EMPLOYEE HANDOUT

FIRE SAFETY
AND
EMERGENCY EVACUATION

Employer: ____________________________

Trainer: ______________________________

Employee: ____________________________

Date: _________________________________
9.10 Introduction

Each year, fires occur in more than 6,000 medical facilities in the United States. According to a study issued by the U.S. Fire Administration (part of the U.S. Federal Emergency Management Agency), more than 40% of medical facility fires occur in residential nursing care facilities, and another 20% occur in hospitals. In fact, fully 89% of medical facility fires occur in facilities that provide 24-hour care—nursing homes, hospitals, developmental facilities, abuse recovery centers, mental institutions, and hospices. Fires in doctors’ offices and clinics account for the remaining 11%. These fires are responsible for 5 deaths, 175 injuries, and $34 million in property loss annually.

Under OSHA regulations, your employer must provide you with basic fire safety training to help prevent you from becoming part of these alarming statistics. In most cases, your employer has several options on how to ensure your safety. Your employer may show you and all other employees how to evacuate immediately in the event of a fire. Alternatively, your employer may train all employees or only a few designated employees in how to use fire extinguishers.

A Special Case: Hospitals, Nursing Homes, and Other Health Care Facilities

Hospitals and other health care facilities present a special set of concerns when it comes to fire. Unlike most workplaces, immediate total evacuation of a hospital may be impossible—and hazardous to the health of patients and staff. For this reason, most inpatient health care facilities are defined as “defend-in-place” occupancies in the National Fire Protection Association’s Life Safety Code (which has been adopted by the Centers for Medicare and Medicaid Services and is required by the Joint Commission for licensed facilities). The “defend-in-place” idea is to contain and compartmentalize the fire whenever possible, or to move threatened patients to an area of refuge within the facility. Essential to this type of fire protection are the following concepts:

- fire-safe design and construction that allow for compartmentalization of the building, which is the use of construction features (e.g., fire walls, fire-rated doors and floor slabs, smoke barriers, and similar structural components) to contain fire and smoke, providing safer routes of egress
- systems for detecting, sounding alarms, and extinguishing a fire, including sprinklers throughout the building for newer construction
• fire prevention measures, including housekeeping, handling of flammable liquids, and electrical safety
• planning, training, and drilling employees in the isolation of fires, transfer of occupants to areas of refuge, and/or evacuation of the building

In a “defend-in-place” facility, your fire response planning may look different than in other workplaces (including some medical workplaces like doctors’ and dentists’ offices), and your responsibilities may be different from those of workers in other industries.

Make sure that you understand and follow your assigned role in your employer’s Fire Safety Plan or Emergency Action plan!

9.11 The Fire Triangle

Three elements must be present at the same time to start a fire. These three elements form the “fire triangle.” If combined simultaneously, they produce a fourth element. This is the chemical reaction known as fire.

The three elements of the fire triangle are:

• **Fuel** – anything that will burn (usually a vapor or gas, but can also be a solid or liquid);
• **Heat** – the energy that ignites the fuel (can be from an external source, such as sparks, flames, etc. or from spontaneous combustion); and
• **Oxygen** – the chemical in our air that is required to sustain combustion.

Understanding the fire triangle is the key to fire safety. First, it will help you understand basic fire prevention. By keeping two essential elements, fuel and heat separate, you can prevent fires from igniting. Second, the triangle teaches us how to stop fires once they begin. All three elements in the fire triangle must be present for a fire to burn. Fire extinguishers work by removing one or more of the triangle’s three elements. An air-pressure water extinguisher eliminates heat. A carbon dioxide extinguisher displaces oxygen. A dry chemical extinguisher coats the fuel source with dust so that it cannot combine with oxygen.

The different types of fire extinguishers are discussed in Section 9.21.
9.12 The Role of Oxygen

Oxygen is one of the three sides of the fire triangle. **Oxygen itself does not burn, but it fuels the fire.** Fires in an oxygen-enriched environment begin more readily and burn hotter and faster than fires in a normal atmosphere. Oxygen can be absorbed by materials that are normally fire-resistant, such as upholstery and flame-retardant fabrics, and cause these materials to unexpectedly burn.

