FIRE PREVENTION

The best defense against a fire is to prevent a fire from starting in the first place. Although many products stored in a warehouse or work area are not flammable, some packaging types commonly used today, such as cardboard, foam compositions, and paper packing are definite fire hazards. In addition, some of the chemicals you work with may be able to start or feed a fire. And, faulty wiring can start an electrical fire in any workplace.

You need to know what to do to keep fires from starting, as well as how to deal with a fire emergency.

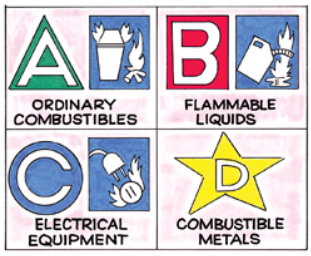
WHERE ARE THE REGULATIONS?

The Occupational Safety and Health Administration (OSHA) regulate several aspects of fire prevention and response. Fire prevention plans are addressed in 29 CFR 1910.39. In addition, the provisions for fire extinguishers and other protection are addressed at 29 CFR 1910.157 as a guide.

WHAT KIND OF FIRE IS IT?

The National Fire Protection Association (NFPA) has classified five general types of fires, based on the combustible materials involved and the kind of extinguisher needed to put them out. The five fire classifications are A, B, C, D, and K.

General classes of fires



Class A: This type of fire is the most common. The combustible materials are wood, cloth, paper, rubber, and plastic. The common extinguishing agent is water, but dry chemicals are also effective.

Class B: Flammable liquids, gases, and greases create class B fires. The most common extinguisher to use is dry chemical. Also, foam and carbon dioxide extinguishers can be used.

Class C: Because class C fires are electrical fires, use a nonconducting agent to put them out, for example, carbon dioxide and dry chemical extinguishers. Never use foam or water-type extinguishers on these fires.

Class D: Fires arising from combustible metals, such as magnesium, titanium, zirconium, and sodium are categorized as class D fires. These fires require specialized techniques to extinguish them. None of the common extinguishers should be used. Use dry powder extinguishers specific for the metal hazard present on these fires.

Class K: Fires resulting from the combustion of cooking oils and fats are class K fires. Commercial kitchens usually have special extinguishers for class K fires.

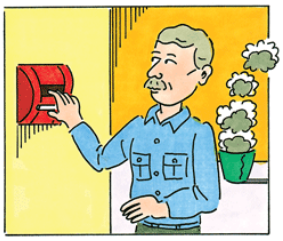
Multi-purpose extinguishers (ABC) will handle all A, B, and C fires. **Be sure to read the label.**

HOUSEKEEPING TO PREVENT FIRES

The importance of good housekeeping ties in closely with fire prevention. If you allow debris or flammable material to accumulate, the risk of starting a fire increases. Everyone must help to keep the work area clutter-free and safe from other fire hazards, such as improperly used or stored chemicals.

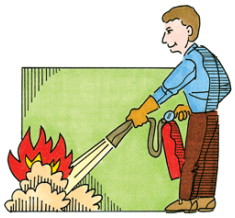
FIRE CHECKLIST

When a fire starts, think first of your safety and the safety of others. Alert the fire department. Try to put out the fire only if you have been trained to use extinguishers and the fire is small and tame enough to be extinguished by a hand-held extinguisher.



When the fire is spreading quickly, the combustible material is unknown, or you have not been trained in the proper use of extinguishers, leave the firefighting to professionals with the proper equipment. In this case, sound the fire alarm, and evacuate.

If the fire can be contained or extinguished, **a properly trained person should use the right extinguisher on the fire**. When using a typical extinguisher, follow the "PASS" method. Hold the extinguisher upright, and:



- Pull the pin; stand back eight to ten feet.
- Aim at the base of the fire.
- Squeeze the handle.
- Sweep at the base of the fire with the extinguishing agent.

Remember, too, that most extinguishers have a very limited operation time, only 8-10 seconds, so you have to act fast and spray correctly at the base of the fire.

Know the location of fire alarms and extinguishers. Know your nearest fire exit, and proceed to it in an orderly fashion.

Smoke and fumes can leave a person unconscious. All fires consume oxygen to burn. Most victims of a fire suffocate from lack of oxygen and die. They are already unconscious or dead before the flames reach them.

Inside a building that is in flames, get to your hands and knees and crawl to an exit. This is important because smoke and heat rise rapidly, and you will inhale less smoke near the floor. Outside, try to get upwind, of the smoke.

THE CHEMICAL FIRE

Many of the thousands of chemicals in use in the workplace are both highly toxic and highly volatile. Extreme caution must be used to prevent and fight fires resulting from chemical spills and accidents. Know the hazards of the chemical substances you use on the job and how to handle and store them properly to prevent dangerous chemical fires.

Chemical hazards

Chemicals can cause serious injuries through physical (fire or explosion) or health (burns or poisons) hazards. Many chemicals have inherent properties that make them very hazardous.

They might include:

- **Flammability** - These chemicals catch fire very easily.
- **Reactivity** - A reactive material can undergo a chemical reaction under certain conditions; reactive substances can burn, explode, or release toxic vapor if exposed to other chemicals, air, or water.
- **Explosivity** - An explosive can undergo a very rapid chemical reaction producing large amounts of gas and heat.

As a result of these properties, chemicals can produce fires that start and spread quickly.

