

FIRE PREVENTION

GENERAL FIRE HAZARDS

The presence of combustible materials, potentially explosive substances, fuel sources and electrical supplies constitute the main fire hazards within the workplace.

1. ORGANIC SOLVENTS

Many commonly used organic solvents have properties which constitute a serious fire hazard.

- 1.1 **The Flash Point** of a liquid is defined as the lowest temperature at which the vapour produced in air is flammable. For example, the flash point of ethyl alcohol is 13°C. If a spark or open flame is brought near the surface of this alcohol at room temperature, it will ignite immediately. The flash points of the more common substances are given below in °C. *(The student and teacher-monitor should become informed of the flash points of other flammable substances used in the student's work placement.)*

	°C
95% Ethanol (Ethyl Alcohol)	+13
Methanol	+10
Ethylmethylketone	- 6
Propanone (Acetone)	- 18
Ethoxyethane (Diethyl Ether)	- 45
Gasoline	- 46

1.2 **Ease of Ignition of Vapour-Air Mixtures:**

Vapour-air mixtures can be ignited by a very small amount of electrical energy such as a static discharge, the sparking of relay contacts, or even the shorting of small dry cell batteries.

Many solvent vapours can be ignited by contact with surfaces below red heat such as that of a steam radiator or a hot electric light bulb.

1.3 **High Density Vapours:**

High density vapours can creep along floors and benches providing a flammable or explosive train.

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1.4 Behaviour in Confined Spaces:

Volatile solvents kept in confined spaces readily vaporize to produce an air/vapour mixture which is explosive. For example, ethyl alcohol, diethyl ether and acetone at percentages as low as one or two percent of vapour in air are explosive. These solvents should be kept in a well-ventilated area in closed, well-labelled containers. Quantities over 1 litre must be stored in safety containers. They should be used only in very well-ventilated areas.

1.5 Spills

Spilling a chemical with a low flash point may cause a fire hazard. If a large amount of flammable substance is spilled (i.e. more than one litre) the area should be evacuated immediately and the Fire Department should be notified.

If a small amount of a flammable substance is spilled:

- i. alert all those who might be affected and remove students from the immediate vicinity until the spill is cleaned up;
- ii. extinguish all flames immediately; turn off any motors and electrical equipment;
- iii. turn on ventilation equipment or, if none exists, open all windows;
- iv. if the substance is not reactive to water, flush with large amounts of water to a drain;
- v. absorb liquids with paper towels, cloths, or other absorbent materials and dispose of in closed containers;
- vi. alert custodians as to the contents of the containers;
- vii. arrange through the custodian to have the contaminated area cleaned with soap and water and dry mopping. Commercial laboratory spill kits are available for flammable solvents.

2. FLAMMABLE GASES

Gases such as hydrogen, methane and propane have explosion hazards because of the ease of their ignition and the wide limits of concentration of explosive gas/air mixtures.

Precautions similar to those of flammable vapours should be taken for oxygen as well.

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3. **SMOKING**
"No Smoking" signs should be posted in all shops.

4. **OILY RAGS**
Must be deposited in a special container marked for that use only.

5. **WASTE OIL & GREASE**
Must be placed in a special container.

FIRE CONTROL

BURNING CLOTHING OR HAIR

Water is the most effective extinguishing substance.

Never use a fire extinguisher on an individual. A fire blanket could be used to smother the fire. Take a fire blanket to the burning individual. Wrap it around the person to smother the fire, while protecting your hands.

EQUIPMENT AND PROCEDURES

Appropriate fire extinguishers must be available and kept in a prominent place. A fire blanket should be available in any area where there is a danger of fire.

It is the supervisor's responsibility to know and to have employees know:

- a) the location of and correct techniques for using the fire extinguisher, the fire blanket, and the fire alarm;
- b) the procedure to follow in case of a fire emergency.

EVACUATION

The potential danger from the fire must be determined immediately. If there is any possibility that the fire might spread or present a danger to workers, the fire alarm must be sounded and the building evacuated.