



PE021: Urea Manufacturing Process Technology

Training Description:

Today, urea is one of the most common nitrogen fertilizer. Urea manufacture is associated with anhydrous ammonia production in modern plants because carbon dioxide is a by-product of ammonia production and is thus readily available to react with the ammonia. The urea can either be dried and granulated into 46% N urea fertilizer, or dissolved in water with ammonium nitrate to make urea ammonium nitrate (UAN) solution.

In most of the modern fertilizer manufacturing plants, most of the ammonia is used on site in the production of urea. The urea is used as a nitrogen-rich fertilizer, and as such is of great importance in agriculture and is also used as a component in the manufacture of resins for timber processing and in yeast manufacture.

This intensive course is designed to provide engineers in the fertilizer industry with an in-depth view of the urea production technologies. The course will guide engineers to identify future trends and needs of this fast pace industry.

The course will examine the status and the most recent urea production technologies. Looking further ahead, the course will review some potentially significant developments and concepts that may impact the manner in which urea is produced. Some of these manufacturing routes are being tested or employed at few plants around the world, but have yet to be fully developed into commercial processes.

The course will also provide an opportunity to exchange ideas and disseminate information through discussion of the various technical, economic, safety, and environmental issues. The knowledge gained will enable the participants to solve specific problems at his/her plant as well as improve its operation and enhance its profitability.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Apply and gain an in-depth knowledge on urea manufacturing and update their knowledge with the latest trends in this fast pace technology
- ✓ Recognize the global overview and outlook of the nitrogen fertilizer industry including its materials product types, characteristics and properties
- ✓ Discuss the economics of the urea industry and employ ammonia production processes such as reforming, oxidation, removal of carbon monoxide and water and synthesis of ammonia
- ✓ Implement the latest strategies on urea production processes such as the urea plant installation, description of production, process water sources and quantities as well as the storage and transfer equipment
- ✓ Explain the environmental impact of the urea production such as emissions and waste, environmental hazards associated with emissions and quality standards
- ✓ Employ proven emission monitoring techniques and identify the major hazards in urea plants

Training Designed for:

This course is intended for engineers and other technical staff working in the urea industry, particularly those who have recently assumed new responsibilities, to increase their technical knowledge in urea production. The course is also beneficial for experienced engineers who want to have better knowledge on the new technologies in the industry. The course will help to improve the participants' skills and broaden

their vision and understanding of the entire industry, including technology, economics, energy, use, safety, and environmental stewardship.

Training Requirement:

“Hand’s on practical sessions, equipment and software will be applied during the course if required and as per the client’s request.”

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

DAY ONE:

- ❖ Pre-Test
- ❖ Introduction
- ❖ A Global Overview and Outlook of the Nitrogen Fertilizer Industry
 - Fertilizer Terminology, Fertilizer Materials and Product Types, Characteristics of Efficient Distribution Systems, Physical Properties of Fertilizer, Chemical Characteristics of Fertilizers, Sampling of Fertilizer, Automatic Sampling Equipment, Fertilizer Regulations
- ❖ Ammonia Production
 - Steam Reforming of Natural Gas, Excess Air Secondary Reforming, Heat Exchange Autothermal Reforming, Partial Oxidation of Hydrocarbons, Hydrogen Production

DAY TWO:

- ❖ Ammonia Production (*continuation*)
 - Nitrogen Addition, Removal of Carbon Monoxide, Water Removal, Removal of Carbon Oxides, Synthesis of Ammonia
- ❖ Urea Process Technologies
 - Urea Plants Installations, Description of BAT Production Processes, Process Water sources and Quantities, Prilling and Granulation

DAY THREE:

- ❖ Urea Process Technologies
 - Feasible and Available Emission Abatement Techniques, Description of Process Water BAT Treatment Systems, Prill Tower Emissions, Granulator Emissions
- ❖ Urea Process Technologies (Storage & Transfer Equipment)
 - Ammonia, Carbon Dioxide, Formaldehyde

DAY FOUR:

- ❖ Urea Uses & Outlook
- ❖ Urea & the Environment (Environmental Data)
 - Inputs, Output
 - Typical Inputs for BAT Synthesis/Prilling Processes
 - Typical Inputs for BAT Melt Granulation Process
 - Production Outputs
 - Emissions and Waste

❖ Practical Sessions

- This hands-on and includes real-life case studies and exercises

DAY FIVE:

- ❖ **Urea & the Environment (Environmental Data) (Continuation)**
 - Environmental Hazards Associated with Emissions
 - Statutory Emissions Limit Values (ELVs)
 - Environmental Quality Standards (EQSs)
- ❖ **Urea & the Environment (Emission Monitoring)**
 - Parameters and Frequency of Monitoring
 - General
- ❖ **Urea & the Environment (Major Hazards)**
 - Corrosion Protection in Urea Plants
 - Explosive Gas Mixtures
 - Hazard Study
- ❖ Course Conclusion
- ❖ POST-ASSESSMENT and EVALUATION

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:

Aisha Relativo - Training & Career Development Manager

aisha@cmc-me.com / training@cmc-me.com

Tel.: +971 2 665 3945 or +971 2 643 6653 | Mob.: +971 52 2954615