



Introduction to Safety – Unit Four: Fire Safety and Emergency Response
Chapter Reading

Unit 4 – Fire Safety and Emergency Response





Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

LEARNING OBJECTIVES:

- **Identify evacuation plans, exit routes and hazards that hinder evacuation, requirements that must be followed through the exit pathways, and the types of evacuation areas.**
- **Explain the difference between flammable and combustible materials and fires, and identify their flashpoint temperatures and conditions.**
- **Examine training requirements and applicable standards relating to exits, fire extinguishers, and storage and handling of flammable and combustible materials.**
- **List the recommended fire response procedures in their proper order.**
- **Describe the proper fire extinguishing agents to use on different classes of fires, identify how they are labeled and who should use them, and following the acronym PASS to help remember their proper use.**
- **Discuss the four classes of fires, their prevention (including a plan), and associated hazards.**
- **Identify the requirements, elements of the applicable standards, and the written plan for emergency response.**
- **Describe chemical hazards, exposure, burns, hazard identification, their importance to emergency response teams, and how the procedures that should be followed if a spill occurs.**
- **Explain the recommended first aid steps when an individual is exposed to a hazard.**
- **Describe and interpret the various types of information that are printed on MSDS and NFPA.**

ALLOTTED LEARNING TIME:

7 days



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Orientation

The probability of fires occurring in many types of workplaces is high. For example, many products that are manufactured require a variety of chemicals that are flammable. Also, many types of the production machines operate under high pressures and at elevated temperatures. Therefore, the probability of fires starting is high due to these conditions. If you work in this type of environment, your role in fire safety is vital, whether it is preventing a fire, reporting an incident, responding to the incident, or evacuating the area. What you do can either save lives and property, or make things worse.

Companies who have fire hazards are required to provide fire safety training for their employees. This training, and your compliance with the fire safety procedures established by your employer, will ensure that you fulfill your fire safety role. Fire safety involves a pro-active fire prevention plan, and if a fire does occur, the [Occupational Safety and Health Administration \(OSHA\)](#) requires that employers have a [written Emergency Response Plan](#). The plan demonstrates the employer's commitment to helping employees work safely in the workplace. The [plan must contain](#) information such as:

- [evacuation procedures](#),
- [alarm systems](#), and
- [fire response procedures](#)

1. Introduction

Each year in the United States, 70,000-80,000 workplaces experience a serious fire. Annually, about 200 employees die in these fires and another 5,000 are injured. Moreover, property losses from workplace fires exceed \$2 billion on a yearly basis. Fires wreak havoc in many ways, such as effecting workers and their families if an individual is killed or injured, by destroying thousands of businesses each year, or putting people out of work and severely impacting their livelihoods. [Knowing what to look for, how to prevent fires, and what to do if a fire occurs is essential to the safety](#) of your company, your co-workers, and your life.

No one expects an emergency fire situation to happen. However, if there is a small possibility of an emergency occurring where you work, you should be prepared. [Knowing what to do](#) in the event of an emergency [could save your life, as well as](#) the lives of your [co-workers](#).



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

2. References

There are two government agencies who are involved with fire safety training, establishing fire codes in the workplace, and in some situations enforcing compliance standards. They **include**:

- **OSHA** – The Agency addresses fire safety with specific standards for different industries, including the general industry, shipyard employment, marine terminals, gear certification, longshoremen, and the construction industry. This module will focus on general industry.
- **National Fire Safety Protection Association (NFPA)** - NFPA is the authority on fire, electrical, and building safety. As a leader in fire safety, they establish codes, provide publications, training and other resources on the subject.
- Additional information regarding safety regulations and practices will be provided as it applies to:
 - Material Safety Data Sheets (MSDS)

3. Emergency Action Plan

Different types of hazardous conditions can potentially arise in the workplace, such as fires igniting, chemical spills occurring, and other situations that can cause damage or harm the workers. Therefore, it is important to have an emergency action plan in place to minimize their effects.

A company's emergency response plan should address all potential workplace emergencies. In this unit, elements of an emergency action plan, fire prevention plan, training, emergency response teams, as well as other information vital to your safety in the workplace, will be addressed.

- A. Emergency Action Plan** – The company's emergency action plan must be kept in the workplace and accessible to all employees. The plan must be periodically updated and, at a minimum, **must include the following elements**:



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Emergency Action Plan

- Emergency escape/evacuation procedures
- Pre-evacuation procedures for critical operations
- Post-evacuation employee procedures
- Rescue/medical duties
- Fire/emergency reporting procedures
- Contacts for further plan information

2-4-12

B. Emergency Action Requirements – Both the emergency action and also fire prevention plans must:

- remain available for employees to review;
- ensure emergency training for all employees which includes:
 - details of the emergency action plan,
 - types of reasonably expected emergencies,
 - effective evacuation procedures,
 - equipment shutdown procedures, and
 - emergency drills,
- require that the employer reviews the plan with new employees, and with all employees whenever the plan is changed,
- to include preferred means of alerting employees to a fire emergency,
- make the evacuation signal known to employees,



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

- to provide for an employee alarm system throughout the workplace,
- require a **fire alarm system** that includes voice communication or sound signals such as bells, whistles, or horns;
- describe the **evacuation routes** for employees to use and procedures to follow,
- to include **procedures for evacuating disabled employees**,
- **to have a procedure which accounts for all employees to ensure they are all evacuated**,
- to address an evacuation plan for employees who stay behind to shut down critical plant equipment,
- to provide emergency response coordinator contact information; and
- identify and assign emergency response team members and their duties; all team members should be trained in:
 - first aid and CPR,
 - equipment shutdown procedures,
 - **fire extinguisher use**,
 - evacuation procedures,
 - **chemical spill control procedures**,
 - self-contained breathing apparatus (SCBA) use, and
 - **emergency search and rescue procedures**.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Review Questions

1. The NFPR is responsible for fire safety and OSHA is responsible for addressing chemical spills.
2. An emergency response plan includes a fire prevention plan.
True or False
3. An account for all employers who were evacuated during a fire is part of the _____.
A. Emergency Action Plan
B. Fire Prevention Plan
C. General Fire Prevention Plan
D. Both A and C
4. In the emergency action plan commonly practiced in industry, some employees are assigned to stay behind during an emergency situation to shut down critical plant equipment.
True or False
5. The company's emergency action plan _____.
A. must be kept in OSHA's possession
B. must be accessible only to management
C. lists escape/evacuation procedures
D. is not showed more frequently than on an annual basis



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

4. Fire Prevention

The best way in which to deal with fires is to prevent them from starting. There are a variety of measures that can be exercised to either prevent them, or to minimize the harm they can cause. These measures include:

- A. **Fire Prevention Plan** – Since fire emergencies can have such a vast impact on manufacturing operations, a fire prevention plan is an essential tool a company must have. **This plan must contain information such as:**

Fire Prevention Plan

- List of major fire hazards and handling, storage, and control procedures
- Names of persons responsible for maintaining equipment and systems to prevent or control ignitions or fires
- Name of persons responsible for controlling fuel source hazards
- List of required training for all employees who have responsibilities in the plan
- Evacuation procedures, including escape procedures and escape route assignments
- Alarm systems
- Fire hazards and prevention

2-4-13¹¹

Fire Prevention Plan (Cont'd.)