Oxygen is commonly found in health care facilities. Neonatal patients, surgical patients, and those patients with breathing difficulties, circulation problems, or congestive heart failure may all need to receive supplemental oxygen. This creates an oxygen-enriched environment in and around their faces. In addition, chemicals known as “oxidizers” are also potential sources of oxygen-enriched environments. Oxidizers are chemicals that readily release oxygen and support combustion. Nitrous oxide and peroxides are common oxidizers found in health care settings.

**If a chemical is not marked “flammable,” but is marked “oxidizer,” be sure to carefully observe all fire-prevention precautions while it is in use.**

**Take Precautions When Oxygen Is Present**

Precautions to observe in the presence of oxygen include the following:

- **Do not smoke.** Patients on oxygen therapy should not smoke, nor should their visitors. Smoking should be prohibited when oxygen cylinders or equipment are stored, cleaned, checked, or maintained.
- **Store oxygen properly** in clean, dry locations away from direct sunlight, and keep separate from any flammable or combustible chemicals and ignition sources. Plugs, caps, and plastic bags should be used to keep equipment free from dust and dirt when not in use.
- **Do not use electrical equipment.** Electric razors, blow dryers, curling irons, and heating pads can ignite hair and clothing in the presence of oxygen. Electrical equipment, including hospital bed controls and nurse call buttons, can spark when activated and cause a fire under oxygen-enriched conditions. Electrical equipment that will be used within one foot of a patient’s face while they are on oxygen therapy should be “intrinsically safe” or “explosion-proof.” In other words, the internal spark that is generated when those electrical devices are activated has been shielded, so that the devices will not come into contact with potentially flammable environments.
• **Avoid petroleum-based products.** For patients receiving oxygen therapy, Vaseline®, Chapstick®, Blistex®, and other petroleum-based lubricants should not be used around the face or other areas where oxygen-enrichment could occur because they can form a flammable mixture. Water-based products should be used instead. Also, post valves, regulators, gauges, and fittings must not come into contact with oils, greases, organic lubricants, rubber, or any other combustible substance.

• **Avoid nylon and wool** pajamas, robes, gowns, and other clothing because they are more likely than other fabrics to discharge static electricity, which could ignite a fire in an oxygen-rich environment.

• **Do not mix other ignition sources with oxygen-enriched environments.** Approximately 100 fires occur each year in surgical suites, causing one or two fatalities and as many as 20 serious injuries. An oxygen-enriched atmosphere combined with an ignition source was found to be a factor in most of these fires. Ignition sources including surgical lasers, electro-surgical and electrocautery units, and even high-speed drills can ignite oxygen-enriched or alcohol-soaked towels, gowns, and masks.

• **Receive training.** Employees who use oxygen equipment, as well as those responsible for cleaning, repair, or transferring of oxygen, should receive equipment-specific training and be familiar with the manufacturer’s instructions.

• **Use tools** designated specifically for use with oxygen equipment. These tools should be kept clean, stored separately, and marked “For Use With Oxygen Equipment Only.”

• **Keep it clean and inspect it.** A standoff tube (bayonette) installed at the inlet of the post valve on an oxygen cylinder can protect against particulate migration. Post valve gaskets and regulator inlets should be visually inspected for cleanliness prior to installation. Gauge guards and other components added to the regulator should not block the regulator vent holes.

**Special Considerations for Home Medical Oxygen Use**

More than 1,000 people per year are treated in emergency rooms for burns that occurred while they were using medical oxygen in the home, and more than 40 die as a result of these injuries. Home health workers who go into an environment where medical oxygen is in use need to be aware of the following additional precautions and, where possible, help patients to implement them:

• **Post “No Smoking” signs.** These signs should be present inside and outside the home to remind patients, other residents, and guests not to smoke.

• **Beware of other ignition sources.** Although smoking is the ignition source in nearly 3/4 of all fires involving home medical oxygen, other ignition sources common in private homes included stovetops and ovens, candles, matches and lighters, grills, incense, and sparking toys.

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• **Maintain smoke detectors.** Smoke detectors should be present in homes where medical oxygen is in use, and they should be tested monthly.

