

## Chapter 5 - A Guide to Fire Safety

### Suggested Activities

- **Demonstrate** safety procedures so employees will know what to expect
- **Demonstrate** how to use fire extinguishers, including locations within the work area
- **Invite** the Fire Marshal or other expert to review your meeting outlines and/or to speak to employees
- **Conduct** a practice evacuation for a fire emergency, after you have gone over the plan with employees

For additional information, refer to the **Background** text below.

### Background

Fire is a very real danger in any workplace. For companies that handle hazardous chemicals, the risks of injury and property damage from flames and smoke are compounded by concerns about fire-created toxic gases.

Companies take many steps to prevent fires, such as using fire-retardant construction materials and equipping their buildings with smoke alarms, sprinklers, and fire extinguishers. Your company's emergency action or fire protection plan covers procedures to follow in case there is a fire, and probably also includes special training, clothing, and equipment for workers with fire-fighting responsibilities.

Because the potential for fire lurks in every corner of the work area, every supervisor and employee must be aware of the fire risks of the materials, equipment, and processes there—and how to keep fires from starting—to reduce the chance of ever having to worry about how to deal with a real fire.

Fire is a product of three components:

- Fuel (paper, wood, oil, etc.)
- Oxygen (present in the air)
- Ignition source (from flame, electrical arcs, and sparks).

Fires can also result from friction, electrical problems, or chemical reactions. The key to fire prevention, then, is making sure that these conditions never happen.

## Electricity

Most industrial fires are the result of improper use or poor maintenance of electrical equipment. Not being fully aware of its fire potential, we may become casual about safe electrical work practices or fail to check wiring and electrical gear during regular inspections. To prevent electrical fires, keep the following "Do's" and "Don'ts" in mind:

### Do:

- Replace wires if they're frayed or have worn insulation.
- Use the correct fuses.
- Keep combustible materials away from lights.
- Make sure ground connections are sound.
- Minimize use of extension cords; when they're used, be sure they're in good condition and adequate for the job.
- Lubricate bearings so they don't run too hot.
- Keep motors and machine tools clean and free of dust and grease.

### Don't:

- Use temporary wiring.
- Overload motors, circuits, or outlets.
- Leave circuit breakers blocked in a closed position.
- Overheat transmission shafts or bearings, especially if they're in an area with dust or lint.

## Flammable Liquids

Another common fire hazard is flammable liquids like oil, gasoline, kerosene, solvents, and other chemicals. The biggest danger is that their vapors become flammable when they mix with air and come in contact with an ignition source. Worse still, flammable vapors are usually invisible and spread quickly—moving fastest in warm, still air.

Any kind of ignition source, even an electrical spark, can set these vapors on fire, so practice these safety habits with flammable liquids:

- Use them only in areas with plenty of ventilation.
- Don't use or store them near heat or fire; don't use heat or fire or smoke near them.
- Use non-sparking tools.

- Store flammable liquids only in approved tight, metal containers—never in breakable containers. Always keep the containers closed when not in use.
- Take only the quantities of liquid needed for a job out of containers.
- Ground containers when making a transfer because static electricity could trigger ignition.
- Clean up leaks and spills immediately, and repair any leaks.
- Immediately remove any clothing that has absorbed a flammable liquid.

Be especially cautious with containers that once held a flammable liquid but are now apparently empty. Don't store them near any kind of heat or ignition source unless they have been tested first. Even a few drops left in an "empty" container could start a fire.

## **Smoking and Space heaters**

Too many fires are caused by careless smoking, or throwing away cigarettes or matches that aren't quite out. Never permit smoking near anything that could possibly burn. That includes flammable liquids and chemicals, wood, paper, etc.

Restrict smoking to designated areas, with tip-proof metal containers for proper disposal of cigarettes and matches. Post "No Smoking" signs in work areas—and enforce them.

Space heaters create another workplace fire risk. The best bet is not to use them at all. If there's no choice, be sure the area is well ventilated and observe these precautions:

- Use only the fuel specified for the particular heater.
- Turn the heater off and allow it to cool before refilling.
- Keep area around heater free of combustible materials for at least two feet on all sides, at least six feet above.
- Make sure the heaters have handles for safe carrying.
- Be sure heaters are constructed, supported, and positioned so they can't fall over.

## **Spontaneous Combustion**

Fires don't always start instantly. Sometimes they occur as the result of slow heat buildup within a material. This is known as spontaneous combustion.

Spontaneous combustion often occurs with rags and scraps that are saturated with oil, paint, or other flammable liquids. To prevent such an occurrence, dispose of flammable wastes in closed, airtight metal containers—and empty the containers daily. Keep flammable scrap that can't be containerized in a cool dry well-ventilated area—with frequent disposal.

## **Other Fire Prevention Precautions**

Welding and cutting operations create flames and sparks that are an obvious fire hazard. So it makes sense to keep these operations as far as possible from flammable liquids, vapors, or dusts. Areas or containers that have held flammable liquids must be tested for flammable residues before performing welding in their vicinity.

If you can't weld or cut in a separate room with a fire-resistant floor, be sure to keep your wood floor clean, dry, and covered with some material that won't burn. Use welding screens to contain the activity—and have a fire extinguisher handy just in case.

Material safety data sheets provide important fire prevention information in the form of reactivity data. Mixing incompatible substances—or even having them too close together—could cause a fire or explosion. Be sure everyone checks labels and MSDSs for reactivity information and uses that information to store and use the chemical at a safe distance from the reactive substance.

