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Flammable Materials

Many types of flammable and combustible materials/liquids are used in today's workplace. As the person responsible for safety at your company, you need to ensure that you have properly identified these materials through your hazard communication program. Flammable liquid fires are more volatile than fires fueled by ordinary combustibles. In fact, the rate of temperature rise is greater, the liquids produce clouds of thick, black smoke and the fires can spread very rapidly.

Because of the above hazards, special precautions are required when storing, handling and using flammable or combustible materials and liquids.

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Storage

There are specific rules governing aboveground storage tanks (AST), underground storage tanks (UST), and storage of small quantities of flammable and combustible materials (these can be found in both OSHA codes and NFPA 30 codes). It is your responsibility to learn the applicable codes and disposal methods for the types of materials being used on your sites. The most recent version of NFPA 30 became effective 8/15/07.

Storage cabinets can be used for flammable liquids in certain circumstances. Ordinary office supply cabinets do not provide adequate protection and are not approved for storage of flammable liquids. Cabinets should be designed to meet the following requirements:

- At least 18 gauge steel with riveted or welded joints
- Double-wall construction with inch and a half air gap between the walls for insulation
- Have a 2-inch raised door sill to contain spills
- Be equipped with a door lock that catches at the top, bottom and middle to prevent buckling in a fire

Wooden cabinets can provide adequate protection if they are built to the following specifications:

- Constructed of exterior grade plywood at least 1-inch thick that will not delaminate under fire conditions
- Have rabbeted joints that are fastened in two directions with wood screws
- Have a raised sill or pan capable of holding at least two inches of spilled liquid.

There are certain requirements for storage cabinet quantities based on the class of liquid being stored. Please check the applicable codes to make sure you are in compliance.

Based on the limited number of storage cabinets that can be located in a fire area, large quantities of flammable liquids must be kept in storage rooms. There are very strict requirements for storage rooms and consist of the following elements:

- Fire resistance
- Opening protection
- Deflagration venting
- Spill containment
- Electrical wiring
- Ventilation
- Dispensing
- Quantity limitations

When storing flammable liquids there are specific fixed fire protection design criteria that must be followed based on the NFPA 30 codes, and includes:

- Having a fully charged portable fire extinguisher outside of the flammable liquid storage area
- Training to all affected employees on fire extinguisher use
- Visually inspecting fire extinguishers on a monthly basis and servicing extinguisher on an annual basis

Important terms when dealing with flammables and combustibles:

Flash Point: The lowest temperature at which a liquid gives enough vapor to cause a momentary flame in the presence of an ignition source. In other words, a fire will not occur until a flammable liquid is heated above a certain temperature called the flash point.

Boiling Point: The temperature at which the vapor pressure of a liquid exceeds surrounding atmospheric pressure. Low boiling liquids are more hazardous because they evaporate more quickly.

Flammable Liquids: Those liquids with a flash point less than 100º F.

Combustible Liquids: Those liquids with a flash point greater than, or equal to 100º F.

Liquid Classes: Class I-A flammable liquids are those with flash points less than 73º F, and boiling points less than 100º F. (e.g. ether, pentane and ethylene oxide)

Class I-B flammable liquids are those that have flash points less than 73º F, and boiling points at or above 100º F. (e.g. acetone and gasoline)

Class I-C flammable liquids are those that have flash points between 73º F and 100º F. (e.g. butyl alcohol and turpentine)

Class II combustible liquids are those with a flash point above 100º F but below 140º F (e.g. kerosene and diesel fuel)

Class III-A combustible liquids are those with a flash point between 140º F and 200º F. (e.g. acetophenone, diethyl benzene and isopherone)

Class III-B combustible liquids are those with a flash point greater than 200º F. (e.g. castor oil, olive oil and peanut oil)

Incidental Use: This generally means one day's supply of a flammable or combustible liquid (whatever the quantity may be) but it can also be a specific amount based on the liquid class.

If you or your employees use or are exposed to flammable or combustible materials or liquids use the following self-inspection checklist developed by OSHA. Take action to correct items, as necessary.

Yes	No	Self-inspection checklist
☐	☐	Are combustible scrap, debris and waste materials stored in covered metal receptacles, and removed from the work site promptly?
☐	☐	Are proper storage methods used to minimize the risk of fire and spontaneous combustion?
☐	☐	Are approved containers and tanks used for the storage and handling of flammable and combustible liquids?
☐	☐	Are all connections on drums and combustible liquid piping (vapor and liquid) tight?
☐	☐	Are all flammable liquids kept in closed containers when not in use?
☐	☐	Are bulk drums of flammable liquids grounded and bonded to containers during dispensing?
☐	☐	Do storage rooms for flammable and combustible liquids have explosion-proof lights?
☐	☐	Do storage rooms for flammable and combustible liquids have mechanical or gravity ventilation?
☐	☐	Are safe practices followed when liquid petroleum gas is stored, handled and used?
☐	☐	Are liquefied petroleum storage tanks guarded to prevent damage from vehicles?
☐	☐	Are all solvent wastes and flammable liquids kept in fire-resistant, covered containers until they are removed from the work site?
☐	☐	Is vacuuming used whenever possible, rather than blowing or sweeping combustible dust?
☐	☐	Are fire separators placed between containers of combustibles or flammables when stacked one upon another (to assure their support and stability)?
☐	☐	Are fuel-gas cylinders and oxygen cylinders separated by distance, fire resistant barriers or other means while in storage?

Yes	No	Self-inspection checklist
☐	☐	Are fire extinguishers provided for the type of materials they will extinguish, and are they placed in areas where they are to be use?
☐	☐	Class A: Ordinary combustible materials fires
☐	☐	Class B: Flammable liquid, gas or grease fires
☐	☐	Class C: Energized-electrical equipment fires
☐	☐	Are appropriate fire extinguishers mounted within the required distance for various types of fires (75 feet for Class A fire or 50 feet for a Class B fire)?
☐	☐	Is the transfer/withdrawal of flammable or combustible liquids performed by trained personnel?
☐	☐	Are employees trained in the use of fire extinguishers?
☐	☐	Are all extinguishers serviced, maintained, and tagged at intervals not to exceed one year? Is a record maintained of required monthly checks of extinguishers?
☐	☐	Are “NO SMOKING” signs posted and enforced where appropriate in areas where flammable or combustible materials or liquids are stored?
☐	☐	Are all spills of flammable or combustible liquids cleaned up promptly?

SAIF has a packet of comprehensive information pertaining to Flammable and Combustible Materials for Spray Finishing (Guide S-849). If you would like to receive this information please contact your local SAIF Loss Control Consultant.

Also, it is important to remember that even if you are in compliance with OSHA's flammable liquids standard, you will want to review the NFPA's Flammable and Combustible Liquids Code (NFPA 30) for a more comprehensive source for current information relating to these dangerous materials.