• **Keep the phone handy.** Unlike health care facilities, private homes do not usually have a system that automatically alerts the fire department if a fire alarm is triggered. Individuals who use medical oxygen should keep a phone near their bed or chair, especially if they would have trouble escaping a fire without assistance.

• **Practice evacuation.** Individuals who use medical oxygen at home should have a fire escape plan that includes two ways out of each room and a designated meeting area. The plan should be practiced at least twice a year.

### 9.13 General Classes of Fires

The National Fire Protection Association (NFPA) divides fires into four basic classifications: A, B, C, and D.

- **Class A “ordinary combustible” fires** are fueled by wood, paper, cloth, trash, plastics and other solid, non-metallic combustibles. Class A fires are the most common type in the workplace.

- **Class B “flammable liquid” fires** are fueled by gasoline, oil, grease, paint thinners, kerosene, and other flammable liquids.

- **Class C “energized electrical equipment” fires** start with electrical equipment, such as appliances, switches, wiring, and power tools. A fire falls in the Class C category as long as the electrical source is “plugged in.” **Cut off the electricity, and the fire becomes reclassified as a Class A or B fire.**

- **Class D “combustible metal” fires** are fueled by magnesium, potassium, sodium, titanium, powdered aluminum, and other combustible metals. These fires require specialized techniques to extinguish them.

In addition, some experts refer to **Class K “oil and fat” fires,** which involve cooking appliances and animal or vegetable oils and fats.

**Understanding the different classes of fires is absolutely essential to your safety.** The different fire classifications require different strategies for their prevention. Even more importantly, different classes of fires require different types of fire extinguishers. **If you use the wrong type of fire extinguisher on a fire, you will not put out the blaze and could make it far worse!**

The different types of fire extinguishers for the different classes of fires are discussed in Section 9.22.
Fire prevention is part of everyone’s job. The best defense against fires is to keep them from starting in the first place.

Many fires involve ordinary combustibles such as cloth, paper, and wood. Fifteen percent of all nonconfined medical facility fires (fires that spread beyond the equipment or object where they originated) begin in the laundry area and involve bedding and gowns—which, unlike curtains and decorations in hospital rooms, are not required to be flame-resistant.

Keeping ordinary combustibles separated from ignition sources, then, is a critical element of fire prevention. Good housekeeping is one way to accomplish this. The risk of fire increases if your work area is cluttered with combustible debris or flammable materials. These include paper, trash, common packaging materials such as cardboard, and improperly stored chemicals.

Unnecessary clutter and debris may provide the fuel that enables a stray spark to turn into a raging inferno. One such fire occurred at a Florida hospital in March of 2004. An employee in the hospital’s microbiology lab discarded a used match too close to an area containing boxes and other flammable materials. The hospital’s sprinkler system put the fire out, and no one was injured, but the flames, smoke, and water caused $100,000 worth of damage.

Separating Fuel and Ignition Sources

Combustibles and flammables should be kept away from workplace heat (ignition) sources. In a health care environment, these sources may include tobacco smoking, space heaters, medical lasers, and kitchen, laundry, and laboratory equipment, as well as other equipment and processes that use or generate heat.

Heat-producing equipment (boilers, stoves, burners, etc.) should be:

- kept away from flammable and combustible materials; and
- regularly maintained and cleaned to prevent flammable residues from accumulating.
Avoiding Spontaneous Combustion

There must be a spark or flame to start a fire, right? Wrong! Although the fire triangle teaches us that a heat source is essential to ignite a fire, the source may be internal as well as external. A fire may start by spontaneous combustion without the existence of a spark or flame.

Spontaneous combustion occurs when flammable materials, such as oily or paint-soaked rags, leaves, damp hay, or coal, are piled up in an area with poor ventilation. Oxygen heats the material internally in a process known as “oxidation.” You generally can avoid oxidation by storing material in one of the following two ways:

• You can provide plenty of air flow, so that heat won’t be trapped (e.g., laying paint-soaked rags out flat to dry); or
• You can tightly seal the materials to prevent oxidation (e.g., placing paint-soaked rags in tightly sealed containers in a cool, well-ventilated place).

