

## Operation of a Chemical Production Unit

### General Objectives:

To provide the know-how for an autonomous job position in operation and maintenance of chemical production units, such as polymerization, fertilizers, chlorine, etc.

### Specific Objectives:

At the end of training the trainees will be able to:

- ✓ Understand the role of chemical reactions and reactants in the production process;
- ✓ Learn about the operating constraints induced by the chemical reactions implemented in a production unit;
- ✓ Grasp the impact of operating conditions on the production facilities output.

### Audience:

Operating or maintenance technicians, operating staff in chemical production facilities.

**Workload:** 30 hours

### CONTENTS:

#### **Module I – Main sections of the unit**

- ✓ Process flow scheme of the unit, specifically in the reaction section;
- ✓ Main operating conditions: temperature, pressure, flow rates, concentrations, profiles.

#### **Module II – Chemical background**

- ✓ Composition of the feed, characteristics of the effluents – Nature and role of the reactants; role of the recycle if any;
- ✓ Chemical and physical characteristics of the chemical reaction: thermal effect, kinetics, complete or incomplete, catalyst role if pertinent;
- ✓ Catalyst nature and effect, loading, poisons, ageing, regeneration.

#### **Module III – Equipments**

- ✓ Reactor type (mixed or piston type), internal devices, mixers, cooling system and temperature control;
- ✓ Recycling system: pumps, compressors, flashes, filters;

- ✓ Safety mechanical devices, SIS, short stop if pertinent.

## **Module IV – Analysis of operating conditions**

- ✓ Mass balance, heat balance;
- ✓ Operating parameters and impact on yields and purity, by-products and purification operations if pertinent;
- ✓ Advanced operation: yields and related modifications, selectivity and impacting parameters, feed composition;
- ✓ Reaction cycle: duration, parameters profiles as a function of time;
- ✓ Operation of the downstream fractionation and purification units.

## **Module V – Operation and disturbances**

- ✓ Nature and origins of disturbances: consequences, diagnostic, parades;
- ✓ Specific safety measures around the reactor.