

Chemical Safety

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Ministry of Higher Education
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Al-Mustaqbal University College
Chemical Engineering and Petroleum Industries
Department



Subject: Chemical Safety

Second Class

Lecture Two

TYPES OF CHEMICAL HAZARDS (in details)

1- CORROSIVES

Corrosive chemicals destroy or damage living tissue by direct contact. Some acids, bases, dehydrating agents, oxidizing agents, and organics are corrosives. Examples of the different

types of corrosive chemicals are listed below:

Acidic corrosives:

- Inorganic Acids
 - Hydrochloric acid
 - Nitric Acid
 - Sulfuric acid
- Organic Acids
 - Acetic Acid
 - Propionic acid

Alkaline, or basic, corrosives:

- Sodium hydroxide
- Potassium hydroxide

Corrosive dehydrating agents:

- Phosphorous pentoxide
- Calcium oxide

Corrosive oxidizing agents:

- Halogen gases
- Hydrogen peroxide (concentrated)
- Perchloric acid

Organic corrosive:

- Butylamine

HEALTH CONSEQUENCES

Extreme caution should be taken when handling corrosive chemicals, or severe injury may result.

- A. Concentrated acids can cause painful and sometimes severe burns.
- B. Inorganic hydroxides can cause serious damage to skin tissues because a protective protein layer does not form. Even a dilute solution such as sodium or potassium hydroxide can attack skin by reacting with the fat tissues and forming a soapy, slick film.
- C. At first, skin contact with phenol may not be painful, but the exposed area may turn white due to the severe burn. Systemic poisoning may also result from dermal exposure.
- D. Skin contact with low concentrations of hydrofluoric acid (HF) may not cause pain immediately but can still cause tissue damage if not treated properly. Higher concentrations of HF (50% or greater) can cause immediate, painful damage to tissues.

SAFE HANDLING FOR CORROSIVES

To ensure safe handling of corrosives, the following special handling procedures should be used:

- A. Always store corrosives properly. Segregate acids from bases and inorganics from organics.
- B. Always wear a laboratory coat, gloves and chemical splash goggles when working with corrosives. Wear other personal protective equipment, as appropriate.
- C. To dilute acids, carefully add the acid to the water, not the water to the acid. This will minimize any reaction.
- D. Corrosives, especially inorganic bases (e.g., sodium hydroxide), may be very slippery; handle these chemicals with care and clean any spills, leaks, splashes, or dribbles immediately.

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E. Work in a chemical fume hood when handling fuming acids or volatile irritants (e.g., ammonium hydroxide).

F. A continuous flow eye wash station should be in every work area where corrosives are present. An emergency shower should also be within 55 feet of the area.

ACID HANDLING SAFETY

The following section will indicate some of the most predominant hazards and the procedures that should be followed to avoid physical impairment.

I. HAZARDS

The hazards of acid are many. Some of the common hazards are:

- A.** Acids, in liquid and vapor states, are highly toxic and irritating to the eyes, skin, and respiratory tract.
- B.** Contact of acid with skin causes very painful and medically serious burns.
- C.** Liquid contact with the eyes can cause immediate blindness.
- D.** Some acids offer a fire and explosion hazard.

II. PROCEDURES

- A.** Store strong acids separately and away from volatile organic chemicals. Do not store more than chest high. Close fitting, shatterproof containers shall be available for transporting glass containers of acids.
- B.** Wear a face shield, acid resistant chemical gloves, and aprons when working with acids. Emergency flood showers and/or eye wash fountains must be available.

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C. Dilute acids by stirring the concentrated acid slowly into the water.

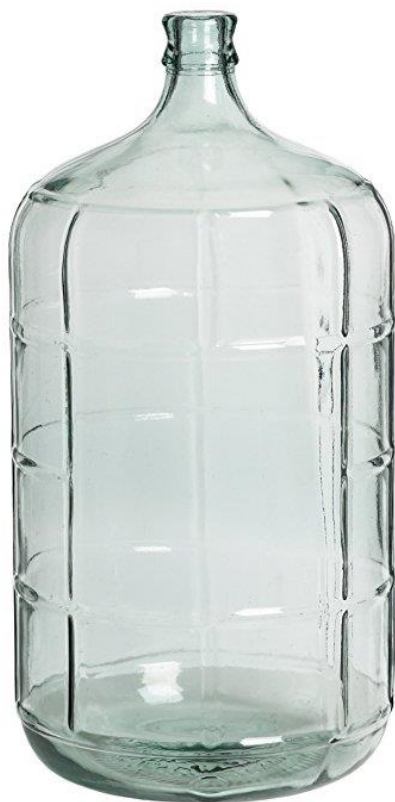
-(DO NOT POUR WATER INTO ACID).

D. When using acids, make available suitable neutralizing agents for use in the event of spills. Acids should be neutralized with weak bases, such as sodium carbonate or bicarbonate. Spill kits are available in the chemical storeroom.

E. Before packaged acid containers or carboys are handled, inspect them for damage. Empty acid containers should be rinsed and disposed of properly.

Hint

Carboy (تعني قنينية زجاجية)



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F. To transfer acid safely from a carboy, move the liquid by suction from a vacuum pump or aspirator or start a siphon with a rubber bulb or ejector. Compressed air even from a hand pump should not be used. Wear protective equipment face shields, gloves, aprons, etc.,

during all transfer operations. Never leave the transfer operation unattended.

G. Transport all liter or greater size bottles of acids or bases in a rubber bucket or an acid resistant, shatterproof carrier.

Hint

shatterproof carrier وعاء محمول ضد الكسر



H. In the event of personal contact with acids, pending medical treatment, wash off the chemical by flooding the burned area with copious amounts of water as quickly as possible. This is the only method for limiting the severity of the burn, Seek professional medical assistance immediately.

Hint

copious غزير