In short, don’t toss your greasy or oily rags into a big pile, especially in a poorly ventilated area. It could ignite a mess that you’ll never forget. Also, make sure to properly store any chemicals in a dry, well-ventilated place (see Section 9.19).

Preventing Flammable Liquid (Class B) and Gas Fires

9.15

Flammable liquids, such as gasoline, oil, kerosene, grease, ethylene oxide, and alcohol, pose a grave fire danger. The safe handling, transfer, and storage of these liquids is essential to avoiding flammable liquid Class B fires.

Safe Use and Storage

Health care workplaces that use flammable liquids typically store them in two different ways. Small quantities are kept at or near the workstations for use in operations. Larger amounts are stored separately.

When using small quantities of flammable liquids at a workstation, follow these rules:

• Ventilate the area well.
• Store flammable liquids in a nearby cabinet that is clearly marked with a warning sign or label.
• Use spill-proof and self-closing containers when possible.
• Tightly close containers when not in use.

When larger amounts of flammable liquid is stored in containers for reserve use, follow these rules:

• Keep filled containers in a designated storage area or a safety cabinet.
• Keep containers away from spark-producing equipment and other heat sources.
• Connect the containers to a grounding system to eliminate static electricity when dispensing liquids.
• Properly vent all containers by:
  - installing a safety vent to prevent pressure build up, and
  - installing an emergency relief device that will operate under extreme conditions.

Finally, make sure to properly store oily or greasy rags to avoid spontaneous combustion (see Section 9.14).

**Transferring Flammable Liquids**

The transfer of flammable liquids involves their removal from storage containers to work areas where they are needed. Generally, this is done by one of two methods, depending on how the containers are stored:

• The **gravity-flow method** is used for containers stored **horizontally**. It uses gravity to drain the flammable liquid from the container.
• The **pump method** is used for container stored **vertically**. The pump method uses a pump to do the work instead of gravity and is generally more efficient and thorough.

Whether you use the gravity-flow or pump method, follow these rules when transferring flammable liquids:

• Always use approved safety cans.
• Ground the safety can to the container before filling to draw off any static charge.
• Use a drip pan during transfer to catch any spills or leaks.

**Refueling Gasoline-Powered Equipment**

Follow these steps to avoid a fire hazard while refueling gasoline-powered equipment:

• Let equipment cool down before refueling.
• Refuel in an open, well-ventilated area.
• Do not refuel near smokers or an open flame.

**Compressed Gases**

Be extremely careful with flammable compressed gases. Their flash points are very low: always below room temperature. When compressed gases mix with air, explosions readily occur. Even a small leak may ignite a catastrophe.

Handle cylinders of compressed gases with great care. The cylinders should never be rolled or dragged during storage or transportation. Handcarts or trucks specially designed for gas cylinders are highly recommended.

### 9.16 Preventing Electrical (Class C) Fires

Without electricity, we really would be in the dark ages. It powers our lights, our tools, and our computers, but also presents a serious potential fire hazard. For example, between 1993 and 2003, the U.S. Food and Drug Administration received reports of 95 fires that started in electrically powered hospital beds. Fully 75% of these were caused by electrical problems (in 25% of the cases, the cause was not determined).

A study by the U.S. Fire Administration found that nearly one third of nonconfined medical facility fires resulted from an electrical failure or malfunction, making electrical fires the leading cause of this type of fire. Examples include a health care facility that evacuated 16 people in June of 2000 due to a fire that began in a lighting fixture, and an August, 2001, fire at Walter Reed Army Medical Center was electrical in origin.

Fortunately, there are several steps that you and your co-workers can take to minimize the risk of electrical (Class C) fires. Keep an eye out for the following potential electrical hazards and report them immediately to your supervisor:

• damaged or deteriorated wiring
• damaged plugs with loose or missing prongs
• worn insulation
• strange-smelling appliances or electrical equipment, which is often the first sign of fire
• unprotected light bulbs, which can start a fire if hit and broken
In addition, you must be very careful not to misuse the power system itself by overloading circuits. Dimmed lights and reduced power output are signs of overloading. Take these steps to avoid overloading electrical systems:

- **Don’t** use unnecessary extension cords.
- Make sure that extension cords are heavy-duty enough for the job. As a rule of thumb, the extension cord should be at least as thick as the cord on the equipment being powered.
- Be careful not to overload circuits. Breakers that trip repeatedly can signal an overloaded circuit as can wall outlets with more than two pieces of equipment plugged into them.
- Power strips, which are fused for safety, are generally safe to use, but non-fused multiple-outlet plugs should be avoided.

