible for the control of fuel source hazards

An employer must inform employees upon initial assignment to a job of the fire hazards to which they are exposed. An employer must also review with each employee those parts of the fire prevention plan necessary for self-protection.

### MODULE 1 QUIZ

1. According to the text, which of the following is NOT one of the purposes of a Fire Prevention Plan?
  - a. eliminate causes of fires
  - b. respond to media questions about fires
  - c. prevent loss of life and property
  - d. comply with OSHA standards
  
2. The FPP identifies persons responsible for which of the following?
  - a. extinguishing potential ignition sources
  - b. controlling and accumulation of flammable material
  - c. maintaining fire prevention equipment
  - d. b and c above
  - e. a and b above
  
3. According to the text, who is responsible for determining FPP policies and making sure adequate hazard controls are provided?
  - a. managers
  - b. plan administrator
  - c. supervisors
  - d. employees
  
4. Who is responsible for enforcing FPP policies?
  - a. managers
  - b. plan administrator
  - c. supervisors
  - d. employees
  
5. When the employer has more than 10 employee, the fire prevention plan must be \_\_\_\_\_, be \_\_\_\_\_, and be made available to employees for review?
  - a. written in English, electronically
  - b. approved by OSHA, in the lunch room
  - c. in writing, kept in the workplace
  - d. updated annually, approved by top management
  
6. When must an employer inform employees of the fire hazards to which they are exposed?
  - a. prior to being hired
  - b. upon initial assignment
  - c. within two days after initial assignment
  - d. within 30 days after initial assignment

### ■ MODULE 2: CONTROLLING HAZARDS

It's important in an effective FPP that fire hazards are identified and controlled. Employees must be educated on the workplace fire hazards and the procedures to follow to prevent and control fire hazards. They must also learn how to respond to the fires those hazards might cause.

#### Electrical Hazards

Electrical system failures and the misuse of electrical equipment are leading causes of workplace fires. Fires can result from loose ground connections, wiring with frayed insulation, or overloaded fuses, circuits, motors, or outlets.

To prevent electrical fires, employees should:

1. Make sure that worn wires are replaced.
2. Use only appropriately rated fuses.
3. Never use extension cords as substitutes for wiring improvements.
4. Use only approved extension cords [i.e., those with the Underwriters Laboratory (UL) or Factory Mutual (FM) label].
5. Check wiring in hazardous locations where the risk of fire is especially high.
6. Check electrical equipment to ensure that it is either properly grounded or double insulated.
7. Ensure adequate spacing while performing maintenance.

#### Portable Heaters

All portable heaters should be approved by the Plan Administrator. Portable electric heaters should have tip-over protection that automatically shuts off the unit when it is tipped over.

There should be adequate clearance between the heater and combustible furnishings or other materials at all times.

#### Office Fire Hazards

Fire risks are not limited to industrial facilities. Fires in offices have become more likely because of the increased use of electrical equipment, such as computers and fax machines. To prevent office fires, employees should:

1. Avoid overloading circuits with office equipment.
2. Turn off nonessential electrical equipment at the end of each workday.
3. Keep storage areas clear of rubbish.
4. Ensure that extension cords are not placed under carpets.
5. Ensure that trash and paper set aside for recycling is not allowed to accumulate.

### Cutting, Welding, and Open Flame Work

Cutting, welding, and open flame work are naturally quite hazards. Welding processes may use oxy-acetylene gas, electrical current, lasers, electron beams, friction, ultrasonic sound, chemical reactions, heat from fuel gas, and robots. It's important that the highest level of attention be given to these processes to prevent fires in your workplace.

The Plan Administrator and affected employees should ensure the following:

1. All necessary hot work permits have been obtained prior to work beginning.
2. Cutting and welding are done by authorized personnel in designated cutting and welding areas whenever possible.
3. Adequate ventilation is provided.
4. Torches, regulators, pressure-reducing valves, and manifolds are UL listed or FM approved.
5. Oxygen-fuel gas systems are equipped with listed and/or approved backflow valves and pressure-relief devices.
6. Cutters, welders, and helpers are wearing eye protection and protective clothing as appropriate.
7. Cutting or welding is prohibited in sprinklered areas while sprinkler protection is out of service.
8. Cutting or welding is prohibited in areas where explosive atmospheres of gases, vapors, or dusts could develop from residues or accumulations in confined spaces.
9. Cutting or welding is prohibited on metal walls, ceilings, or roofs built of combustible sandwich-type panel construction or having combustible covering.
10. Confined spaces such as tanks are tested to ensure that the atmosphere is not over ten percent of the lower flammable limit before cutting or welding in or on the tank.
11. Small tanks, piping, or containers that cannot be entered are cleaned, purged, and tested before cutting or welding on them begins.
12. Fire watch has been established.

### Flammable and Combustible Materials

If your workplace contains flammable and combustible materials, the Plan Administrator should regularly evaluate the presence of those materials.

Certain types of substances can ignite at relatively low temperatures or pose a risk of catastrophic explosion if ignited. Such substances obviously require special care and handling.

#### Class A Combustibles

These include common combustible materials (wood, paper, cloth, rubber, and plastics) that can act as fuel and are found in non-specialized areas such as offices.

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To handle Class A combustibles safely:

1. Dispose of waste daily.
2. Keep trash in metal-lined receptacles with tight-fitting covers (metal wastebaskets that are emptied every day do not need to be covered).
3. Keep work areas clean and free of fuel paths that could allow a fire to spread.
4. Keep combustibles away from accidental ignition sources, such as hot plates, soldering irons, or other heat- or spark-producing devices.
5. Store paper stock in metal cabinets.
6. Store rags in metal bins with self-closing lids.
7. Do not order excessive amounts of combustibles.
8. Make frequent inspections to anticipate fires before they start.

Water, multi-purpose dry chemical (ABC), and halon 1211 are approved fire extinguishing agents for Class A combustibles.