- Fire response procedures
- Fire protection equipment
- Critical plant operations shutdown procedure
- Procedure to account for all personnel
- Assignment of rescue and medical duties
- Means for reporting emergencies
- Identification of responsible persons to contact for further information

2-4-14¹¹



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

B. Housekeeping Practices - Housekeeping plays a critical role in fire prevention.

Keeping your workplace clean and organized not only prevents the ignition and spread of a fire, it also helps keep exits clear and fire response equipment available. To reduce fire hazards in the workplace, practice the following housekeeping tips:

- Keep combustible dusts under control, particularly around motors and hot machinery.
- Rags contaminated with oils or solvents must be disposed of in appropriate metal containers.
- Keep the area free of combustible materials such as cardboard, paper, and wood.
- Keep exits clear.
- Keep access to emergency response equipment clear.



Question: What is your facility's most serious housekeeping concern?

Answers will vary, but may include:

- Combustible dusts such as sawdust, metal grindings, lint, or grain dust.
- Accumulation of cardboard boxes or wooden crates.
- Oily or solvent-soaked rags not disposed of properly.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

C. Proper Storage of Flammable and Combustible Liquids - Flammable and combustible materials are so common in businesses and households that many people fail to recognize the potential dangers associated with them. Nonetheless, it is important to take precautions when using, storing, and handling these materials. Accumulations of flammable and combustible waste materials and residues must be controlled so they do not contribute to a fire emergency.

The difference between the terms *flammable* and *combustible* is a matter of heat and ignition. *Flammable* materials catch fire with an ignition source. *Combustible* materials catch fire but only after being heated sufficiently. Flammable and combustible liquids can be easily ignited by any number of potential sources of ignition. Vapors can also be potentially dangerous and sometimes cause the most damage and harm. When flammable vapors are ignited under certain conditions, the ignition can be an explosive force. To avoid vapors from accumulating to a dangerous level, ventilation fans should be used whenever possible.

Flammable and Combustible Liquids

- Common materials people often use carelessly
- Ignite with explosive force
- Burn readily and give off twice the heat as an ordinary material fire



2-4-22

Fires in which flammable or combustible liquids are involved can be difficult to put out and therefore be very dangerous. The temperature of these fires rise quickly. Once ignited, flammable and combustible liquids burn readily and give off



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

twice as much heat as a fire burning ordinary combustibile material such as paper, cardboard, or wood. Billowing clouds of thick black and acrid smoke are often produced. Flammable liquid fires also spread rapidly when spilled material flows dozens or even hundreds of feet away.

Flammable and combustibile materials should be kept separated in all situations.

D. Recognizing Flammable and Combustibile Liquids, Flashpoints, and Ignition Sources – It is important that you learn to recognize some of the more common flammable and combustibile liquids so you can minimize the risk of them being ignited when storing, dispensing, or using these materials in the workplace. For the same reason, it is also important to know the flashpoints of certain materials, and potential sources that can ignite flammable materials.

Common Flammable and Combustibile Liquids

<ul style="list-style-type: none">• Flammable liquids– Isopropyl alcohol– Propane– Acetone, MEK, paint thinner– Gasoline, kerosene– Aerosol cans	<ul style="list-style-type: none">• Combustibile liquids– Oil– Greases and lubricants– Oil-based paints
---	--



2-4-23

Question: Why should we be concerned about flammable and combustibile liquids?

Answer: These materials ignite with explosive force and burn readily while giving off twice the heat of ordinary fires.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Flashpoint – The flashpoint of a liquid is the lowest temperature at which the liquid will give off enough vapors, in high enough concentration, that the vapors can be ignited. A low flashpoint indicates a more flammable substance. For example, a solvent may have a flashpoint of 50°F (ex. Toluene @ 39°F), meaning that the vapors could easily ignite and burn at room temperature. Oil, with a flashpoint of 300°F, would have to be heated before it would give off enough ignitable vapors.

Low Flashpoint = High Flammability

- (1) **Flammable liquids** – defined as having a flashpoint less than 100°F. This means that many flammable liquids give off enough vapors to be ignited at room temperature. These materials have the potential to become even more dangerous in hot weather conditions when they can give off a lot of flammable vapors.
- (2) **Combustible liquids** – defined as having a flashpoint greater than or equal to 100°F. Although they often do not give off enough vapors to be ignited under normal conditions, they are still dangerous and will burn easily and readily when ignited.

Flashpoint

- Lowest temperature at which a liquid gives off enough vapors to be ignited
- Low Flashpoint = High Flammability
- Flammable liquids have a flashpoint less than 100° F
- Combustible liquids have a flashpoint greater than or equal to 100° F

2-4-24



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Sources of Ignition - Many potential sources for igniting flammable and combustible liquids exist because any open flame, spark, or even hot surface can potentially ignite them.

- (1) **Lit Cigarettes** – Even in outside areas, smoking is not permitted within 25 feet of gasoline pumps or other areas where flammable liquids are stored or dispensed.
- (2) **Welding and Cutting Operations** – Sparks from welding and cutting operations have often been the source of fires. Therefore, these activities should never be conducted near flammable or combustible liquids. Most companies require that the technician complete a *Hot Work Permit* before welding can be performed. This permit requires the welder to clear all flammable and combustible materials within a 30-foot area around the welding location. If the area cannot be cleared, fire watches and other precautions are required.
- (3) **Static Electricity** – Static electricity is an excellent ignition source, which is why special precautions must be taken when dispensing flammable liquids. When dispensing flammable chemicals, follow the procedures outlined in the chemical storage area and dispensing areas. Ensure that the containers are properly grounded and bonded to safely discharge static electricity.
- (4) **Sparks** – Machinery or combustion engines may give off sparks that could ignite a flammable or combustible liquid. Flammable and combustible liquids and gases must not be stored near heat sources such as hot machinery. Also, never weld or torch-cut a drum that once contained a flammable liquid. Chemical vapors remaining in the drum could ignite and cause an explosion.
- (5) **Hot Equipment** – Equipment, such as an overheated motor or an industrial oven or dryer, can ignite a flammable or combustible liquid stored or dispensed too close to the equipment.
- (6) **Electrical Equipment** – Equipment, such as electric panels, conduits, extension cords or outlets can short circuit and ignite a nearby flammable liquid.





Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading



Questions: Consider the following scenario:

A driver has a portable gas tank (either plastic or metal) in the bed of his truck. While the driver was traveling to the gas station, the tank was free to move around in the truck bed. Because of this, the tank built up a static charge. When the driver stopped to put gas in the portable tank, he left the tank sitting in the truck bed instead of placing the container on the ground.