**Electrical Equipment and Motors**

Poorly maintained electrical equipment and power tools may cause fires through faulty cords, switches, and wiring. Inspect devices and their cords regularly. Immediately unplug equipment and remove it from service if there are any signs of a problem, such as smoke, burning smells, sparks, or unusual noises.

Poorly maintained motors also may lead to overheating and fires. A spark from a dirty engine can ignite oil, dust, or grease. Keep motors clean and in good working order to prevent such fires. Also, keep the area around motors free from combustible materials.

**9.17 Preventing Metal (Class D) Fires**

Class D fires are those that involve combustible metals such as potassium, sodium, magnesium, and powdered aluminum. These metals require a very high heat source to ignite and burn at an extremely high temperature. Unless you are in a laboratory or metal-working area, you are unlikely to confront one of these fires.

While Class D fires should be uncommon in health care facilities, unusual circumstances have been known to arise. For example, in 1999, the Food and Drug Administration and National Institute for Occupational Safety and Health issued a Public Health Advisory concerning fires and explosions that had occurred in aluminum oxygen regulators.

All Class D fires must be treated only with special fire extinguishers (see Section 9.22). Use of the wrong extinguishing agent could turn a serious situation into a deadly one.
Preventing Oil and Fat Fires

Sixty-four percent of all fires in medical facilities are cooking fires, and they are the third-leading cause of nonconfined medical facility fires. When these fires involve cooking appliances and vegetable or animal oil and fats, they are called “Class K Fires.” In order to prevent an oil or fat fire, follow these guidelines:

- Always heat cooking oil or grease slowly, as it will become hotter and hotter until it bursts into flames. Never leave anything being cooked in oil or grease unattended. Never leave anything containing any kind of animal or vegetable fat or oil unattended on the stove.
- Keep water and other liquids away from hot cooking oil and grease. If water spills into hot grease, it will immediately turn into steam and spew out hot grease in every direction. Never drink water, soda, etc. near a fryer or other cooking appliance in use.
- Ensure that fryers and other cooking appliances are firmly anchored so they will not tip over. Ensure that all cords are protected so that no one can trip over them and tip the appliance. If the cooking appliances are portable, ensure that they are placed only on a stable surface away from the edge.
- Add foods carefully to hot grease. Always use tongs or a long fork; never drop foods in hot grease because they could spatter and cause burns. Make sure that foods being added to hot grease are not holding excessive moisture. For example, pat french fries dry with paper toweling, make sure that chicken is covered with flour, etc.
- Always keep oven mitts, pot holders, and a properly fitting lid nearby. A small grease fire occurring in a pan or basket may be smothered by immediately placing a properly fitted lid onto the pan or basket. Never pick up a pan or basket this is on fire, as the grease or oil will “grab” onto whatever it can and spread.
- Always remember to activate the fire protection system before using a fire extinguisher on the fire. See Section 9.22 for information on selecting the correct fire extinguisher.

Chemical Fires

Thousands of chemicals used in today’s workplace are both highly toxic and highly flammable. For your own safety, you need to be aware of the chemical substances that you use on the job and their basic properties. This will enable you to properly store and use them and to quickly react if something goes wrong.

Your employer must provide you with Material Safety Data Sheets (MSDSs) for hazardous chemicals in your workplace. MSDSs have basic information on the following:
• Avoiding Fires and Explosions:
  - Section IV – Fire and Explosion Hazard Data (includes flash point)
  - Section V – Reactivity Data (includes incompatibles such as sparks, open flame, etc.)
  - Section VII – Precautions for Safe Handling and Use
  - Section VIII – Control Measures (e.g., ventilate area)

• Extinguishing Fires:
  - Section IV – Fire and Explosion Hazard Data (includes extinguishing agents such as carbon dioxide, dry chemicals, and foam)
  - Section VIII – Control Measures

• Avoiding Potential Dangers:
  - Section IV – Fire and Explosion Hazard Data (includes unusual hazards such as toxic decomposition during fire)
  - Section VI – Health Hazard Data
  - Section VII – Precautions for Safe Handling and Use

It is a very good idea to read the MSDS before using any chemical. Many chemicals will explode or combust if improperly used or stored (see Section 9.14). Different chemicals present different physical and health hazards. For example, a fire from a certain chemical could produce both flames (a physical hazard) that could burn you and lethal fumes (a health hazard) that could require you to promptly flee or put on an air-purifying respirator.