### Class B Combustibles

These include flammable and combustible liquids (oils, greases, tars, oil-based paints, and lacquers), flammable gases, and flammable aerosols.

To handle Class B combustibles safely:

1. Use only approved pumps, taking suction from the top, to dispense liquids from tanks, drums, barrels, or similar containers (or use approved self-closing valves or faucets).
2. Do not dispense Class B flammable liquids into containers unless the nozzle and container are electrically interconnected by contact or by a bonding wire. Either the tank or container must be grounded.
3. Store, handle, and use Class B combustibles only in approved locations where vapors are prevented from reaching ignition sources such as heating or electric equipment, open flames, or mechanical or electric sparks.
4. Do not use a flammable liquid as a cleaning agent inside a building (the only exception is in a closed machine approved for cleaning with flammable liquids).
5. Do not use, handle, or store Class B combustibles near exits, stairs, or any other areas normally used as exits.
6. Do not weld, cut, grind, or use unsafe electrical appliances or equipment near Class B combustibles.
7. Do not generate heat, allow an open flame, or smoke near Class B combustibles.
8. Know the location of and how to use the nearest portable fire extinguisher rated for Class B fire.

Water should not be used to extinguish Class B fires caused by flammable liquids. (See Photo) Water can cause the burning liquid to spread, making the fire worse. To extinguish a fire caused by flammable liquids, exclude the air around the burning liquid. The following fire-extinguishing agents are approved for Class B combustibles: carbon dioxide, multi-purpose dry chemical (ABC), halon 1301, and halon

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1211. (NOTE: Halon has been determined to be an ozone-depleting substance and is no longer being manufactured. Existing systems using halon can be kept in place.)

### **Smoking in the Workplace**

In an effective FPP, smoking is prohibited in all company buildings. Certain outdoor areas may also be designated as no smoking areas. The areas in which smoking is prohibited outdoors should be identified by NO SMOKING signs.

### MODULE 2 QUIZ

1. What are the leading causes of workplace fires?
  - a. smoking in non-designated areas
  - b. electrical system failures and equipment misuse
  - c. microwave and other kitchen fires
  - d. fires in waste cans and dumpsters
  
2. Which of the following is required when using portable heaters in the workplace?
  - a. must be certified by the supervisor
  - b. manual shut off switch in front and back of unit
  - c. a thermal index of at least 5 in the on position
  - d. adequate clearance between the heater and combustibles
  
3. Fires in offices have become more likely because of \_\_\_\_\_.
  - a. use of cell phone causing battery fires
  - b. higher voltages being used
  - c. increased use of electrical equipment
  - d. more employees smoking in the building
  
4. Type \_\_\_\_ combustibles can act as a fuel and are found in areas such as offices.
  - a. A
  - b. B
  - c. C
  - d. D
  
5. Type \_\_\_\_ include flammable and combustible liquids, flammable gases, and flammable aerosols.
  - a. A
  - b. B
  - c. C
  - d. D

## ■ MODULE 3: FIXED EXTINGUISHING SYSTEMS

### *What are Fixed Extinguishing Systems?*

Fixed fire extinguishing/suppression systems are commonly used to protect areas containing valuable or critical equipment such as data processing rooms, telecommunication switches, and process control rooms.

Their main function is to quickly extinguish a developing fire and alert occupants before extensive damage occurs by filling the protected area with a gas or chemical extinguishing agent.

### **Does the Fixed Extinguishing System OSHA standard apply to you?**

OSHA's fixed extinguishing systems, general standard applies to all employers who have a fixed extinguishing system installed to meet a particular OSHA standard, with the exception of automatic sprinkler systems that are covered by [29 CFR 1910.159](#).

[29 CFR 1910.160](#) contains specific provisions for any fixed system, regardless of why it was installed, that may expose employees to possible injury, death, or adverse health consequences caused by the extinguishing agent. These systems are only subject to the requirements of 29 CFR 1910.160(b)(4) through 29 CFR 1910.160(b)(7) and (c) of the standard.

### **System design and application**

A fire extinguishing systems is an engineered set of components that work together to quickly detect a fire, alert occupants, and extinguish the fire before extensive damage can occur. All system components must be:

- Designed and approved for use on the specific fire hazards they are expected to control or extinguish.
- Protected against corrosion or either made or coated with a non-corrosive material if it may be exposed to a corrosive environment.
- Designed for the climate and temperature extremes to which they will be exposed.

### **Components of a Fixed System**

Typical elements and components include:

1. **Discharge Nozzle** Discharge nozzles are used to disperse the extinguishing agent into the protected area.
2. **Piping** The piping system is used to transport the extinguishing agent (carbon dioxide, halon, argon, etc) from its storage container to the discharge nozzle.

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3. **Control Panel** The control panel integrates all devices and displays their operational status and condition.
4. **Warning Alarm** Electronic devices that provide an audible or visual alarm when detected. Each area protected by a fixed extinguishing system must have a distinctive alarm or signal which complies with 29 CFR 1910.165 to alert occupants that the system is discharging.
5. **Warning and Caution Signs** Hazard warning signs must be posted at the entrance to, and inside, areas protected by fixed extinguishing systems.
6. **Fire Detectors** A device that detects fire and causes an alarm signal to be generated. Automatic detection devices sense the smoke, heat, or flames from a fire and initiate an alarm.
7. **Pull Station** A device that provides a way to manually discharge the fire extinguishing system. A manual discharge station is a device usually mounted on a wall near the emergency exit(s) which will automatically sound an alarm and release the extinguishing agent.
8. **Agent Storage Containers** The storage system discharges agent into the piping and through the discharge nozzles when activated by a manual or automatic device.