Answer: Since the driver did not remove the portable tank from the truck and place it on the ground, it was not “grounded.” Therefore, it is possible that when the gas nozzle touched the container the static discharged from the container and into the nozzle, which then ignited the gasoline fumes.

Question: Why do gasoline stations have “No Smoking” signs near the fuel pumps?

Answer: Because gasoline and its vapors are highly flammable. For that same reason, “No Smoking” signs are also placed near other flammable liquids and gases.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Review Questions

6. Fine dust can be ignited when in contact with an electrical motor.
True or False

7. Keeping the workplace clean _____.
 - A. prevents the ignition of a fire
 - B. prevents the spread of a fire
 - C. keep exits clean
 - D. keeps fire response equipment accessible
 - E. All of the above

8. _____ liquids catch fire only after being heated sufficiently.
 - A. Flammable
 - B. Combustible

9. Flammable and combustible liquids become hotter than solid materials.
True or Fales

10. Which of the following liquids is combustible?
 - A. Paint thinner
 - B. Gasoline
 - C. Oil
 - D. All of the above

11. The flashpoint of a liquid is the lowest temperature _____.
 - A. at which it gives off enough vapors to ignite
 - B. it will begin burning
 - C. Both A and B
 - D. Neither A or B

12. _____ liquids are defined as having flashpoints less than 100°F.
 - A. Flammable
 - B. Combustible
 - C. Both A and B



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

5. Fire Response

The ability to respond properly to a fire situation requires the proper equipment and the establishment of general procedures that should be followed by all employees. In the workplace, fire safety is everyone's responsibility. Employers should address, in a fire safety plan, workplace fire hazards and provide information about what to do in a fire emergency. The fire safety plan should outline the assignments of key personnel in the event of a fire and provide procedures for training on evacuation, use of firefighting equipment, and equipment safety.

If a fire or another type of hazard does occur in the workplace, the ability to respond effectively to emergencies depends on appropriate planning and training. Many dangers exist no matter what size of fire you may face. Typical fire hazards are:



If the emergency is an actual fire, the following sequential steps should be followed:

1. Rescue any person who is in immediate danger.
2. Send someone to activate an audio alarm to alert co-workers that there is a fire and they should exit the premises.
3. Call the fire department.
4. If a fire extinguisher is accessible, the fire is small, and you are trained on its use and what type to use, attempt to put it out.
5. If there is a risk of injury, get out of the area as fast as possible.
6. Follow the proper evacuation route.

To properly follow each step in this emergency process, the individuals involved should have a certain degree of knowledge about them. The following information on some of



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

the emergency steps is important because knowing how to avoid certain situations to prevent potential problems that could cause the situation to escalate if the procedures were carried out improperly.

Alarms

When a fire is discovered, the production technician's first action is to notify others (unless someone who is in immediate life threatening danger) either by yelling, phoning, paging, or triggering an alarm. Yelling for help is probably the most natural and instinctive way to report a fire. In most companies, the fire suppression system is connected to security agencies that notify the fire department if the system experiences a flow or a drop in pressure. This way, if a sprinkler head discharges, the fire department will be notified.



Types of Extinguishing Agents used in Fire Extinguishers

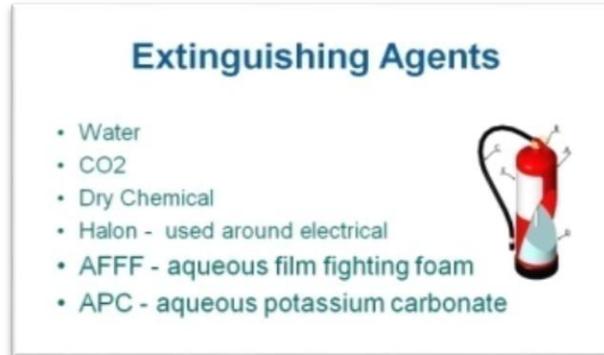
There are several types of fire extinguishers, each of which have a different extinguishing agent to suppress fires fueled by specific combustible and flammable sources. The choice of the proper fire extinguisher to use when fighting a fire is based on the type of fire you are attempting to control or extinguish. The National Fire Protection Association (NFPA) classifies five different types of fires, all of which are determined by the material on fire. The five classifications are A, B, C, D, and K. Fire extinguishers are labeled as to which type of fire they can control/extinguish. “Type” and “Class” are terms used interchangeably to identify fires and extinguishing agents. Fire extinguishers should be strategically located throughout the facility. Having a fire extinguisher is one thing, having it handy in case of an emergency is another.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

The following describes the types, or classes of fires, and the extinguishers that should be used to put them out:



(1) Class A Fires

(a) Characteristics

- Ordinary combustibles, such as **paper, wood**, etc.
- White smoke
- Leaves an ash

(b) Extinguishing technique

- Cool the material below its ignition temperature and soak the fibers to prevent re-ignition.
- Use pressurized **water, foam** or **multipurpose (ABC-rated)** dry chemical **extinguishers**.

(c) Cautions

- **DO NOT USE** carbon dioxide or ordinary (BC-rated) dry chemical extinguishers on Class A fires.

(2) Class B Fires

(a) Characteristics

- **Flammable liquids, greases, or gases**



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

- Black smoke

(b) Extinguishing Technique

- **Remove the oxygen**, which prevents the vapors from reaching the ignition source or inhibits the chemical chain reaction.
- **Foam, carbon dioxide, ordinary (BC-rated) dry chemical, multipurpose dry chemical, and halon extinguishers** may be used to **fight Class B fires**.

(c) Cautions

- **Do not use water** on **Class B fires**. The liquid will float on top of the water and spread the fire.

(3) Class C Fires

(a) Characteristics

- Energized **electrical equipment**
- White or black smoke

(b) Extinguishing Technique

- Use an extinguishing **agent** that is **not capable of conducting electrical currents**.
- **Carbon dioxide, ordinary (BC-rated) dry chemical, multipurpose dry chemical and halon fire extinguishers** may be used to **fight Class C**
- Use agent on new classification of fire (class A or B depending on what is still burning).

(c) Cautions

- **DO NOT USE water** extinguishers on energized **electrical** equipment. Water is a good conductor of electricity and if an individual is in contact with the water, the current from the electrical source to the person and cause a severe electrical shock.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading



(4) Class D Fires

(a) Characteristics

- **Burning metals**, such as burning vehicles or aircraft

(b) Extinguishing Technique

- **Jettison**. There is **no agent** to use on burning metals other than to cool the metal. On ships, the burning item would be ejected into the water to prevent the item from melting through the deck and sinking the ship.

(c) Cautions

- **Avoid** coming into **contact** with **burning metal**, as metal burns hotter than any other substance.

(5) Class K

(a) Characteristics



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

- Fires found in cooking appliances that involve combustible **cooking media (vegetable or animal oils and fats)**.
- (b) Extinguishing Technique
- **Remove the oxygen**, which prevents the vapors from reaching the ignition source or inhibits the chemical chain reaction. An example is putting a lid over a pan on a stove.
 - **APC, carbon dioxide, ordinary (BC-rated) dry chemical, multipurpose dry chemical, and halon extinguishers (if oil or fats are involved)**.
- (c) Cautions
- **Do not use water** on **oil** or **fat** fires.
 - These fires burn hot and can suck the oxygen out of the air.