Properties of chemicals that may make them especially hazardous include the following:

• **flammability** – catching fire easily
• **reactivity** – burning, exploding, or releasing toxic vapors if exposed to other chemicals, air, or water
• **explosiveness** – undergoing a very rapid change that produces large amounts of gas and heat (can occur by mixing chemicals that are ordinarily safe)

Unless you are a member of a firefighting team, you should not be involved in combating a major chemical fire. However, the information on MSDSs can help you to avoid causing a fire and to select the proper extinguisher for fighting a small chemical fire (see Section 9.21).

### 9.20 When a Fire Occurs: RACE!

Your employer's Emergency Action and Fire Prevention Plan spell out everyone's role in the event of a fire. Know your role. You may save your life and the lives of others.
Just because fire extinguishers are located in the workplace does not mean that you are allowed to use them. **DON'T use fire extinguishers unless your employer has provided you with the necessary basic training.** Without proper training, you will not be able to use the extinguisher to effectively fight the fire and will be vulnerable to serious injury and even death.

Remember, your first priority in a fire is to make sure that anyone in immediate danger gets to safety—including you! **Whenever you smell smoke or see fire, act quickly—RACE!**

**R** - Rescue  
**A** - Alert  
**C** - Confine  
**E** - Extinguish

**R** Is for Rescue

When a fire occurs, every second counts. A fire can double in size every 30 seconds. This means that a fire can grow more than a thousand-fold in five minutes! Any delay could be fatal to you and others.

When you smell smoke or see fire, the first thing to do is rescue patients, visitors, and employees (including you!) who are in immediate danger, and remove them to a safe location. This might be the nearest exit or beyond the closest firewall or fire door.

All exit routes from buildings must be properly marked. Know at least two different routes to safety in the event of a fire, and keep these corridors and doorways clear and free from obstruction. **Never block or lock exit doors.** Remember that if the corridor fills with smoke, you may have to crawl out—could you find your way to safety if you had to crawl?

During evacuation, be aware of smoke and noxious fumes. Breathing them can render you unconscious and leave you at the mercy of the flames. Remember that all fires consume oxygen when they burn. Many fire fatalities result from suffocation due to a lack of oxygen.

Follow these procedures to ensure your safety and the safety of others while you are evacuating to a safe area:

- Stay low to avoid smoke and hazardous gases; crawl if necessary. The safest air is near the floor.
- Cover your nose and mouth with a damp cloth or handkerchief if possible to protect yourself from smoke.
• If you come to a closed door, feel it with the back of your hand before opening it. If the door is hot, use another exit.
• Use a respirator if one is readily accessible.
• Use heavy blankets or tarps as a shield if needed.
• Get away from billowing smoke and flames if you are evacuating to the outside of the building to avoid breathing fumes.
• Remain available so that a head count can be taken and you can give information, if necessary, to firefighters about the location and size of the fire, shut-off valves, etc.

If your clothes catch on fire, DON'T panic and run! Running to a shower or fire blanket will only fan the flames and aggravate the situation. Instead, cover your face with your hands and stop, drop, and roll on the ground to extinguish the flames.

A is for Alert

Once anyone who is in immediate danger from the fire has been moved to a safe location, you should activate the alarm system, which will alert the fire department to respond, and also alert other employees, patients, and visitors that there is an emergency in the building.

Your employer should establish an employee alarm system as part of its Emergency Action Plan. The alarm may operate by voice, by sound signals, or both. Depending on how recently your facility was constructed and what its primary use category is, activating the alarm or the sprinkler system may also automatically notify the fire department, shut down portions of the ventilation system, and close fire doors.