### Operation, maintenance, and testing

Automatic fire suppression systems, particularly the total flooding variety, must be operated properly and regularly maintained and tested to guarantee worker safety and system effectiveness. To ensure your fire extinguishing system will perform as expected in the event of a fire, you are required to:

- Inspect each system annually, and operate and maintain them in a working condition, making sure they are always turned on, except during repairs or maintenance.
- Notify employees and establish measures to guarantee their safety if a fixed extinguishing system becomes inoperable. Fix any defects or impairments by trained personnel.
- Check the weight and pressure of refillable containers at least semiannually. If the container shows a loss in net content, weight, or pressure, it must be subjected to maintenance.
- Assure that factory charged non-refillable containers that have no means of pressure indication are weighed at least semiannually. Replace the container if it shows a loss in net weight.
- Assure that inspection and maintenance dates are recorded and kept until the container is checked again or for the life of the container, whichever is less.
- Train employees designated to inspect, maintain, operate, or repair fixed extinguishing systems. Review their training annually to keep them up-to-date.
- Train all employees with respect to the type of systems installed in the workplace, the hazards involved, proper activation in case of emergency, and the correct response to audible and visual pre-discharge alarms. Provide training for non-English speaking employees in languages understood by the affected employees and other individuals that may be exposed to the hazard.
- Provide and assure the use of personal protective equipment (PPE) for rescuing employees trapped in areas that have become hazardous due to an agent discharge.

### Total flooding applications

Total Flooding Applications consist of protecting an enclosed space by flooding it with a gas, such as carbon dioxide or halon. This method is used to protect electrical equipment and other types of deep-

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seated smoldering fires that may re-ignite after the flame has been extinguished. Because these systems can create an oxygen deficit or toxic atmosphere they deserve special attention.

### Safety and Health Hazards

The Material Safety Data Sheet for each extinguishing agent should be available in the workplace. It is important that employees know the potential hazards of the extinguishing agents they may be exposed to and how to protect themselves. Additionally, employees who are likely to enter such areas should receive a basic level of instruction into the operating principles of the system to include alarms and related hazards, as well as evacuation procedures. The two most common extinguishing agents used for total flooding applications are carbon dioxide and halon.

### Hazards of Carbon Dioxide and Halon Systems

**Carbon Dioxide Systems.** Carbon dioxide, under normal conditions, is a colorless, odorless, electrically nonconductive gas that is approximately 1.5 times heavier than air. It will not disturb live electrical components, is non-corrosive, and leaves no residue to clean up.

Agents used for initial supply and replenishment shall be of the type approved for the system's application. Carbon dioxide obtained by dry ice conversion to liquid is not acceptable unless it is processed to remove excess water and oil. Specific hazards include:

- Asphyxiation - Exposure to high concentrations of CO<sub>2</sub> gas may create an oxygen-deficient atmosphere.
- Cold Temperature - Direct contact with the vaporizing liquid during discharge can cause frostbite burns to the skin.

**Halon Systems.** Halon is a bromo freon that works by replacing oxygen, thus creating an oxygen-deficient atmosphere. This can be very dangerous to employees. The reaction products of halon on hot surfaces may result in the release of toxic substances and carcinogens. These areas should be clearly labeled as follows: Specific halon hazards include:

- Asphyxiation - Exposure to high concentrations of halon can create an oxygen-deficient atmosphere.
- Cold Temperature - Direct contact with the vaporizing liquid during discharge can cause frostbite burns to the skin.
- Central Nervous System (CNS) - Inhaling high concentrations of halon gas can cause dizziness, tingling in extremities and, in severe cases, unconsciousness.
- Cardiovascular Effect - In some people, exposure to halon can cause an increased sensitivity of the heart to adrenaline resulting in irregular heartbeats and, in severe cases, heart attack.

When halon is exposed to temperatures above 900 degrees F. it could break down and create high concentrations of toxic gases.

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### MODULE 3 QUIZ

1. Fixed fire extinguishing and suppression systems are commonly used to \_\_\_\_\_.
  - a. protect employees in office spaces
  - b. protect valuable or critical equipment
  - c. prevent fires in manufacturing plants
  - d. flood spaces containing combustibles
2. What is the main function of fixed fire extinguishing and suppression systems?
  - a. quickly extinguish fires and alert occupants
  - b. quickly fill an area with gas or chemical extinguishing agent
  - c. quickly cover employees with water to prevent burning
  - d. a and b above
  - e. b and c above
3. Which method is used to protect against deep-seated smoldering fires that may re-ignite?
  - a. Oxygen Depletion Method
  - b. Total Flooding Applications
  - c. Carbon Dioxide Suppression
  - d. Continuous Discharge
4. A \_\_\_\_\_ for each extinguishing agent should be available in the workplace.
  - a. storage container
  - b. Emergency Response Procedure
  - c. Portable Respirator
  - d. Material Safety Data Sheet (MSDS)
5. What are the two most common extinguishing agents used for total flooding applications?
  - a. carbon dioxide and halon
  - b. carbon monoxide and freon
  - c. oxygen and nitrogen
  - d. baking soda and carbon dioxide

## ■ MODULE 4: DUTIES, RESPONSIBILITIES AND TRAINING

### *What is the purpose of an alarm system?*

The purpose of the employee alarm system is to reduce the severity of workplace accidents and injuries by ensuring that alarm systems operate properly and procedures are in place to alert employees to workplace emergencies.

### *Does the standard apply to you?*

OSHA's employee alarm systems standard 29 CFR 1910.165 applies to all employers that use an alarm system to satisfy any OSHA standard that requires employers to provide an early warning for emergency action, or reaction time for employees to safely escape the work place, the immediate work area, or both.

### **Requirements for alarm devices**

The employee alarm system must provide warning for necessary emergency action as called for in the emergency action plan, or for reaction time for safe escape of employees from the workplace or the immediate work area, or both.

An employee alarm system can be any piece of equipment and/or device designed to inform employees that an emergency exists or to signal the presence of a hazard requiring urgent attention.

National Fire Protection Association (NFPA) 72, National Fire Alarm Code, requires a fire alarm signal to be distinctive in sound from other signals and can not be used for any other purpose.

The employee alarm must be capable of being perceived above ambient noise or light levels by all employees in the affected portions of the workplace.

Tactile devices may be used to alert those employees who would not otherwise be able to recognize the audible or visual alarm.