FLAMMABLE LIQUID HANDLING AND STORAGE

Flammable liquids give off ignitable vapors. Also, nearly all flammable liquid vapors are heavier than air and will accumulate in low areas with poor ventilation. When they accumulate sufficiently, they spread and can travel to an ignition source. These ignition sources might be cigarettes, a hand tool that sparks, a cutting torch, or a motor.

Storage

The typical workplace stores flammable liquids in two ways: reserve storage in drums and operational storage in small quantities (for use at work stations.) For reserve storage safety, as soon as a drum is unloaded, the bung cap should be replaced with a drum vent; this prevents pressure build-up if the drum is exposed to heat. Proper vents also incorporate emergency relief devices, which blow out under extreme pressure.

Drums should also be connected to a grounding system; this eliminates static electrical build-up when dispensing from the drum. If your workplace does not have a drum storage room, drums should be stored in a safety cabinet; they are available in sizes to hold drums vertically or horizontally.

Transfer

Liquids can be dispensed from drums by two methods: gravity flow from drums stored horizontally, and pumping from drums stored vertically.

For gravity flow safety, liquids are dispensed into a safety can using a self-closing drum valve. OSHA requires the use of approved safety cans for transfer purposes.

A drip pan should be placed under the valve to catch spills and leaks. The drip pan and receiving container must be bonded to the drum to draw off any static electrical charge.

The pump method is faster, empties the drum almost completely, and saves space because drums are stored vertically. Drip pans are not required. Bond the receiving containers if the pump hoses are not self-bonding.

Mobile solvent tanks (liquid caddies) are used to distribute flammable liquids to work stations using large production line equipment. They are equipped with rubber wheels, a measuring pump, and a self-bonding hose.

Use

Use safety cans to hold and dispense flammable liquids as you work. There are many work station cans from which to choose. Keep containers closed when not in use, and put containers back into safety cabinets for storage.

Disposal

Disposing of waste flammable liquids requires proper procedures. Oily, solvent-soaked rags can easily start a fire. To prevent this, specially designed waste cans should always be used for temporary storage. These cans have spring-loaded lids and a raised bottom with vent holes to dispense heat. Collect waste flammable liquids in approved liquid disposal cans.

Dipping and coating operations using flammable liquids

A dip tank means a container holding a liquid other than water and that is used for dipping or coating. Examples of dipping and coating operations are paint dipping, electroplating, pickling, quenching, tanning, degreasing, stripping, cleaning, roll coating, flow coating, and curtain coating.

Dip tanks for flammable and combustible liquids are designed and installed with fire prevention safeguards, but employees need to be aware of some other fire prevention procedures:

- To prevent sparks that can cause fires, electrical wiring and electrical equipment used in the area of the dip tank must be approved for a hazardous location.
- If portable containers are used to pour flammable or combustible liquids into the dip tank, there is a risk that the pouring action could cause sparks due to static electricity discharge. To prevent this, wires must be used to ground and bond portable containers to the dip tank.
- The dip tank area must be kept free of any combustible debris. Rags contaminated with flammable or combustible liquids must be placed in approved waste cans immediately after use. The waste must be properly disposed of at the end of each shift.
- Smoking is prohibited near dip tanks containing flammable or combustible liquids.
- Fire extinguishers must be available in the area.

There are other safe procedures to follow in any dipping or coating operation:

- Dip tanks must be emptied and ventilated before cleaning. Employees who enter a dip tank must follow permit-required confined space entry procedures, as applicable.
- If ventilation does not adequately reduce exposures to hazardous chemicals, employees will need to wear respirators and follow the procedures of the employer's Respiratory Protection Program.
- Employees need to know first aid procedures that are appropriate to the hazards of the operation.
- If the liquids could harm employees' skin, the employer must provide storage space for employees' street clothes, an emergency shower and eye wash station, and basins with hot-water faucets.

SPILL CLEANUP

Only specially trained emergency response team members may respond to an emergency release or spill.

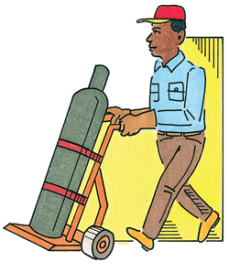
Specially designed absorbent materials have been developed for spill cleanup. These products are offered in pillows, pads, sheets, tubes, and other shapes to fit all cleanup needs. Once the absorbent material is saturated, it should be placed in a large disposal drum and sealed with a drum cover. Another spill cleanup technique involves the use of specialized vacuum equipment.

COMPRESSED AND LIQUEFIED GASES

To avoid fires resulting from ignition of compressed gases:

- Never roll or drag cylinders when gases are stored, transported, or used. Use a hand cart or truck specially designed for gas cylinders.
- Store all cylinders upright and secure them to walls or bench tops during storage or use.
- Compressed gases should be stored in dry, cool and well ventilated areas, protected from the weather, and away from flammable materials. The area should be posted for no smoking.
- Keep compressed gas cylinders which contain oxygen away from oil, grease, or liquid flammables.
- Separate fuel and oxidizing gas cylinders by at least 20 feet or a fire wall.
- Be very careful about fittings or connections. Before any connections are made, inspect the cylinder carefully. Do not change, modify, repair, or tamper with pressure relief devices on cylinders.
- When more information, advice, or help is needed, call the gas supplier; when in doubt about handling, contents, or cylinder condition, seek an expert's advice.

WORK AT WORKING SAFELY

Prevention is the key to eliminating fire hazards:

1. Keep work areas clean and clutter-free.
2. Know how to handle and store the chemicals you work with.
3. Know what you are expected to do in case of a fire emergency.
4. Make sure you are familiar with your facility's emergency action plan for fires.