Note: The class of extinguisher should be clearly marked on the extinguisher shell. The picture-symbol labeling system currently in use is designed to make the operation of fire extinguishers more effective and safe to use through the use of less confusing pictorial labels. The system also emphasizes when not to use an extinguisher on certain types of fires.

Fire Suppression			
Extinguishing Agent	Fire Classes	Properties	Special Consideration
Water	A	Cools	Not for Type B & C fires
CO2	ABCK	Displaces Oxygen	Hazard to Life & health
Dry Chemical	ABCDK	Breaks chemical chain reaction	Can be used for C but corrosive
Halon	C	Breaks Chemical Chain reaction	Easily displaced
AFFF	B K	Suppresses fumes	Displaces O2, cools, not for B C
APC	K	Suppresses fumes	Little to no cooling

2-4-37



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Question: How do you extinguish a class “B” fire?

Answer: Remove oxygen so vapors do not reach ignition source using foam, CO₂, dry chemical or halon fire extinguishers.

Question: What are the characteristics of a class “C” fire?

Answer: White or black smoke coming from energized electrical equipment.

Question: What cautions should you take in extinguishing a class “K” fire?

Answers: Do not use water; evacuate unnecessary personnel.

- Manual foam or water systems, such as hoses, may also be installed in your facility.
- Sprinkler systems, including wet, dry, and foam systems, may also be installed to extinguish fires.
- All fire-fighting equipment must be inspected on a regular basis.
- Only trained and authorized persons should use fire-fighting equipment.
- Retrieving a fire extinguisher, a fire hose, or other firefighting equipment is essential. Even if you are not trained to use the extinguisher or are not comfortable using the extinguisher, go get one. Bring it back to the scene so someone else or your supervisor can use the equipment. Then stand back from the scene or evacuate if instructed to do so by the scene supervisor or incident commander.
- When fighting a fire, the supervisor or incident commander will continually evaluate the situation to make sure it is still safe to fight the fire.

Fire Response

- General equipment requirements
 - Fire extinguishers strategically located
 - Manual foam or water systems
 - Sprinkler systems
 - Inspect firefighting equipment regularly
 - Trained and authorized employees use equipment



Fire Response (Cont'd.)

- Procedures
 - Activate alarm
 - Set-up equipment
 - Get a fire extinguisher
 - Evaluate the situation



2-4-34



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Review Question

13. When a fire is discovered, the production technician's first action is to _____.
A. attempt to put it out
B. notify others by sounding an alarm
C. evacuate the premises
D. remove the fuel source
E. help someone who is immediate danger
14. Which of the following is not a firefighting hazard?
A. Heat
B. Smoke or vapor inhalation
C. Suffocation
D. Explosions
E. None of the above
15. Which type of fire extinguishing agent cannot be use on a Class A fire?
A. water
B. foam
C. BC rated dry chemical
D. carbon dioxide
E. C and D
16. Water, the most convenient source to use for extinguishing Class C fire, is recommended.
True or False
17. The only way to stop a Class D fire is to cool down the metal. True or False
18. Using a class C extinguisher on a fire fueled by cooking oil will cause it to spread.
True or False
19. A class _____ fire pertains to wood or paper.
A. F
B. A
C. D
D. B
20. When _____ is used as the extinguishing agent, it puts out the fire by displacing oxygen.
A. a dry chemical
B. Halon
C. CO₂
D. water



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Emergency Egress

Every workplace must have enough exits suitably located to enable everyone to get out of the facility quickly during an emergency. Considerations include the type of structure, the number of persons exposed, the fire protection available, the type of industry involved, and the height and type of construction of the building or structure. In addition, exit doors must not be blocked or locked when employees are inside.

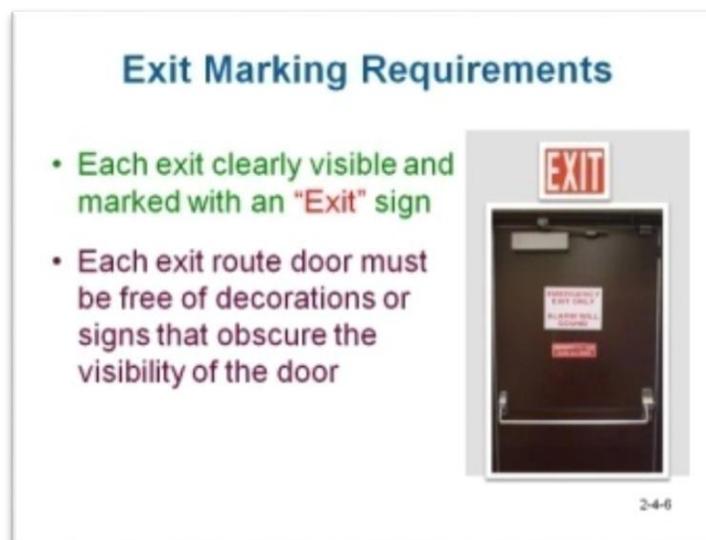
Note: The term *egress* refers to a “way out”.

Exit doors that have a delayed opening function are permitted when an approved alarm system is integrated into the door design. Exit routes from buildings must be free of obstructions and properly marked with exit signs.

(1) Terms associated with emergency egress include:

(a) Exit

- An *exit* is that part of an exit route that is generally separated from other areas to provide a protected way of travel to the exit discharge.
- *Exit access* is that part of an exit route that leads to an exit.
- Exits must be separated by fire-resistant materials.
- Exit markings must be clearly visible and marked with an illuminated “Exit” sign.

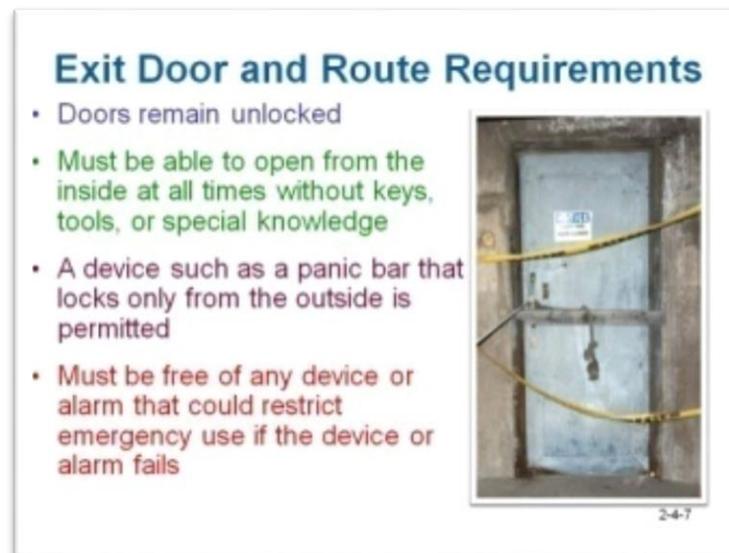




Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

- The opening to an exit must be protected by an approved self-closing fire door that remains closed or automatically closes in an emergency. This will help contain the fire.
- (b) Exit doors and route requirements
- Exit doors must:
 - remain unlocked and able to open from the inside at all times without keys, tools, or special knowledge,
 - incorporate a device such as a panic bar that locks only from the outside, and
 - be free of any device or alarm that could restrict emergency use if the device or alarm fails.