The two most common types of alarms are audible and visual devices.

### **Audible Alarms**

Audible alarms include bells, horns, sirens, voice announcement systems, and other devices that can be distinguished above and apart from the normal sound level within the workplace.

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### **Temporal and voice signals are the most effective means.**

Temporal coding is accomplished by interrupting a steady sound in the following manner: .5 sec ON; .5 sec OFF; .5 sec ON; .5 sec OFF, in a repeating cycle. Use a distinctive three-pulse temporal pattern to signal an immediate emergency evacuation.

Audible notification devices such as horns, bells, or sirens are no longer recognized for new systems by NFPA 72, National Fire Alarm Code – only temporal signals or voice signals. For visual signals, only strobe lights are now recognized by NFPA 72 and the Americans with Disabilities Act (ADA).

The following bells, horns and sirens, are only permitted in existing systems.

- **Bells.** Vibrating bells are the most common signal device. Bells are commonly used in schools for fire alarms.
- **Horns.** Horns produce a very loud distinctive sound that immediately attracts attention. Horns can be useful to call attention to critical situations. Signals other than those used for evacuation purposes do not have to produce the temporal coded signal.
- **Sirens.** Sirens produce a loud piercing wail that makes them ideally suitable for initiating a site-wide evacuation.

**Workplace Announcement System.** Speakers can be used to play a live or recorded voice message. They are often ideally suited for large workplaces where phased or guided evacuations are needed.

### **Visual Alarms**

Visual alarms use steady, flashing, or strobe lights to alert workers to an emergency situation in areas where noise levels are high, especially where ear protection must be worn and audible signals may not be heard or may be misunderstood. Visual signals also provide an effective way to alert workers with hearing loss about an emergency. Provide visible signals in restrooms, in other general and common use areas, and in hallways and lobbies.

**Flashing/Steady Lights.** These lights are well suited for areas where ambient noise makes audible signals difficult to hear. These types of lights come with different colored covers for increased attention and can be ordered with rotating or flashing lights.

**Strobe Lights.** Strobe lights use high intensity flash tubes that are ideally suited for areas where high ambient light levels make traditional rotating or flashing lights difficult to distinguish or where ambient noise makes audible signals difficult to hear. Strobe lights are recognized as the most effective means. Only strobe lights are now recognized by NFPA 72 and the Americans with Disabilities Act (ADA).

### Installation and restoration

For alarm systems to provide adequate notification in the event of an emergency, all devices, components, combinations of devices or systems constructed and installed must meet OSHA requirements and be approved.

Steam whistles, air horns, strobe lights or similar lighting devices, or tactile devices meeting the requirements of the OSHA standard are considered to meet this requirement for approval.

Make sure your installed alarm systems are:

- Capable of being heard, seen, or otherwise perceived by everyone in the workplace.
- Distinctive and easily identified by all employees as a signal to evacuate the work area or perform actions identified in your emergency action plan, such as "shelter-in-place".
- Supervised if they were installed after January 1, 1981 and contain circuitry that is capable of being supervised. These systems must also provide positive notification to assigned personnel whenever a deficiency exists in the system.

### Alarm Selection Guidelines

To get the most from an alarm system, follow these guidelines when selecting devices:

- Make sure the alarm's sound is as different from the background noise and light as possible. Audible alarms should exceed the ambient noise level by at least six decibels. The light intensity for visual alarms should be at least 75 candela.
- Use alarms with integrated audible and visual signals to accommodate the hearing and visually impaired, and for areas where a person may be working alone. This includes areas such as restrooms, storage areas, offices, and similar areas. (These devices are available for about the same cost as an audible or visual signal alone).
- Avoid using strobe devices that flash at rates above five flashes per second (fps). Rates above five fps can trigger seizures in people with certain forms of epilepsy. When multiple devices are used, either synchronize or reduce their flash rate so that the combined rate does not exceed five fps.

### Protection of Alarms

To make sure devices stay operable, follow these guidelines:

- Alarm system components that may be exposed to corrosive environments should be either made or coated with a non-corrosive material.
- Position alarm devices away from or out of contact with materials or equipment which may cause physical damage.
- Alarms that are installed outdoors and need to be shielded from the weather to work properly must be protected with a canopy, hood, or other suitable device.

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- All devices should be securely mounted to a solid surface, such as screwed to a junction box with a mounting plate or other appropriate method that prevents them from putting pressure or stress on attached wires or tubing.

### Alarm Placement Guidelines

To ensure your alarm system provides adequate coverage, follow these guidelines when placing alarm devices:

- Put at least one visual alarm in each room and any other general usage areas (guest restrooms, meeting rooms) which may be occupied by those with hearing impairments. You may need more than one alarm per room for those that exceed the manufacturer's spacing requirements. For example, if your alarm is rated for 50 feet, install alarms so they are evenly spaced with no more than 50 feet between devices.
- Mount visual and audible devices 80 inches above the highest floor level within the space or six inches below the ceiling, whichever is lower.
- Make sure manually activated devices for use in conjunction with alarms are unobstructed, conspicuous, and readily accessible.
- Make available an emergency communications system such as a public address system, telephone, portable radio unit, or other means to notify employees of the emergency and to contact local law enforcement, the fire department, and others.

### Maintenance and testing

Employee alarm systems are important life safety devices and must be maintained in an operating condition at all times except during repairs or maintenance.

**Routine Test and Maintenance.** Test the reliability and adequacy of non-supervised employee alarm systems every two months.

- Use a different actuation device in each test of a multi-actuation device system.
- Maintain or replace power supplies as often as necessary to ensure a fully operational condition.
- Provide a back-up means of alarm when systems are out of service, such as employee runners or telephones.
- Use properly trained persons to service, maintain, and test employee alarms.
- Do a visual check to ensure that employee alarm devices are not obstructed/installed in a manner that would prevent sound or light from reaching or entering the protected areas.
- Restore all employee alarm systems to normal operating condition as soon as possible after each test or alarm.
- Spare alarm devices and components must be readily available in sufficient quantities and locations for prompt restoration of the system.