If the alarm activated by another employee is the first you hear of a fire in your building, be sure you know what to do. Find out where the fire is, and decide whether you need to begin evacuating, stay sheltered in place behind fire doors and fire walls, or wait for more information. Your employer should provide drills on all shifts so that all employees know exactly what to do when the fire alarm is activated.

C is for Confine

Once individuals in immediate danger have been safely evacuated and the alarm has been activated, the next step is to begin trying to control the spread of fire and smoke. In recently constructed buildings, fire doors should automatically close when the fire alarm is activated, and ventilation systems that could spread smoke should automatically shut down. Even in these buildings, it is important to close the door or doors to the room.
where the fire began, confining the fire and limiting its oxygen supply. In older buildings, closing the door may not fully confine the fire or the smoke, but it will help to slow the blaze down. So, **always close the door to the room where a fire has started**, and make sure any fire doors (which are supposed to be closed) have not been blocked open.

**E is for Extinguish**

Once endangered individuals have been removed to safety, fire alarms have been activated, and the fire has been confined, **evaluate whether you can safely attempt to extinguish the fire**. It may seem a bit late for that, after you have Rescued, Alerted, and Confined—but maybe not. For example, perhaps the fire began in a laundry room or laboratory, and no one present requires assistance to evacuate to safety. If the fire alarm pull is within reach and the door to the area of the fire is closed, then extinguishing the fire may be an option. **However, do not try to extinguish a fire unless the appropriate type of fire extinguisher is available and you have been trained in its use.**

You are only allowed to use a fire extinguisher if you have been trained in its proper use. You will receive fire extinguisher training if:

- you have been designated to receive such training as part of your employer’s Emergency Action Plan; or
- your employer has:
  - chosen to provide portable fire extinguishers in the workplace, and
  - designated them for use by all employees.

Even if fire extinguishers are available for your use, they are intended simply as a first line of defense. Fire extinguishers are not a replacement for the professionals in the fire department. **Sound the alarm first BEFORE using the fire extinguisher, however small the fire may appear to be.**

**Situations When Fire Extinguishers Should NOT Be Used**

The fact that you have been trained to use fire extinguishers does not mean that you should always attempt to fight the particular blaze. In fact, you should err on the side of caution. Fire spreads very rapidly and can quickly trap an opponent. **DON’T attempt to extinguish a fire unless you are sure that it is safe to do so.** One-third of all people who are hurt in fires are injured trying to extinguish the flames.
Don't attempt to extinguish a fire if ANY of the following apply:

- You are unsure if the fire is small enough to safely extinguish.
- You are unsure of the type of combustible material and can't tell which type of fire extinguisher may be used safely (see Section 9.22).
- The fire is out of control (i.e., the fire has spread beyond its place of origin).
- The fire has blocked your only escape route.

9.21 Basics of Fire Extinguisher Use

To correctly use the typical portable fire extinguisher, just remember the acronym PASS:

- **Pull** the pin.
- **Aim** the nozzle at the base of the fire.
- **Squeeze** the handle (lever).
- **Sweep** nozzle from side to side at the base of the fire.

Don't aim high at the smoke and the top of the flames; you won't put out the fire. Spray low at the fire's base. Remember also that most extinguishers have a very limited operation time, as little as 8 to 10 seconds. Don't panic and spray incorrectly. You will squander any possible chance to stop the fire.

9.22 Selecting the Right Fire Extinguisher

There are several types of fire extinguishers from which to choose. Your employer is responsible for selecting the right type and number of fire extinguishers based on the:

- classes (A, B, C, D, and if applicable, K) of anticipated workplace fires; and
- the size and degree of the fire hazards.

Your employer must make sure that the extinguishers are properly mounted and readily accessible. They must remain in their designated places except during use fighting fires.

Your employer is also responsible for ensuring that extinguishers are kept in a fully charged and operable condition. Extinguishers must be visually inspected at least once a month and given a full maintenance check at least once a year.

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Types of Fire Extinguishers

Fire extinguishers are categorized in two ways:

• by the class of fire that they are designed to fight; and
• by the extinguishing agents that they contain.

