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Modern Approach to Chemical Industry

Quality Control, Quality Assurance (QA), Quality Assurance (QA)

Pollution Control, Process Control

## Quality Control

Quality control is a system of activities, to measure control the quality of the record as it is being developed.

QC system is related to the

Furnish routine and uniform checks to ensure data fairness completeness

Print out and address errors and omissions

Quality control is of immense importance in any chemical process industry. It is integral part of the chemical production and involves the analysis or testing of the raw materials and the finished products for their standard specifications.

In most of the chemical industries, the products of one industry are used as raw materials for industry. Such products are called intermediates. In high-tech industries, such a pharmaceutical, semiconductor and microchip industries purity of the raw material as well as the product is of utmost importance. Different industries require different quality and purity of compounds. Terms as technical grade, analytical grade, reagent grade, spectroscopic purity etc. are used to denote the degree of purity and quantity of the compounds. The use of sophisticated instruments, skilled labour and autoionization can maintain the quality of the product Quality control can also be effected by testing the properties such as melting point, boiling po refractive index, colour, odour, tensile strength etc.

## **Quality Assurance (QA)**

Definition: The activities which include a planned system of review measures governed by personal not directly involved in the inventory compilation / development process is called quality assurance.

QA/QC programmed contributes to the goal of good practice guidance improve clarity, uniformity, comparability, completeness and confidence in national inventories of emissions estimates. Before performing QA/QC activities, it is essential to determine which techniques should be used, and where and when they will be employed. The following are the major basics to be considered in the development of a QA/QC system

- (1) Coordination of QA/QC activities,
- (ii) A QA/QC plan
- (iii) General QC procedures
- (iv) QA review procedures
- (v) Reporting, documentation and archiving procedures.

To coordinate QA/QC activities is the responsibility of inventory agency. The inventory agency should also see that the other organizations follow the QA/ QC plane may be useful to refer to the standards and guidelines published by the International Organization for Standardization (ISO).

## **Process Control**

The control of variables such as temperature, concentration, pressure, time, flow of reactant etc. for getting the desired product in an economic way is called process control

The process control involves three steps

- 1) Analysis of incoming raw material
- 2) Analysis of intermediate products during manufacturing
- 3) Analysis of the end product.

Almost all raw materials in chemical process industry are tested by chemical methods. It helps to determine the useful part of the raw material and the impurities present in it

Analysis of intermediate products during manufacturing process is also a part of process control. It involves the testing and analysis of the samples of the reaction mixture time to time. This helps to decide the completion of a chemical reaction. In modern chemical plants, process control is achieved through the use of automatic and instrumental methods. Data processing and computing instruments have taken over the running of complex chemical processes. The main function of automation or instrumentation is to ensure uniform quality of the product

There are various types of instruments used to check or to the quality of the product. These instruments are

Indicating instruments-They help to present current data

(1) Recording Instruments-They permit the analysis

Indicating recording and controlling instruments-They permit all above a data. Now a days, two more types of instruments are used

- 1) Analog
- 2) Digital

## **Pollution Control**

The protection of environment is a serious problem today. Environment is affected by almost every chemical process industry. There is no adequate awareness about environmental protection in our country.

For environmental protection, two important laws have been made - (1) Water pollution law and Air pollution law

Water pollution law: This law is made to ensure proper disposal of effluent by private industry, municipality and others.

Air pollution law: It is related with maintenance of purity of air. There are seven air pollutants recognized - ozone, carbon monoxide, hydrocarbons, Sulphur dioxide, oxides of nitrogen, lead and particulates.

Cause of Pollution: Pollution may be caused due to (1) Natural reasons- eg. Volcanic eruptions, forest fires etc. (ii) Factors concerned with industrial, commercial, agricultural and domestic activities. Chemical industries like paper and pulp mills, iron and steel industries, fertilizer industries etc. are responsible for air pollution. They give out gases like CO, CO<sub>2</sub>, NO, SO, etc.

Choice of Process to control air pollution: The choice of process depends upon the type of pollutant. A careful study of all aspects of a manufacturing process contaminant is made before selecting a specific

control system. There are two process namely dry process and wet process to remove solid and liquid pollutants respectively (1) Dry Process: It includes devices like settling chambers, electrostatic precipitators, s chimneys to remove solids.

(ii) Wet process: It includes open spray tower, wet centrifuge, orifice, wet dynamic etc. remove liquids. In each country, Government have stipulated strict legal restrictions to avoid a control pollution

## **Human Resource**

Human resources is a phrase used to express the individuals who consists of the e workforce of an organization, even though it is also applied in labour economics to, for example business area or even whole nations. It is also the name of the function within an establishment charged with the complete responsibility for performing plans and policies relating to the management of individuals. This function title is often abbreviated to the initials 'HR' The HR function may set strategies and develop policies, standards, systems and process to execute these schemes in a whole range of areas. These areas are

Recruitment and selection (Resourcing)

Organizational design and development.

Business transformation and change in management.

Performance, conduct and behaviour management.

Industrial and employee relation

Training and development.

Human Resources Development is a combination of training and education. Adam Smith States. "The capacities of individuals depended on their access of education." HR development is the mean that manages the process between training and learning in a broadly supporting environment. Human Resources is a framework for the enlargement of human capital within an organization or a municipality, region or nation HRD is the structure that allows for individual development, satisfying the organizations, or the nation's goals.

References: According to the new revised syllabus of Savitribai Phule Pune University from June 2021, Text book of Industrial chemistry for T.Y. B.Sc. course (CH- 505), Sem-V Manali Publication, Nirali Publication and google images