## MODULE 4 QUIZ

1. The purpose of the employee alarm system is to reduce the \_\_\_\_\_ of workplace accidents and injuries.
  - a. frequency
  - b. severity
  - c. duration
  - d. all of the above
  
2. You must be able to distinguish fire alarm signals from other signals.
  - a. true
  - b. false
  
3. As long as OSHA approves it, you may use fire alarms for other purposes.
  - a. true
  - b. false
  
4. Which of the following devices must be used to alert employees who can not otherwise hear or see an alarm?
  - a. visual
  - b. audible
  - c. tactile
  - d. sensory
  
5. Which of the following are the two most common types of fire alarms in the workplace?
  - a. audible and visual
  - b. visual and tactile
  - c. sensory and visual
  - d. audible and tactile

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6. Which of the following are the most effective means producing audible alarms?
- d. voice and sensory
  - b. voice and sirens
  - c. sensory and horns
  - d. temporal and voice
7. Which of the following are no longer allowed in the United States for new fire alarm systems by NFPA 72?
- d. temporal signals
  - b. horns, bells, or sirens
  - c. voice signals
  - d. temporal or voice signals
8. Only \_\_\_\_\_ lights are now recognized by NFPA 72 and the Americans with Disabilities Act (ADA).
- a. strobe
  - b. steady
  - c. variable
  - d. flashing
9. For areas where a worker may be hearing or visually impaired, or working alone, what action should a FPP plan administrator take?
- d. ensure a co-worker is present
  - b. prevent the worker from working alone
  - c. use integrated audible and visual signal alarms
  - d. use only tactile alarms
10. Which of the following is NOT requirement for manually activated devices?
- d. they must be unobstructed
  - b. they must be conspicuous
  - c. they must be readily accessible
  - d. they must have an automatic option

## ■ MODULE 5: PORTABLE FIRE EXTINGUISHERS

### Introduction

Workplace fires and explosions kill hundreds and injure thousands of workers each year. One way to limit the amount of damage due to such fires is to make portable fire extinguishers an important part of your fire prevention program. When used properly, fire extinguishers can save lives and property by putting out a small fire or controlling a fire until additional help arrives.

### Fire and extinguisher operation

#### The Fire Triangle

To understand how fire extinguishers work, you need to understand a little about the nature of fire. Fire is a very rapid chemical reaction between oxygen and a combustible material, which results in the release of heat, light, flames, and smoke.

For a reaction that creates a fire, the following three elements, which are represented by the three sides of the Fire Triangle, must be present at the same time:

1. Enough **oxygen** to sustain combustion,
2. Enough **heat** to raise the material to its ignition temperature, and
3. Some sort of **fuel** or combustible material.

#### How a fire extinguisher works

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, agent is expelled out the nozzle. A fire extinguisher works much like a can of hair spray.

All portable fire extinguishers must be approved by a nationally recognized testing laboratory to verify compliance with applicable standards. Equipment that passes the laboratory's tests are labeled and given an alpha-numeric classification based on the type and size of fire it will extinguish.

#### Fire Extinguisher Ratings

There are basically five different types or classes of fire extinguishers, each of which extinguishes specific types of fire. Newer fire extinguishers use a picture/labeling system to designate which types of fires they are to be used on. Older fire extinguishers are labeled with colored geometrical shapes with letter designations. Both of these types of labels are shown below with the description of the different classes of extinguishers.

Additionally, Class A and Class B fire extinguishers have a numerical rating which is based on tests conducted by Underwriter's Laboratories that are designed to determine the extinguishing potential for each size and type of extinguisher.



**Class A Extinguishers** will put out fires in ordinary combustibles, such as wood and paper. The numerical rating for this class of fire extinguisher refers to the amount of water the fire extinguisher holds and the amount of fire it will extinguish.



**Class B Extinguishers** should be used on fires involving flammable liquids, such as grease, gasoline, oil, etc. The numerical rating for this class of fire extinguisher states the approximate number of square feet of a flammable liquid fire that a non-expert person can expect to extinguish.



**Class C Extinguishers** are suitable for use on electrically energized fires. This class of fire extinguishers does not have a numerical rating. The presence of the letter "C" indicates that the extinguishing agent is non-conductive.



**Class D Extinguishers** are designed for use on flammable metals and are often specific for the type of metal in question. There is no picture designator for Class D extinguishers. These extinguishers generally have no rating nor are they given a multi-purpose rating for use on other types of fires.



**Class K Extinguishers**, or Wet Chemical, fire extinguishers are designed specifically for use in restaurant kitchens. They utilize a potassium acetate based, low PH agent - the same agent used in pre-engineered cooking equipment fire extinguishing systems. The agent discharges as a fine mist which helps prevent grease splash and fire re-flash while cooling the appliance. The Class K extinguisher is the ideal choice for use on all cooking appliances including solid fuel charbroilers.

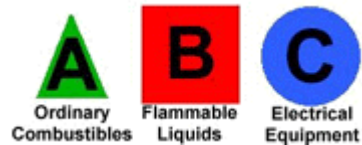


## Multi-Class Ratings



Many extinguishers available today can be used on different types of fires and will be labeled with more than one designator, e.g. A-B, B-C, or A-B-C. Make sure that if you have a multi-purpose extinguisher it is properly labeled.

This is the old style of labeling indicating suitability for use on Class A, B, and C fires.



This is the new style of labeling that shows this extinguisher may be used on Ordinary Combustibles, Flammable Liquids, or Electrical Equipment fires.



This is the new labeling style with a diagonal red line drawn through the picture to indicate what type of fire this extinguisher is **NOT** suitable for. In this example, the fire extinguisher could be used on Ordinary Combustibles and Flammable Liquids fires, but not for Electrical Equipment fires.

