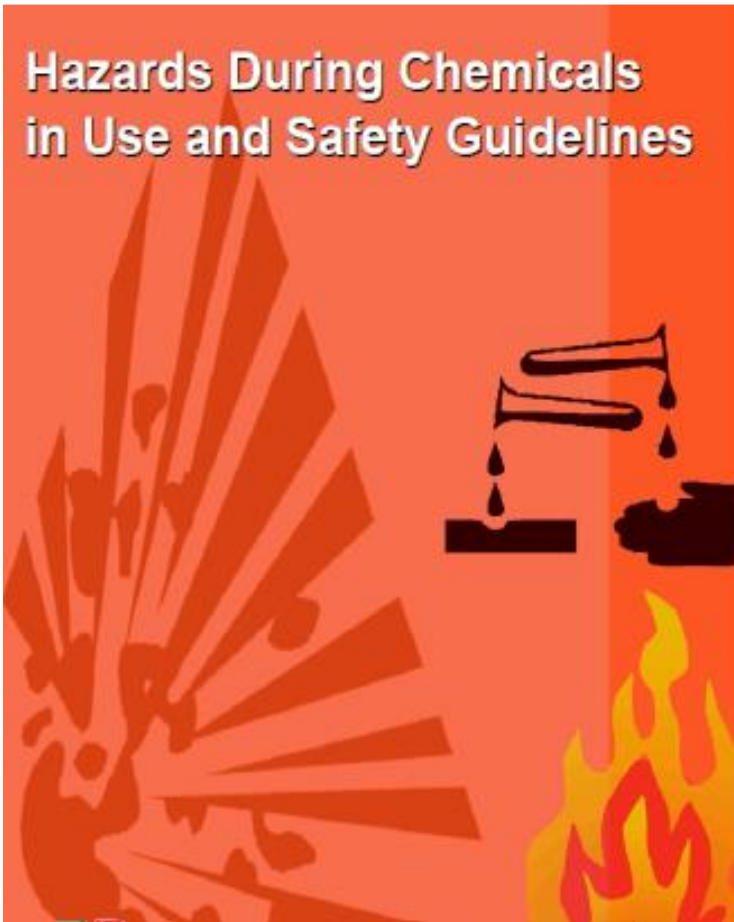


# Hazards During Chemicals in Use and Safety Guidelines



# Key Steps in Safe Use of Chemicals

*Know the hazards  
and  
take safety measures*

## Know the Hazards

- Understand the hazardous properties of the chemicals involved
- Understand the reaction and the products during chemicals in use
  - May the process generate heat and/or gases ?
  - Is there any side reaction involved ? What are the side products ?
  - Are the products dangerous substances ? What are the hazardous properties ?
- Understand the effect of the environment to the reaction, the reactants and the products
  - May light, heat and shape of the container affect the reaction so that it will be out of control ?
  - May light, heat, air and water affect the reactants and the products so that other reactions will occur ?

## Safety measures

- Select other safer substitutes or procedures
- Use engineering control measures
  - including ventilation and exhaust system, temperature control, stirring facility, appropriate container
- Wear appropriate personal protective equipment
- Understand and follow safe operating procedures
  - including procedures for use of engineering control and personal protective equipment and for waste disposal
- Understand contingency measures, and in case of accident follow emergency procedures
  - including procedures for fire fighting, evacuation, first aid, treatment of spillage

## How can we obtain hazard and safety information ?

- Read the label and material safety data sheet (MSDS) of the chemicals
- Obtain information from other references, such as handbooks on chemical safety

# GHS Hazard Pictograms

## Globally Harmonized System



### Health Hazard

Carcinogen  
Mutagenicity  
Reproductive Toxicity  
Respiratory Sensitizer  
Target Organ Toxicity  
Aspiration Toxicity



### Flammable

Flammables  
Pyrophorics  
Self-Heating  
Emits Flammable Gas  
Self-Reactives  
Organic Peroxides



### Harmful

Irritant (skin & eye)  
Skin Sensitizer  
Acute Toxicity (harmful)  
Narcotic Effects  
Respiratory Tract Irritant  
Hazardous to Ozone Layer (Non-Mandatory)



### Compressed Gas

Gases Under Pressure



### Corrosive

Skin Corrosion/Burns  
Eye Damage  
Corrosive to Metals



### Explosive

Explosives  
Self-Reactives  
Organic Peroxides



### Environmental

Aquatic Toxicity



### Toxic

Acute Toxicity (fatal or toxic)



### Oxidizing

Oxidizers

Know the signs and meaning  
***THINK SAFETY***



Safety helmet must be worn



Ear protection must be worn



Safety harness must be worn



Eye protection must be worn



Respiratory equipment must be worn



Face protection must be worn



Safety overalls must be worn



Safety boots must be worn



Safety gloves must be worn



Pedestrians must use this route



General mandatory sign  
(To be accompanied where necessary by another sign)

## Know the hazard before using the chemicals

- √ Use appropriate control measures and personal protective equipment
- √ Keep the work area well-ventilated, or even work under local exhaust ventilation
- √ Keep away from any ignition source when handling flammable substances
- √ Don't eat, drink and smoke
- √ Don't touch chemicals with bare hands. Wear protective gloves.
- √ Don't suck chemicals with your mouth. Use appropriate liquid delivery tools.
- √ Don't use container with narrow opening for a process that evolves heat and/or gases
- √ Don't mix oxidizing agents with flammable/ combustible substances
- √ Don't mix acid with bleaching solution