

Chemical Safety Management in WIP, Kalpakkam - An Overview



Biplab Das
**Safety Officer, NRB,
BARC, KALPAKKAM**

Chemical Risk Analysis



- ② Quantity of the Chemical
- ② Toxicity of the Chemical
- ② Concentration of the Chemical
- ② Possibility of exposure
- ② Entry routes to human body
- ② Whether constitutes fire Hazards

Bulk Chemicals Used



- ② Nitric Acid
- ② Sodium Hydroxide
- ② Formaldehyde
- ② Dodecane
- ② Sodium Carbonate
- ② Tri-Butyl Phosphate

Exposure Limits of Chemicals used



Exposure limits(ACGIH)

Chemicals	TLV-TWA	TLV-STEL	Ceiling
HNO ₃	2.0 ppm	4.0 ppm	---
HCHO	---	---	0.3 ppm
TBP	0.2 ppm	---	---
Dodecane	500	---	---
NaOH	2 mg/m ³	---	---
Na ₂ CO ₃	15 mg/m ³	---	---

Receipt & Storage of NaOH & HNO₃



- ① TREM card
- ① Awareness of the hazards
- ① Hazchem panel
- ① Permit Procedures
- ① SS hose and designated pump
- ① Use of PPEs.

Receipt & Storage of other chemicals



- ② Storage at an isolated chemical store
- ② Authorised persons are permitted
- ② Adequate ventilation
- ② Chemicals in designated location
- ② Labelling of chemicals
- ② No drain line
- ② Bund area
- ② Flame proof and spark free fittings
- ② Fire detection system
- ② Emergency shower and eye wash system
- ② Communication system
- ② Safety symbols displayed

General Safety Precautions during handling of Chemicals



- Ⓢ Minimum inventory is maintained inside the plant.
- Ⓢ SOP followed
- Ⓢ No eating/drinking in process area
- Ⓢ Good hygiene practice
- Ⓢ Material Safety Data Sheets
- Ⓢ PPEs
- Ⓢ Periodical Medical Check up

Globally Harmonized Classification of Hazardous Chemicals



Nitric Acid:

Signal Word: Danger

Hazard Category:

- Metal Corrosive 1
- Skin Corrosive 1B
- Eye Damage 1

Hazard Statement:

H 290: May be corrosive to metals

H 314: Causes severe skin burns and eye damage

Globally Harmonized Classification of Hazardous Chemicals



Sodium Hydroxide:

Signal Word:

Danger

Hazard Category:

Skin Corrosive 1B

Eye Damage 1

Aquatic Acute 3

Hazard Statement:

H 314: Causes severe skin burns and eye damage

H 402: Harmful to aquatic life.

Globally Harmonized Classification of Hazardous Chemicals

Formaldehyde: Signal Word: Danger

Hazard Category:

- Flammable Liquid 3
- Acute Toxic 4 (oral)
- Acute Toxic 3 (inhalation)
- Skin Corrosive 1B
- Eye Damage 1
- Skin Sensitizer 1A
- Carcinogenic 1B
- Aquatic Acute 2

Hazard Statement:

- H 226: Flammable liquid and vapour
- H 302: Harmful if swallowed
- H 314: Causes severe skin burns and eye damage
- H 317: May cause an allergic skin reaction
- H 318: Causes serious eye damage
- H 331: Toxic if inhaled
- H 350: May cause cancer (Inhalation)
- H 401: Toxic to aquatic life.

Spill Management and Emergency Preparedness

- Everyone should be alerted
- Area of spill should be cordoned off
- Control room, Safety Coordinator, security and fire station personnel are to be informed;
- Injuries are to be attended first;
- The spilled chemical is to be retrieved and collected in suitable container.
- The area should be cleaned with cotton mops and the wet mops are to be treated and packed for disposal with appropriate tagging;
- Salvage operation should be done by wearing personal protective equipments like full face chemical mask, PVC clothing etc. by standing at upwind direction of the spill.



Hazardous Chemicals used in Laboratory

- Sulphuric Acid
- Hydrofluoric Acid
- Alcohols
- Acetone
- Hydrogen Peroxide
- Liquid Nitrogen etc.



Conclusion



- Following all engineering means to keep/use the chemicals within closed circuits wherever possible;
- Providing all information and training to the employees about the hazards from these chemicals;
- Ensuring good ventilations to keeps vapours out of the breathing zone of the employees;
- Getting the health of the employees checked periodically;
- Monitoring the workers and improving work practices;
- Welcoming any ideas from the employees about how to balance risks and benefits that are still better;
- Providing all standard personal protective equipments to the employees.



THANK YOU