## Types of Fire Extinguishers

Different types of fire extinguishers are designed to fight different types of fire. The three most common types of fire extinguishers are: air pressurized water, CO<sub>2</sub> (carbon dioxide), and dry chemical. The following table provides information regarding the type of fire and which fire extinguisher should be used.



**Dry Chemical** extinguishers are usually rated for multiple purpose use. They contain an extinguishing agent and use a compressed, non-flammable gas as a propellant.

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**Halon** extinguishers contain a gas that interrupts the chemical reaction that takes place when fuels burn. These types of extinguishers are often used to protect valuable electrical equipment since they leave no residue to clean up. Halon extinguishers have a limited range, usually 4 to 6 feet. The initial application of Halon should be made at the base of the fire, even after the flames have been extinguished.



**Water** These extinguishers contain water and compressed gas and should only be used on Class A (ordinary combustibles) fires.



**Carbon Dioxide (CO<sub>2</sub>)** extinguishers are most effective on Class B and C (liquids and electrical) fires. Since the gas disperses quickly, these extinguishers are only effective from 3 to 8 feet. The carbon dioxide is stored as a compressed liquid in the extinguisher; as it expands, it cools the surrounding air. The cooling will often cause ice to form around the “horn” where the gas is expelled from the extinguisher. Since the fire could re-ignite, continue to apply the agent even after the fire appears to be out.

### More on Extinguisher Labeling

Let's take a quick look at the label pictured. (Don't worry, this part isn't on the exam :-)

Look at the extinguisher to the right. The classification is:

**1-A:10-BC**

The letters (A, B, and C) represent the type(s) of fire for which the extinguisher has been approved.

The number in front of the A 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.

### How to Use a Fire Extinguisher

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Even though extinguishers come in a number of shapes and sizes, they all operate in a similar manner. Here's an easy acronym for fire extinguisher use:

**P A S S** --- Pull - Aim - Squeeze - Sweep

**Pull** the pin at the top of the extinguisher that keeps the handle from being accidentally pressed.



**Aim** the nozzle toward the base of the fire.



**Squeeze** the handle to discharge the extinguisher. Position yourself approximately 8 feet away from the fire. If you release the handle, the discharge will stop.



**Sweep** the nozzle back and forth at the base of the fire. After the fire appears to be out, watch it carefully since it may re-ignite!



Make sure all employees who are expected to use fire extinguishers if a controllable fire occurs are properly training with hands-on practice. There's no OSHA requirement to actually extinguish a fire or discharge a fire extinguisher during training. However, each employee should handle the fire extinguisher demonstrate they can perform the PASS steps.

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### MODULE 5 QUIZ

1. Each of the following is a component of the Fire Triangle, except:
  - a. oxygen
  - b. humidity
  - c. heat
  - d. fuel
  
2. Which of the following is NOT a purpose of the Portable fire extinguisher?
  - a. cool burning fuel
  - b. displace or remove oxygen
  - c. stop a chemical reaction
  - d. reduce the likelihood of explosion
  
3. Class \_\_\_\_ Extinguishers should be used on fires involving flammable liquids, such as grease, gasoline, oil, etc.
  - a. A
  - b. B
  - c. C
  - d. D
  
4. Class \_\_\_\_ Extinguishers are designed for use on flammable metals and are often specific for the type of metal in question.
  - a. A
  - b. B
  - c. C
  - d. D
  
5. Class \_\_\_\_ Extinguishers will put out fires in ordinary combustibles, such as wood and paper.
  - a. A
  - b. B
  - c. C
  - d. D

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6. Class \_\_\_\_ Extinguishers are suitable for use on electrically energized fires.
- a. A
  - b. B
  - c. C
  - d. D
7. Class K portable fire extinguishers are designed specifically for use in which of the following locations?
- a. residential kitchens
  - b. restaurant kitchens
  - c. oil drilling rigs
  - d. gasoline service stations
8. These extinguishers contain water and compressed gas and should only be used on Class A (ordinary combustibles).
- a. water
  - b. dry chemical
  - c. carbon dioxide
  - d. halon
9. These extinguishers are usually rated for multiple purpose use.
- a. water
  - b. dry chemical
  - c. carbon dioxide
  - d. halon
10. The acronym "PASS" stands for:
- a. pass, add, select, serve
  - b. place, actuate, steady, select
  - c. pull, attempt, select, squeeze
  - d. pull, aim, squeeze, sweep

## MODULE 6: REQUIREMENTS FOR EXIT ROUTES

### What is an exit route?

An exit route is a continuous and unobstructed path of exit travel from any point within a workplace to a place of safety. An exit route consists of three parts:

1. Exit access - 29 CFR 1910.36(a)(3) portion of an exit route that leads to an exit.
2. Exit - portion of an exit route that is generally separated from other areas to provide a protected way of travel to the exit discharge.
3. Exit discharge - part of the exit route that leads directly outside or to a street, walkway, refuge area, public way, or open space with access to the outside.

### Basic requirements

- An exit route must be permanent. Each exit route must be a permanent part of the workplace.
- An exit must be separated by fire resistant materials. Construction materials used to separate an exit from other parts of the workplace must have a one-hour fire resistance-rating if the exit connects three or fewer stories and a two-hour fire resistance-rating if the exit connects four or more stories.
- Openings into an exit must be limited. An exit is permitted to have only those openings necessary to allow access to the exit from occupied areas of the workplace, or to the exit discharge.
- An opening into an exit must be protected by a self-closing fire door that remains closed or automatically closes in an emergency upon the sounding of a fire alarm or employee alarm system. Each fire door, including its frame and hardware, must be listed or approved by a nationally recognized testing laboratory.

### Number of exits

- The number of exit routes should be adequate. (**Question: What's wrong with the exit in the photo?**)
- At least two exit routes should be available in a workplace to permit prompt evacuation of employees and other building occupants during an emergency.
- The exit routes should be located as far away as practical from each other so that if one exit route is blocked by fire or smoke, employees can evacuate using the second exit route.
- More than two exit routes should be available in a workplace if the number of employees, the size of the building, its occupancy, or the arrangement of the workplace is such that all employees would not be able to evacuate safely during an emergency.
- A single exit route is permitted where the number of employees, the size of the building, its occupancy, or the arrangement of the workplace is such that all employees would be able to evacuate safely during an emergency. (**Answer: The exit is blocked in the photo!**)

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For assistance in determining the number of exit routes necessary for your workplace, consult NFPA 101, Life Safety Code.