- Exit routes
 - An exit route is a continuous and unobstructed path of travel from any point within a workplace to a place of safety (including refuge areas) and includes all vertical and horizontal areas along the route.
 - Exit routes must be permanent and there must be enough exits in the proper arrangement for quick escape in case of fire.

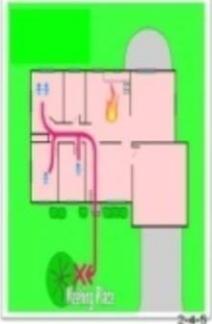


Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Exit Route

- A continuous and unobstructed path of exit travel that is permanent and has enough exits for quick escape.
- Consists of three parts:
 - Exit access
 - Exit
 - Exit discharge



- General requirements for exit routes:
 - Routes must support the maximum permitted occupant load for each floor served.
 - The capacity must not decrease in the direction of exit route travel to the exit discharge.
 - Ceilings must be at least 7 feet 6 inches high with no projection reaching a point less than 6 feet 8 inches from the floor.
 - Exit access must be at least 28 inches wide at all points.

Additionally, each exit route door must be free of obstructions, decorations, or signs that obscure the visibility of the door.

Evacuation Procedures – During an evacuation, every employee will have a specific role. If safe to do so, all employees will shut down their equipment before evacuating. Some employees may stay behind to shut down critical operations. All other employees should evacuate through the nearest safe exit and gather at the designated assembly area to wait for the official head count.

During emergencies, it is extremely important to keep fire exits clear. To ensure that panic and disorderly evacuation does not cause injury to personnel



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

and unnecessary damage to equipment and property, [practice evacuation drills should be conducted annually](#).

During the practice drill, employees will be instructed on what actions must be taken when the alarm sounds. The goal of this mock drill is to ensure that all employees clearly understand their specific roles. Some employees will be tasked with staying behind to shut down critical equipment that cannot be shut down with just an emergency stop. Those employees who will remain behind must be properly trained on shutting down the equipment, but more importantly, how they will eventually evacuate the facility.

After the drill is over, it is important to solicit feedback by asking employees if they heard the alarm, if the exits were clear, or if they noticed any other important details or problems that should be addressed.

Once the drills are evaluated, and the results are reviewed, evacuation plans can be modified and employees retrained as necessary.

Evacuation

- Shut down equipment
- Evacuate
- Headcount
- Keep fire exits clear
- Annual drills



2-4-19

Evacuation Preparedness – An emergency evacuation often results in confusion, injury, and property damage. Therefore, it is imperative that employees know the company's evacuation plan specific to each emergency or disaster (e.g., tornados, earthquakes, floods, fires, explosions, hurricanes, biological accidents, civil disturbances, and even workplace violence).



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Evacuation Preparedness

- Keep evacuation organized
- Know your evacuation plans
- Train for and practice evacuation procedures
- ERT training conducted within 30 days for new hires and then annually



2-4-20

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 that is large enough to accommodate all building occupants likely to use the exit route. Exit stairs that continue beyond the level on which the exit discharge is located must be interrupted on that level by doors, partitions, or other effective means that clearly indicate the direction of travel to the exit discharge

Exit Discharge



- Must lead directly outside or to a street, refuge area, public way, or open space with access to the outside that is large enough to accommodate all building occupants likely to use the exit route
- Exit stairs that continue beyond the level on which the exit discharge is located must be interrupted on that level by doors, partitions, or other effective means that clearly indicate the direction of travel to the exit discharge

2-4-8



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Refuge Area – A refuge area is a space along an exit route protected from fire by a barrier with at least a one-hour fire resistance rating. The refuge area may also be a floor with at least two spaces, separated from each other by smoke-resistant partitions, in a building protected by an approved automatic sprinkler system.

Refuge Area

- A space along an exit route protected from fire
- May be a floor with at least two spaces separated by smoke resistance partitions

2-4-10

Safe Escape Factors – Factors to consider that may interfere with safe escape and may cause more injuries and fatalities than the hazard itself include:

Safe Escape Factors

- Considerations
 - Panic and confusion
 - Poor visibility
 - Lack of information or misinformation

DON'T PANIC

2-4-11



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Question: What are some important things to do during an emergency evacuation/evacuation drill?

Answer:

- Keep fire exits clear.
- Shut down and secure critical equipment.
- Evacuate to designated assembly areas and wait for the head count.
- Evaluate practice drills.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Review Questions

21. The term *egress* refers to an emergency door that automatically closes to contain a fire.
True or False
22. A refuge area must be protected by a barrier with at least a ____ fire resistance rating.
- A. 15 minutes
 - B. 30 minutes
 - C. 1 hour
 - D. 2 hour
23. The exit access must be at least ____ inches wide.
- A. 20
 - B. 28
 - C. 36
 - D. 42
24. A function that does not interfere with a safe escape during a fire is _____.
- A. panic
 - B. poor visibility
 - C. lack of information
 - D. None of the above
25. How often should practice fire drills be conducted?
- A. Once each month
 - B. Every 90 days
 - C. 4 time each year
 - D. Annually
26. Emergency response training (ERT) should be conducted _____ for new hires.
- A. on the first day
 - B. during the first week
 - C. within 30 days
 - D. sometime during the first year



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

The remainder of the coverage in this unit has information that addresses codes, guidelines, regulations and signage that can contribute to minimizing the effects of fires and similar hazardous conditions.

6. Chemical Spills

Another type of emergency situation in the workplace that requires an action plan is when there is a chemical spill. If a **chemical spill occurs**, do not attempt to clean it unless you are part of an emergency response team. Instead, use the following guidelines:

- (1) **Immediately evacuate** the area and help others get out.
- (2) **Notify a supervisor or the emergency response team.**
- (3) **Remove ignition sources**, if safe to do so.

NOTE: Emergency response training should be conducted within 30 days of initial employment and then annually to ensure that employees know how to spot a spill or leak, how to report it, and how to evacuate the area. During the training, employees will normally discuss what types of spills or leaks might occur at the company. Could a drum be punctured by a forklift? Could a tank or pipe rupture? What kind of chemicals could be leaked in volumes that would require evacuation? Employees will also discuss the company's specific emergency response plan and the procedures that they must understand to spot a spill, report a spill, and evacuate. Spills of hazardous materials should be immediately reported to a supervisor.