These two factors are closely related. For example, an air-pressurized water (APW) extinguisher is rated for Class A fires (ordinary combustibles such as wood, paper, clothing, etc.) only. Water does not work to extinguish Class B (flammable liquids) or Class D (metal) fires. In addition, water cannot be used on Class C (electrical fires) because of the potential shock hazard.

All ratings are found on the extinguisher faceplate. In addition, most extinguishers have simple pictures to indicate the targeted classes of fires. For example, a picture of a plug and socket tells you that the extinguisher is suitable for fighting electrical fires. **Always read the label before you use an extinguisher. Use of the wrong extinguisher could worsen the fire and fatally injure you or your co-workers.**

Dry chemical (DC) extinguishers work by coating the fuel with a thin layer of dust. The dust separates the fuel from oxygen and eliminates one of the three elements of the fire triangle. The capabilities of DC extinguishers vary depending on the particular extinguishing chemical. Multi-purpose DC extinguishers that are ABC-rated (those using ammonium phosphate) may be used on A, B, and C fires. Some DC extinguishers (e.g., those using sodium or potassium bicarbonate) are only rated BC and cannot be used on Class A (ordinary combustible) fires.

Carbon dioxide (CO₂) extinguishers are always rated BC. They can be used on flammable liquid fires or electrical fires, but not on fires with ordinary combustibles (Class A Fires). CO₂ extinguishers work by displacing oxygen to kill the fire. The CO₂ comes out of the nozzle at very high pressure and in a very cold state, which also increases the extinguisher’s effectiveness.

None of the common fire extinguishers are suitable for use on metal (Class D) fires. If you use an A-, B-, or C-rated extinguisher on a Class D fire, it will only make the situation worse.

Class D fire extinguishers (or containers with appropriate extinguishing agents) must be accessible to employees in metal-working areas where combustible metal powders, flakes, etc. are generated at least once every two weeks. Examples of Class D extinguishing agents are dry powders that are graphite-based or made of sodium chloride. Often, extinguishing agents for Class D fires are applied with a scoop or shovel, rather than with a portable extinguisher.
Use of the correct fire extinguisher (or extinguishing agent) for the different types of fires is summarized in the chart below:

<table>
<thead>
<tr>
<th>Fire Classification</th>
<th>Examples</th>
<th>Type of Extinguisher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>Wood, textile, paper, plastics, and similar materials</td>
<td>Water</td>
</tr>
<tr>
<td>Ordinary combustibles</td>
<td></td>
<td>Dry Chemical/ABC</td>
</tr>
<tr>
<td>Class B</td>
<td>Gasoline, oil, grease, paint, and kerosene</td>
<td>Dry chemical/ABC</td>
</tr>
<tr>
<td>Flammable liquids</td>
<td></td>
<td>Dry chemical/BC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carbon dioxide</td>
</tr>
<tr>
<td>Class C</td>
<td>Electrical wires, equipment, or appliances</td>
<td>Dry chemical/ABC</td>
</tr>
<tr>
<td>Electrical</td>
<td></td>
<td>Dry chemical/BC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carbon dioxide</td>
</tr>
<tr>
<td>Class D</td>
<td>Magnesium, potassium, and powdered aluminum</td>
<td>Dry powder/D</td>
</tr>
<tr>
<td>Metal</td>
<td></td>
<td>Graphite-based</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sodium chloride</td>
</tr>
<tr>
<td>Class K</td>
<td>Vegetable or animal oils and fats</td>
<td>Water plus potassium</td>
</tr>
<tr>
<td>Oil and fat</td>
<td></td>
<td>acetate, carbonate, or citrate/K</td>
</tr>
</tbody>
</table>

**9.23 Fire Safety: Don’t Be a Statistic**

Thousands of Americans die each year in fires. Many more are injured. Property losses due to fire reach into the billions of dollars. Workplace fires kill hundreds and injure thousands of workers every year. These statistics are staggering.

Make sure that you understand and follow your assigned role in your employer’s Fire Safety Plan. Don’t attempt to operate a fire extinguisher unless you have been designated to do so and have received proper training. If you have been instructed to flee, that is all you should do. Don’t become a statistic—play it safe around fires.