### Exit discharge

- Each exit discharge must lead directly outside or to a street, walkway, refuge area, public way, or open space with access to the outside.
- The street, walkway, refuge area, public way, or open space to which an exit discharge leads should be large enough to accommodate the building occupants likely to use the exit route. The walkway in the photo to the right is partially blocked by stored items.
- Exit stairs that continue beyond the level on which the exit discharge is located should be interrupted at that level by doors, partitions, or other effective means that clearly indicate the direction of travel leading to the exit discharge.



### Locking arrangements

- An exit door should be unlocked from the inside.
- Employees should be able to open an exit route door from the inside at all times without keys, tools, or special knowledge.
- A device such as a panic bar that locks only from the outside is permitted on exit discharge doors. The door to the right is blocked and the exit sign is not illuminated.
- Exit route doors should be free of any device or alarm that could restrict emergency use of the exit route if the device or alarm fails.
- An exit route door may be locked from the inside only in mental, penal, or correctional facilities and then only if supervisory personnel are continuously on duty and the employer has a plan to remove occupants from the facility during an emergency.

### Door swing

- A side-hinged exit door should be used.
- A side-hinged door should be used to connect any room to an exit route.
- The door that connects any room to an exit route must swing out in the direction of exit travel if the room is designed to be occupied by more than 50 people or if the room is a high hazard area (i.e., contains contents that are likely to burn with extreme rapidity or explode).

See Photo: **What's wrong with this picture?** Never hold fire doors open. The door should be self closing, not blocked or held open!

### Exit route capacity

- The capacity of an exit route should be adequate.
- Exit routes must support the maximum permitted occupant load for each floor served.

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- The capacity of an exit route may not decrease in the direction of exit route travel to the exit discharge.

### Height and width requirements

- An exit route must meet minimum height and width requirements.
- The ceiling of an exit route should be at least seven feet six inches (2.3 m) high. Any projection from the ceiling must not reach a point less than six feet eight inches (2.0 m) from the floor.
- An exit access should be at least 28 inches (71.1 cm) wide at all points. Where there is only one exit access leading to an exit or exit discharge, the width of the exit and exit discharge should be at least equal to the width of the exit access.
- The width of an exit route should be sufficient to accommodate the maximum permitted occupant load of each floor served by the exit route.
- Objects that project into the exit route must not reduce the width of the exit route to less than the minimum width requirements for exit routes.

### Outdoor exit routes

- An outdoor exit route must have guardrails to protect unenclosed sides if a fall hazard exists.
- The outdoor exit route should be covered if snow or ice is likely to accumulate along the route, unless the employer can demonstrate that any snow or ice accumulation will be removed before it presents a slipping hazard.
- The outdoor exit route should be reasonably straight and have smooth, solid, substantially level walkways.
- The outdoor exit route must not have a dead-end that is longer than 20 feet (6.2 m).

### MODULE 6 QUIZ

1. Which of the following is that part of the exit route that leads directly outside or to a street, walkway, refuge area, public way, or open space with access to the outside?
  - a. access
  - b. exit
  - c. discharge
  - d. assembly
  
2. Which of the following is NOT a requirement of an exit route?
  - a. it should be a permanent part of the workplace
  - b. it should be separated by fire resistant materials
  - c. openings to exit should be limited
  - d. exits must have a self-opening door
  
3. At least \_\_\_\_ exit route(s) should be available in a workplace to permit prompt evacuation of employees and other building occupants during an emergency.
  - a. one
  - b. two
  - c. three
  - d. four
  
4. When may an exit door be locked from the inside?
  - a. when employees are thought to be stealing
  - b. to keep looters out of the building
  - c. when approved by ANSI standards and/or top management
  - d. When located in mental, penal, or correctional facilities
  
5. When must the door that connects a room to an exit route swing out?
  - a. the room is designed for 50 people or more
  - b. the room is high hazard area
  - c. the room contents may burn rapidly or explode
  - d. any of the above conditions

## MODULE 7: FPP TRAINING REQUIREMENTS

### What should employers do to protect workers from fire hazards?

Employers should train workers about fire hazards in the workplace and about what to do in a fire emergency.

Supervisors should train employees about the fire hazards associated with the specific materials and processes to which they are exposed, and maintain written documentation of the training.



### Which Plan do you follow?

If your policy is to require employees to immediately evacuate if a fire emergency occurs, follow the training program you have developed in your emergency action plan.

If you require employees to respond to workplace fires or uncontrollable releases of hazardous substances, you will need to train them in accordance with 29 CFR 1910.120, Hazardous waste operations and emergency response (to be discussed in a future course).

### Management training responsibilities

- Unless a specific manager is designated, all managers should be responsible for coordinating with the Plan Administrator for training all employees covered under the FPP.
- All managers should be educated to understand their FPP responsibilities including inspection and drill procedures.
- Managers should also make sure all employees who might be expected to use portable fire extinguishers are properly trained.

### What are the important training topics?

Many of the topics taught in the FPP training may be presented in the classroom. As mentioned before, if employees are expected to use the portable fire extinguishers, they must participate in "hands-on" that allows them to understand and demonstrate the skills require for proper use of the extinguishers.

At a minimum, FPP Training should include all of the following topics:

- Review OSHA requirements contained in 29 CFR 1910.38, Emergency Action Plans
- Review OSHA requirements contained in 29 CFR 1910.39, Fire Prevention Plans
- Person(s) responsible for Control of Fuel Source Hazards
- The location of the company FPP and how it can be accessed.
- Good fire-prevention housekeeping practices and equipment maintenance.
- Alarm systems and evacuation routes.
- Proper response and notification in the event of a fire.