Chemical Spills

- Evacuate the area
- Notify a supervisor or the emergency response team
- Remove ignition sources (if safe to do so)





Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

7. Material Safety Data Sheets (MSDS) and National Fire Protection Association (NFPA) Labels

Printed materials on documents or labels provide various types of guidelines and other information that should be observed to avoid conditions that will cause a fire from occurring. This information is commonly listed on MSDS documents and labels, and from the NFPA.

A. **Material Safety Data Sheets (MSDS)** – An MSDS contains the following information pertaining to flammable or combustible liquids:

- (1) Smoking restrictions
- (2) Proper storage and handling
- (3) Proper dispensing
- (4) Spill or leak response procedures

The MSDS also contains fire and explosion data, including:

- (1) flammable limits,
- (2) reactivity hazards, and
- (3) fire-fighting procedures.

MSDS



- Smoking restrictions
- Proper storage
- Proper dispensing
- Fire and explosion data
- Spill/leak response

MATERIAL SAFETY DATA

SECTION 4 - FIRST AID

SECTION 5 - FIRE FIGHTING MEA

SECTION 6 - ACCIDENTAL RELEASE I

SECTION 7 - HANDLING AND STI

Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

- B. National Fire Protection Association (NFPA) Labels** – NFPA labels provide information similar to that found on the MSDS, but often not as detailed. However, NFPA labels are a useful tool to determine a materials' fire hazard. The red portion of the label (see Figure 4-1) displays the product's fire hazard flashpoint.

4 = Below 73° F
3 = Below 100° F
2 = Below 200° F
1 = Above 200° F
0 = Will not burn

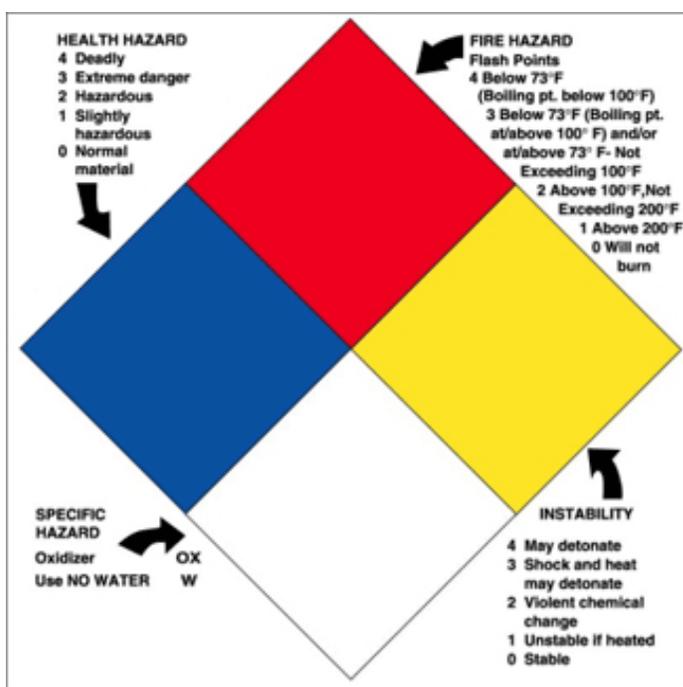


Figure 4-1: NFPA Label

8. Storing Flammable and Combustible Liquids

OSHA requires that “No Smoking” signs be placed in areas where flammable and combustible liquids are stored. Storage requirements for these liquids are often dictated by local building codes and fire department rules, however, the basic requirements are typically the same.

- A. Indoor Storage** – Specific indoor storage requirements include the following:



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

- Flammable/combustible liquids must be stored in a designated fire-resistant building, room, or cabinet.
- All storage areas must be marked with warning signs.
- The storage room must be well ventilated.
- Explosion-proof electrical equipment must be used in the immediate area to prevent an electrical short circuit from igniting the vapors that might accumulate in the room.
- Special covers must be installed over light fixtures to prevent ignition by hot glass or filament if a bulb bursts.

Storage Room Requirements

- Warning signs
- Ventilated room
- Explosion-proof electrical equipment
- Covers over light fixtures



2-4-29

B. Indoor/Outdoor Storage – Requirements that apply to indoor and outdoor storage of flammable and combustible liquids include the following:

- Containers with flammable liquids must be bonded and grounded to prevent the buildup of static electricity when dispensing the liquids.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

- Substances must be kept in a secondary containment area to prevent a spill from entering a nearby drain or escaping to the environment and, in the event of a spill, to facilitate cleanup.
- Storage areas must be kept free of other materials such as wood chips, leaves, rags, pallets, paper, etc.
- Containers should only be stacked as outlined by OSHA. Improperly stacked containers can tip over, causing injury to workers, an explosion, or a hazardous liquid spill.
- Flammable/combustible liquids must not be stored with incompatible materials such as oxidizers.
- Storage areas should be kept cool and out of direct sunlight to prevent high temperatures from increasing the amount of vapor that could escape or even warming the container to temperatures that could ignite the vapors.
- Flammable/combustible liquids must not be dispensed or stored near electrical panels, furnaces, etc.



9. Safe Handling of Flammable Liquids

The main concern when dispensing flammable liquids is static electricity, which can build up between the main storage container and the smaller container you are dispensing the liquid into. Eventually, the static will build up to a point where it sparks and ignites the flammable liquid. The result is usually an explosion.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading



A. Safe Handling Rules – The following rules should be followed when dispensing flammable liquids:

- Use spark-proof tools, such as drum wrenches, when working on/around open metal containers.
- Use shovels made of a non-sparking bronze alloy or plastic to clean sludge from a tank.
- Store small supplies of flammable liquids in approved, fire-resistant safety containers that have self-closing lids.
- Keep the container closed except when adding or removing chemicals. This prevents flammable vapors from escaping and building up to ignitable levels.
- Label all containers with information such as the name and hazards of the chemical.
- Take only the minimum amount needed for the job. If an incident such as a spill or fire does occur, it will be minimal.
- Practice good housekeeping by disposing of soaked rags in approved, closed containers. Just like the liquid, rags must be kept in closed containers to prevent ignition.
- Never weld or torch cut a drum that once contained a flammable liquid. Chemical vapors remaining in the drum could ignite and cause an explosion.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Review Questions

27. If a chemical spill occurs, a production technician should not _____.
A. attempt to clean it
B. evacuate the area
C. notify the supervisor
D. remove ignition sources
28. What types of information is provided on an MSDS document about flammable and combustible liquids?
A. Smoking restrictions
B. Proper storage and handling
C. Proper dispensing
D. Spill or leak response procedures
E. All of the above
29. An NFPA label displays a product's flashpoint. True or False
30. The color _____ pm am NFPA label indicates a material is a health hazard.
A. Red
B. Blue
C. White
D. Yellow
31. An odorant added to natural gas called _____ makes it smell like rotting cabbage.
A. sulfur
B. thiophane
C. T-butyl mercatan
D. carbon
32. To avoid ignition from static electricity, storage containers with flammable liquids must be _____.
A. enclosed by a tank
B. submerged in water
C. bonded and grounded
D. any of the above
33. When finished with oily soaked rags, they should be _____.
A. set on fire
B. put in a container filled with water
C. put in a specialty designed fire-resistant container with a self-closing lid
D. any of the above



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

10. Safety Rules for Compresses and Liquified Gasses

To avoid fires from the ignition of compresses gasses, the following guidelines should be observed:

- Never roll or drag cylinders that store the gasses.
- Store the cylinders upright and secure them to walls or bench tops during storage or use.
- Compressed gasses should be stored in a cool, dry and well ventilated area.
- Keep away from flammable materials and there should be no smoking in the vicinity.
- Separate fuel and oxidizing gas cylinders by at least 20 feet or a fire wall, and keep away oil, grease or liquid flammables.
- Make sure the fittings and connections to the tanks are secure.

