

Chemical Safety

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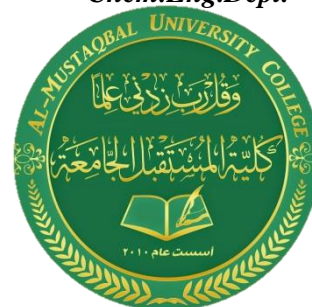
Ministry of Higher Education
and Scientific

Al-Mustaqbal University College

Chemical Engineering and Petroleum Industries

Department

Chem.Eng.Dept.



Subject: Chemical Safety

Second Class

Lecture One

Hydrofluoric Acid – Emergency Procedures

First Aid must be started within seconds in the event of contact of any form!

Skin Exposure

a) Immediately flood the body area with cold water thoroughly cleaning the area, then apply calcium gluconate. If no calcium gluconate is immediately available, continue rinsing the affected area until emergency medical responders arrive, using copious amounts of water.

Remove contaminated clothing and footwear while rinsing.

b) Call or have a co-worker call for medical assistance (Emergency phone must be labeled in the Laboratory entrance)

c) Gently rub calcium gluconate ointment onto the affected area. Continue applying until emergency medical responders arrive.

d) Inform responders and all others that the exposure involved hydrogen fluoride/hydrofluoric acid.

Eye or Inhalation Exposures to HF

a) Flush eyes with plenty of cool tap water for about 15 minutes.

b) Move inhalation exposure victim to clean air

c) Call or have a co-worker call for medical assistance

d) Await emergency medical responders, informing them and all others that the exposure involved hydrogen fluoride/ hydrofluoric acid.

Hydrogen fluoride and hydrofluoric acid cause severe, deeply penetrating burns to the skin, eyes, and lungs. Although concentrated forms of these compounds are readily perceived by a burning sensation, more dilute forms are often imperceptible for many hours. This potential time delay between exposure recognition and treatment can lead to insidious and difficult to treat burns.

If you work with hydrogen fluoride or hydrofluoric acid, make certain you and your coworkers familiarize yourselves with these first aid procedures, and keep an updated supply of 2.5% calcium gluconate ointment in the work area.

FLAMMABLE LIQUID SAFETY

I. PURPOSE

The fire, explosion, and health hazards of handling, storing, and using flammable liquids generally can be eliminated or minimized by strict observance of safety procedures.

This safety guide provides basic information applicable to most areas that use flammable or combustible liquids in their daily operations.

A flammable chemical is any solid, liquid, vapor, or gas that ignites easily and burns rapidly in air. Consult the appropriate MSDS before beginning work with flammables.

H.w

Give three examples to the flammable chemicals?

Flammable chemicals are classified according to flashpoint, boiling point, fire point, and auto-ignition temperature.

1) Flash Point (FP) is the lowest temperature at which a flammable liquid's vapor burns when ignited.

2) Boiling Point (BP) is the temperature at which the vapor pressure of a liquid is equal to the atmospheric pressure under which the liquid vaporizes. Flammable liquids with low BPs generally present special fire hazards.

C.w

How we can determine the vapor pressure of a liquid?

3) Fire Point is the temperature at which the flammable liquid will burn.

4) Auto-ignition Temperature is the lowest temperature at which a substance will ignite without an ignition source.

Conditions for a Fire

Improper use of flammable liquids can cause a fire. The following conditions must exist for a fire to occur:

- Flammable material (i.e., fuel) must be present in sufficient concentration to support a fire.
- Oxygen or an oxidizer must be present.
- An ignition source (i.e., heat, spark, etc.) must be present.

When working with flammables, always take care to minimize vapors which act as fuel.

A. Fire and Explosion Hazards

Many flammable liquids are volatile by nature, and it is their vapors combined with air, not the liquid, that ignite and burn. Increased temperature of a flammable liquid generally causes an increase in the rate at which vapors are evolved.

Ordinarily, flammable liquid vapors are heavier than air and will settle to the lower levels, not easily diffusing with air unless there is sufficient movement of air.

Explosions occur when the lower explosive limit (L.E.L.) is reached and a source of ignition is present. (L.E.L. is the minimum concentration of a flammable liquid vapor in air below which propagation of flame does not occur on contact with a source of ignition.)

B. Health Hazards

Some flammable liquids are primary skin irritants that destroy tissue; others are skin sensitizers. An inhalation hazard exists in all cases, varying in degree in accordance with the concentration and toxicity of the vapor. Some atmospheres containing flammable vapors in concentrations below their lower explosive limit may still be harmful to health because of the vapor's toxic properties.

A. Minimizing Hazards

Methods of minimizing the hazards associated with flammable liquids and their vapors include:

1. Process modifications that substantially reduce the areas of exposed liquids
2. Substitution of a nonflammable or less flammable material for a low flash liquid
3. Local exhaust removal of the vapors.

B. Basic Principles for Safe Handling

1. Limit the quantities at any one location to those actually necessary.
2. Eliminate other possible ignition sources wherever flammable liquids are stored or used.
3. Avoid sparks from static charges generated by pouring; connect dispensing and receiving containers (if metal) by a suitable electrical conductor.
4. Use flammable chemicals in appropriately equipped areas only.
5. Prevent accumulation of vapors by careful handling and by providing adequate ventilation.
6. Use only approved containers, e.g., safety cans or metal drums, for all transportation and handling.
7. Label every storage container used for flammable liquids with the name of the material and the words: "Danger Flammable Keep away from heat, sparks, and open flames Keep closed when not in use."
8. Use ground straps when transferring flammable chemicals between metal Containers to avoid generating static sparks.

C. Storage Inside Buildings

1. Egress

Flammable or combustible liquids shall not be stored so as to limit use of exits, stairways, or areas normally used for the safe egress of people.

2. Containers

Flammable or combustible liquids should be stored in the container provided by the manufacturer. These liquids, in pure or combined forms, should be transferred to approved containers only and should be labeled to indicate the hazards.

3. Container Storage

Approved containers for flammable and combustible liquids should be stored in an explosion proof cabinet or explosion proof refrigerator, unless all traces of such chemicals have been removed from the container.