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- The use of portable fire extinguishers.
- Recognition of potential fire hazards.

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### MODULE 7 QUIZ

1. According to the text, supervisors should train employees about the fire hazards associated with the \_\_\_\_\_ materials and processes to which they are exposed.
  - a. general
  - b. actual
  - c. specific
  - d. potential
  
2. From which plan would you train if all employees are required to immediately evacuate if a fire occurs?
  - a. Fire Prevention Plan
  - b. HAZCOM Plan
  - c. HAZWOPER Plan
  - d. Emergency Action Plan
  
3. From which plan would you train if some employees are required to respond to a workplace fire or uncontrollable release of hazardous substances?
  - a. Fire Prevention Plan
  - b. HAZCOM Plan
  - c. HAZWOPER Plan
  - d. Emergency Action Plan
  
4. If employees are expected to use portable fire extinguishers, they must participate in "hands-on" training that includes practice.
  - a. true
  - b. false
  
5. Which of the following should be included in FPP training?
  - a. fire prevention housekeeping
  - b. alarm systems and evacuation routes
  - c. use of portable fire extinguishers
  - d. all of the above

## MODULE 8: FPP EVALUATION

### The most common fire prevention plan violations

When evaluating any safety plan, it's makes good sense to check those program components that OSHA cites most often. We're lucky to have that information for the course, so let's take a look.

The following are some of the most common fire code and OSHA program violations found during inspections. Please be sure to walk through your facility and correct any conditions that fail to meet these requirements.



### Housekeeping

- Combustible material should not be stored in boiler rooms, mechanical rooms or electrical equipment rooms.
- Combustible materials should not be stored in exits or exit enclosures.
- Outside dumpsters should be kept at least 5 feet away from combustible walls, windows, doors, overhangs and lid should be closed.
- Combustible storage should be at least 2 feet below the ceiling or 18 inches below sprinkler heads.
- Compressed gas containers, cylinders and tanks should be secured to prevent falling.
- Storage is not allowed near electrical panels or in electrical equipment rooms.

### Exits

- Exit ways and doors should not be visually or physically obstructed.
- Exit ways and doors should be unlocked when building is occupied.
- Emergency lighting systems should be functional.
- Fire assemblies should not be obstructed or otherwise impaired from their proper operation at any time.
- Main door should have a sign above door stating "THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED."
- Exit door should not be blocked
- Exit signs should be illuminated as required.
- Items should not be stored in hallways.

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### Fire Protection

- All fire lanes, hydrants, fire department connections (F.D.C.) or control valves should be clear and unobstructed.
- Sprinkler or fire alarm systems should be serviced annually.
- Fire protection systems should be maintained in an operative condition at all times and repaired where defective.
- Fire hydrants and hose connections should not be blocked by items (i.e., idle pallets, etc.)
- Vehicles should not be parked in a marked fire lane.
- Make sure fire department connections are not missing protective caps.
- Make sure trash and debris are not lodged into piping and other locations.

### Commercial Cooking Processes

- A Class K fire extinguisher should be mounted within 30 feet of commercial food equipment using vegetable or animal oils.
- Commercial cooking systems should be serviced semi-annually.
- Hoods, grease removal devices, fans, ducts and other appurtenances should be cleaned to bare metal.
- Cleaning should be recorded, and records should state the extent, time and date of cleaning.
- Records should be maintained on premises.

### Building Maintenance

- The building address should be clearly visible from the street, minimum 4 inches in height with a contrasting background.
- Provide Knox box and keys for the box.
- Fire-resistance-rated construction should be maintained.
- Provide legible & permanent sign with occupant load posted in conspicuous location.
- Emergency lighting must be tested every six months and records must be maintained on site.

### Electrical

- A working space of not less than 30 inches wide (or width of equipment), 36 inches deep and 78 inches high should be provided in front of electrical service equipment. There should be no storage within this designated work space.
- Relocatable power strips should be polarized or grounded equipped with over-current protection and should be listed.
- Relocatable power strips should be directly connected to a permanently installed receptacle.
- Relocatable power strip cords and extension cords should not extend through walls, ceilings, floors, under doors or floor coverings, or be subject to environmental or physical damage.
- Extension cords and flexible cords should not be a substitute for permanent wiring.
- Electrical panels must not be obstructed.
- Electrical panel openings must be covered.

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- Breakers that continue to trip should not be tied off.
- Power strips must be plugged directly into an outlet and NOT daisy-chained.

### Portable Fire Extinguishers

- A minimum of one 2A-10:BC portable fire extinguisher should be provided within 75 feet of travel distance from anywhere in the business on each floor.
- Fire extinguishers should be inspected at least monthly.
- Fire extinguishers should not be obstructed and should be in a conspicuous location.
- When visually obstructed, an approved means should be provided to indicate location of fire extinguishers.
- Fire extinguisher should be mounted on the wall with a hanger.

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### MODULE 8 QUIZ

1. Which of the following is allowed?
  - a. combustible items stored in exits
  - b. unsecured storage of compressed gas cylinders
  - c. dumpsters at least 5 feet from walls
  - d. storage near electrical panels
  
2. Main door should have a sign above door stating "THIS DOOR TO REMAIN LOCKED WHEN BUILDING IS OCCUPIED."
  - a. true
  - b. false
  
3. Sprinkler or fire alarm systems should be serviced \_\_\_\_\_.
  - a. monthly
  - b. quarterly
  - c. annually
  - d. as needed
  
4. Extension cords and flexible cords may be a substitute for permanent wiring.
  - a. true
  - b. false
  
5. Which of the following need NOT be checked as part of the FPP evaluation?
  - a. use of hangers to place extinguishers on walls
  - b. extinguishers are conspicuous (easy to see)
  - c. annual checks of fire extinguishers are conducted
  - d. appropriate extinguishers are placed within 75 feet of travel

**Congratulations! You've completed the course. Time for the Final Exam!**