11. Fire Suppression Equipment

Fire extinguishers are vital to preventing serious damage to property and harm to humans. When a fire first starts, using a fire extinguisher located nearby can suppress it while it is still small, and therefore prevent the flames from spreading. There are many types of extinguishing systems, both portable and fixed.



- A. Portable Fire Extinguishers** – Employers do not have to provide portable fire extinguishers; however, if they do, they must establish an educational program to familiarize the workers with the general principles of fire extinguisher use. If



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

they expect their workers to use portable fire extinguishers, employers must provide hands-on training in using this equipment.

B. Fixed Fire Extinguishing Systems – Fixed extinguishing systems used throughout the workplace are among the most reliable firefighting tools. These systems detect fires, sound an alarm, and send water to the fire. To meet OSHA standards, employers who have these systems must:

- substitute (temporarily) a fire watch of trained employees to respond to fire emergencies when a fire suppression system is out of service,
- ensure that the watch is included in the fire prevention plan and the emergency action plan, and
- post signs for systems that use agents such as carbon dioxide, halon, and others that pose serious health hazards.

C. Maintaining Portable Fire Extinguishers – Portable fire extinguishers require routine care. Specific inspection and maintenance instructions are included in the operator's manual. In general, however, the following are guidelines for maintaining these extinguishers:

- Ensure that the extinguisher is fully charged and in operable condition.
- Keep extinguishers in their designated places at all times except during use.
- Conduct annual maintenance checks.
- Record the annual maintenance date and retain this record for one year after the last entry or upon retiring the extinguisher due to reaching the life of the shell (outer casing), whichever is less.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Maintaining Portable Fire Extinguishers

- Fully charged and operable condition
- Keep in designated places at all times except during use
- Conduct annual maintenance checks
- Record the annual maintenance date and retain this record for one year

2-4-39

D. Portable Fire Extinguishing Training and Education – Where portable fire extinguishers have been provided for employee use in the workplace, employees must be provided with an educational program on the general principles of fire extinguisher use and the hazards of incipient (beginning) stage firefighting.

Portable Fire Extinguisher Training and Education

- Employees must be provided with an educational program on:
 - General principles of fire extinguisher use
 - Hazards of incipient (beginning) stage fire-fighting
- Employees designated to use extinguishers must receive instruction and hands-on practice in the operation of equipment



2-4-40

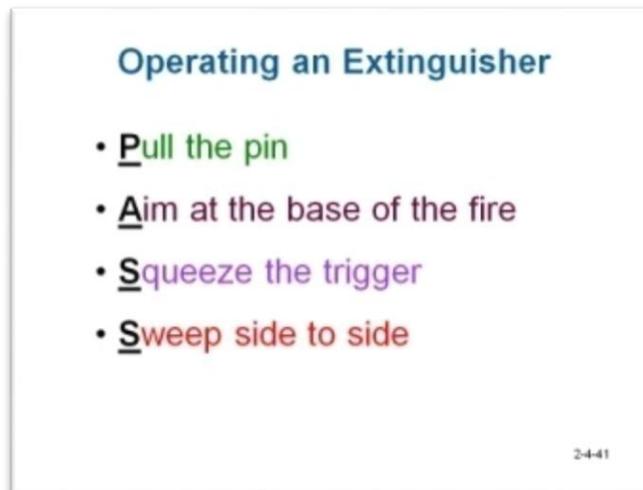
Employees designated to use extinguishers must receive instruction and hands-on practice in the operation of equipment.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

- a. **Using a Fire Extinguisher** – The following four steps can easily be remembered by using the acronym **PASS**. Most extinguishers empty in 8 to 10 seconds, so it is important to act fast and aim carefully.
- **P**...Pull the pin.
 - **A**...Aim the extinguisher nozzle at the base of the flames.
 - **S**...Squeeze the trigger while holding the extinguisher upright.
 - **S**...Sweep the extinguisher from side to side.



12. First Aid Procedures

If you are exposed to flammable or combustible materials, consult the container label or MSDS for the exact first-aid steps. The following includes some of the most common ways to become exposed and the first aid procedures to use:

- Inhalation** – Get fresh air until the symptoms go away.
- Eye Contact** – Flush eyes in a designated eyewash station for 15-40 minutes. Consider consulting a doctor for follow-up care.
- Skin Contact** – Wash area with soap and water. Use cool water for minor skin burns.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

First Aid Procedures

- Get fresh air
- Flush the eyes
- Wash skin with soap and water
- If ingested, consult a doctor, and or activate EMS



- d. **Ingestion** – Consult a doctor and/or activate the Emergency Medical System (EMS).
- Some chemicals require that vomiting be induced while others do not.
 - Sometimes you should drink water; and other times you should drink milk.
 - Consult the MSDS and see a doctor.

13. Welding and Fire Safety

Welding is hazardous in any environment, but it becomes deadly in environments where flammable or combustible vapors are present. Every precaution must be taken to ensure the safety of the welder and those in the vicinity of the welding operation. The following list includes some steps that should be taken to ensure the safety of the welder and the manufacturing facility:

- Obtain a hot work permit before welding.
- Weld in a designated area. Keep a minimum of 30 feet clear around all welding operations.
- If welding must be performed outside of a known safe area, the area must be inspected for potential hazards prior to commencement of work.
- If the fire hazard cannot be removed, guards (fire watch) must be posted or the welding/cutting cannot take place.
- A fire watch must be posted from the time welding begins to one-half hour after the job has been completed.



