ECKERD COLLEGE

Safe Operating Procedure

1/04

FLAMMABLE LIQUIDS

Flammable liquids generate vapors that can catch fire and burn when subjected to flames, sparks, heat, or incompatible chemicals. The following precautions should be observed when using flammable liquids:

- Flammable liquids used in the laboratory that are in glass containers shall not exceed 1 liter unless the chemical purity must be protected. In that case, 4-liter quantities are permissible.

- Secure screw caps on containers immediately following dispensing. Do not dispense flammable liquids into beakers or other open containers and allow them to remain on ordinary work tables/bench tops. Flammable liquids should be placed in a hood as soon as possible and used in a reasonable time normally allotted for the particular activity.

- Do not allow flammable liquids to evaporate in a fume hood as a means of disposal. This is an illegal act.

- Eliminate ignition sources such as open flames, hot surfaces, operation of electrical equipment, and static electricity from areas in which flammable liquids are used or stored.

- Segregate flammable liquids from oxidizing acids and oxidizers.

- Refrigerators and freezers used for the storage of flammable liquids must be rated for such use. Commonly, these refrigerators and freezers display conspicuous manufacturer's signs with this rating. When purchasing a refrigerator for storing flammable liquids in a laboratory or similar space, select one that is rated for "Flammable Material/Liquids." "Explosion Proof" refrigerators are intended for locations such as solvent vaults or process rooms where solvent vapors are commonly encountered in the atmosphere. These refrigerators must be "hard-wired" into the location and can be nearly twice as expensive as "Flammable Materials/Liquids" refrigerators.

- Ensure that there is proper bonding and grounding when transferring between metal containers or dispensing a flammable liquid from a large container or drum.

- Spent flammable and combustible liquids should be kept in containers like the original, with an appropriate label giving the exact contents of the container.

The minimum temperature at which a liquid gives off vapor sufficient to form an ignitable mixture in air near the surface of the liquid is called the flashpoint. The minimum flashpoint temperature defines whether a material is classified as a flammable liquid. However, different agencies have different flashpoint criteria. For example, the United States Environmental Protection Agency (EPA) defines a flammable liquid as any liquid with a flashpoint of 140° F or less. The National Fire Protection Agency defines a flammable liquid as any liquid with a flashpoint of 100° F or less. Most manufacturers will label a container as flammable only if it has a flashpoint of 100° F or less. Containers with flashpoints between 100° and 200° F will be labeled "combustible." For our purposes at Eckerd, we generally observe the EPA definition and refer to a flammable liquid as any liquid with a flashpoint of 140° F (66° C) or less.

To better understand the concept of flashpoint, consider two common liquids, gasoline and diesel fuel with flashpoints of –40° F and 120° F, respectively. By Eckerd's definition, both are flammable liquids. However, a lit match held over both at room temperature (72° F) would result in only the gasoline igniting. Gasoline is above its flashpoint and is generating enough vapors to ignite when the match is near. In order to get the diesel fuel to ignite, it is necessary to warm it to at least 120° F. Flashpoints for chemicals can be found on Material Safety Data Sheets (MSDSs). Generally, the testing is done up to about 212° F. If a liquid has a flashpoint greater than 212° F, either >212° F or NA is listed on the MSDS.

Most flammable liquid vapors are heavier than air. The vapors can sink and then move along the floor. If the vapors encounter an ignition source such as a pilot light, electrical motor, etc., the vapors can ignite resulting in a flashback fire. The initial ignition can be violent enough to blow out windows and even blow closed doors off their hinges. Fire and explosions can also result from reactions between flammable liquids and oxidizers.