Good housekeeping can go a long way toward preventing fires, as well as permitting quick response if a fire does start. Don't, for example, let dust and/or lint build up on machinery, work surfaces, or floors. Dispose of debris promptly and properly and see that trash containers are emptied frequently. Don't store materials so high that they block sprinklers. Keep doorways and passageways clear and keep fire extinguishers in easily seen, easy-to-reach locations.

## **If there is a Fire**

Small fires often become big ones because people don't know what to do when they first spot them. One rule should always apply. If you spot a fire, turn in the alarm immediately. Then, if it's a very small fire, a worker may try to put it out with an extinguisher. Fires of any size should be handled by trained, equipped personnel. Everyone else should quickly follow company evacuation procedures. Periodic fire drills will help ensure that people will be able to react automatically and calmly if they're ever faced with the real thing.

Though every company's emergency procedures vary somewhat, here are some that usually apply in case of fire:

- Turn off machinery.
- Close off any windows or doors that aren't fire exits.
- Clear passageways.
- Leave the building quickly but calmly through your assigned exit.
- Report to your assigned evacuation location.
- Stay out of the building unless you have been assigned, trained, and equipped to fight the fire.

## **Fire extinguishers**

Everyone should know where to find fire extinguishers—and how to use them. Extinguishers should be in plain sight and easy reach—and tested periodically to be sure they'll work when needed.

Each type and size of fire calls for a different kind of extinguisher. They are labeled as to type, usually based on the National Fire Protection Association classification system:

- Class A: Puts out fires involving ordinary burnables like wood, paper, trash, etc. where you want to wet down and cool the area. Class A extinguishers also have a number—1-A, 2-A, etc. The higher the number, the larger the fire it can handle.
- Class B: Puts out flammable liquid and gas fires, either cutting off oxygen or reducing flame. The numbers on B extinguishers tell how many square feet the extinguisher can handle—5-B is adequate for a five square foot fire.
- Class C: Extinguishes fires in electrical equipment. Don't use water on electrical fires; water conducts electricity and can shock the firefighter. Class Cs have no numbers.
- Combinations (ABC, BC): Extinguishers that are effective against more than one of the above three types of fires.
- Class D: Puts out fires in combustible metals such as sodium, magnesium, zinc, etc. Class Ds have no numbers.

## Fire Safety Checklist

	Yes	No
<b>Electricity</b>		
Is wiring permanent, not temporary?	<input type="checkbox"/>	<input type="checkbox"/>
Are ground connections good?	<input type="checkbox"/>	<input type="checkbox"/>
Are extension cords in good condition and adequate for the job?	<input type="checkbox"/>	<input type="checkbox"/>
Are motors and machine tools kept clean and lubricated?	<input type="checkbox"/>	<input type="checkbox"/>
Is overloading of motors, circuits, and outlets avoided?	<input type="checkbox"/>	<input type="checkbox"/>
Is overheating of transmission shafts and bearings avoided?	<input type="checkbox"/>	<input type="checkbox"/>
<b>Flammable Liquids</b>		
Are all flammable liquids stored in approved, airtight metal containers?	<input type="checkbox"/>	<input type="checkbox"/>
Are they stored away from ignition sources?	<input type="checkbox"/>	<input type="checkbox"/>
Are they used only in needed quantities?	<input type="checkbox"/>	<input type="checkbox"/>
Are they used only in areas with adequate ventilation?	<input type="checkbox"/>	<input type="checkbox"/>
Are they used only in areas away from heat, fire, and cigarettes?	<input type="checkbox"/>	<input type="checkbox"/>

- Are only non-sparking tools used near flammable liquids?
- Are leaks and spills cleaned up promptly and leaks repaired?
- Is clothing that has absorbed flammable liquids removed immediately?

## **Reactivity**

- Are chemicals stored/used away from anything they'd react to  
(air, water, heat, other chemicals)?

## **Smoking**

- Is smoking forbidden in any area containing burnables?
- Are No Smoking signs posted and smoking prohibitions enforced?
- Are metal ashtrays provided in designated smoking areas?

## **Space Heaters**

- Are they used only when necessary and in well-ventilated areas?
- Does each heater use only the fuel it's designed for?
- Do heaters have handles for safe carrying and moving?
- Are heaters kept away from flammable materials?
- Are heaters turned off and cooled down before refilling?
- Are heaters designed and placed so they can't tip over?

## **Spontaneous Combustion**

- Are flammable wastes placed in closed, tight metal containers?
- Are flammable waste containers emptied daily?
- Are non-containerized flammable wastes kept cool, dry, well ventilated,  
and disposed of frequently?

## **Welding and Cutting**

- Are these operations performed away from flammable materials?
- Is the floor made of, or covered with, fire-resistant material?
- Is a fire extinguisher kept close at hand?

## **Housekeeping**

- Are machinery and surfaces kept free of dust and lint buildup?
- Is debris disposed of promptly and properly?
- Is there ample clearance for doorways, passageways, and sprinklers?

## **Fire Handling Procedures**

- Are periodic fire drills conducted?

- Are fire extinguishers easy to see and reach?
- Are fire extinguisher classes and their uses known?
- Is the first rule in a fire to turn in the alarm?
- When the alarm sounds, are evacuation procedures followed quickly and calmly?
- Are only assigned, trained, outfitted personnel permitted in the building during a fire?