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Welding and Fire Safety

- Obtain hot work permit
- Weld in designated area
- Inspect surrounding area for hazards (keep a 30 feet clear area around a cutting operation)
- Post fire watch when needed and for time required



2-4-44

14. Fire Safety Regulations/Codes

Additional information about fire safety can be found in the following publications:

A. OSHA

- i. 1910 Subpart E – Exit routes, emergency action plans, and fire prevention plans
- ii. 1926.152 – Flammable and combustible liquids
- iii. 1926.153 – Liquefied petroleum gas

B. NFPA

- i. NFPA 30 – Flammable and combustible liquids
- ii. NFPA 51B – Fire prevention during welding, cutting, and other hot work
- iii. NFPA 55 - Storage, use, and handling of compressed gases and cryogenic fluids in portable and stationary containers, cylinders, and tanks



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Fire Safety Regulations/Codes

- OSHA

- 1910 Subpart E: Exit routes, emergency action/fire prevention plans
- 1926.152: Flammable and combustible liquids
- 1926.153: Liquefied petroleum gas

- NFPA

- NFPA 30: Flammable and combustible liquids
- NFPA 51B: Fire prevention during welding, cutting and other hot work
- NFPA 55: Storage, use, and handling of compressed gases and cryogenic fluids in portable and stationary containers, cylinders, and tanks

2-4-45



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Review Questions

34. Employers are required to provide portable fire extinguishers in the workplace.
True or False
35. Maintenance checks on portable fire extinguishers should be conducted _____.
A. every 30 days
B. every 90 days
C. every 180 days
D. annually
36. The acronym _____ is used to help remember how to properly operate a portable fire extinguisher.
A. FIRM
B. SPRAY
C. PASS
D. ARMY
37. Fire extinguishers empty in _____.
A. less than one minute
B. 2 minutes
C. 3 minutes
D. 5 minutes
38. When flushing eyes at a designated eyewash station, the recommended amount of time is _____.
A. 1 minute
B. 5 minutes
C. 10 minutes
D. 15 – 40 minutes
39. When welding in an environment with flammable or combustible vapors, post a fire watch _____.
A. during the welding operation
B. for 30 minutes after the welding operation is finished.
C. Both A and B



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Summary

Fire safety is everyone's responsibility. Knowing how to prevent a fire is the most important aspect of every production technician's job. You need to know what to look for, who to notify, what to do, how to evacuate the area if there is a fire, and your role in an evacuation. If you are not trained to use firefighting equipment, do not use it. Find someone who is trained to help. If you have any questions or concerns about potential hazards in your work area, how you should respond to emergencies in your department, or your role in an evacuation, ask your supervisor for help.

Summary

- Understand how to prevent emergencies
- Understand emergency response
- Only use fire-fighting equipment if trained
- Know your role in an evacuation
- Apply this information at work and at home
- Ask your supervisor

2-4-46



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Chapter Questions

1. The term egress refers to _____.
 - a. eye protection
 - b. a fire emergency evacuation exit
 - c. a locked entrance way
 - d. a fire hazard
2. The ceilings of an evacuation route must be at least _____ high.
 - a. 6 ft. 8 inches
 - b. 7 ft. 6 inches
 - c. 8 ft. 0 inches
 - d. 10 ft. 0 inches
3. A refuge area is a space along an exit route protected from a fire by a barrier with at least _____ fire resistant rating.
 - a. 10 minutes
 - b. 30 minutes
 - c. 1 hour
 - d. 3 hours
4. When an emergency alarm is activated, some employees are trained to shut equipment off before they evacuate.
 - a. True
 - b. False
5. _____ liquids that catch fire only require an ignition source, such as a spark or flame from a match.
 - a. Flammable
 - b. Combustible
 - c. Both a and b
 - d. Neither a or b
6. Which of the following liquids is flammable?
 - a. Isopropyl alcohol
 - b. Propane
 - c. Kerosene
 - d. All of the above
7. MSDS forms do not contain which types of fire and explosion data?
 - a. flammable limits
 - b. reactivity hazards



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

- c. fire-fighting procedures
 - d. None of the above
8. Some liquids have a flashpoint as low as 50°F.
- a. True
 - b. False
9. Smoking is not permitted within _____ feet of gasoline pumps, or other areas where flammable liquids are stored or dispensed.
- a. 10
 - b. 25
 - c. 50
 - d. 100
10. A *hot work permit* requires that all flammable and combustible materials are not within _____ feet of a welding operation.
- a. 30
 - b. 50
 - c. 75
 - d. 100
11. An NFPA label with the number _____ indicates a flashpoint above 200°F.
- a. 1
 - b. 2
 - c. 3
 - d. 4
12. An MSDS can include fire fighting procedures.
- a. True
 - b. False
13. NFPA labels provide information similar to that found on the MSDS.
- a. True
 - b. False
14. Flammable/combustible liquids must be stored indoors in a fire-resistant _____.
- a. building
 - b. room
 - c. cabinet
 - d. Any of the above



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

15. _____ liquids have a flashpoint greater than or equal to 100°F.
- Flammable
 - Combustible
16. Only trained and authorized persons should use a fire extinguisher.
- True
 - False
17. In the event of a fire, which of the following steps should be the first priority?
- put out the fire if you can safely do it
 - send out an alarm
 - head for the exit
 - remove the fuel source
18. Which type of fire extinguisher cannot be used on a Class B fire?
- Water
 - Foam
 - ABC rated dry chemical
 - Carbon dioxide
19. An energized motor that is in flames is classified as a Class _____ fire.
- A
 - B
 - C
 - Any of the above
20. Class K fires involve combustible cooking materials.
- True
 - False
21. Which is not a potential hazard you may face when fighting a fire?
- Smoke inhalation
 - Toxic vapors
 - Suffocation
 - None of the above
22. The class of extinguisher should be listed on its shell.
- True
 - False



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

23. The acronym PASS refers to _____.
a. following fire emergency exits
b. the use of fire extinguishers
c. the types of fire hazards
d. fire remedies
24. For minor burns, the recommended first aid procedure is _____.
a. to wash with soap and water
b. to use cool water on the skin
c. to immediately apply a bandaid
d. None of the above
25. Publications about fire safety regulation/codes are provided by _____.
a. OSHA
b. NFPA
c. Both a and b
d. Neither a or b



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

Review Questions

1. False
2. True
3. D
4. True
5. C
6. True
7. E
8. B
9. True
10. C
11. A
12. A
13. E
14. E
15. E
16. False
17. True
18. False
19. B
20. C
21. False
22. C
23. B
24. D
25. D
26. C
27. A
28. E
29. True
30. B
31. C
32. C
33. C
34. False
35. D
36. C
37. A
38. D
39. C



Introduction to Safety – Unit Four: Fire Safety and Emergency Response

Chapter Reading

SAFETY DISCLAIMER:

M-SAMC educational resources are in no way meant to be a substitute for occupational safety and health standards. No guarantee is made to resource thoroughness, statutory or regulatory compliance, and related media may depict situations that are not in compliance with OSHA and other safety requirements. It is the responsibility of educators/employers and their students/employees, or anybody using our resources, to comply fully with all pertinent OSHA, and any other, rules and regulations in any jurisdiction in which they learn/work. M-SAMC will not be liable for any damages or other claims and demands arising out of the use of these educational resources. By using these resources, the user releases the Multi-State Advanced Manufacturing Consortium and participating educational institutions and their respective Boards, individual trustees, employees, contractors, and sub-contractors from any liability for injuries resulting from the use of the educational resources.

DOL DISCLAIMER:

This product was funded by a grant awarded by the U.S. Department of Labor’s Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership.

RELEVANCY REMINDER:

M-SAMC resources reflect a shared understanding of grant partners at the time of development. In keeping with our industry and college partner requirements, our products are continuously improved. Updated versions of our work can be found here:

<http://www.msamc.org/resources.html>.