CONCEPT

Fertilizer Production Plant Operations Course: Ammonia, Urea and Phosphate Units

11 – 15 January 2027
Barcelona - Eixample district four-star



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Ref: 1395_23337 **Date:** 11 – 15 January 2027 **Location:** Barcelona - Eixample district four-star **Fees:** 23500 SAR

Introduction:

Fertilizer production plant operations training on ammonia, urea and phosphate units is a 1-week course for process engineers, panel and field operators, shift supervisors and technical service staff, ending with an Ammonia-Urea Unit Performance Review and Improvement Plan. Complexes lose output and energy when reformer outlet methane drifts, synthesis loop pressure creeps, urea stripper efficiency falls and granules cake in storage. Nominees already run or support a nitrogen or phosphate unit and work through plant log data, flowsheets and benchmark sheets as case studies. CoreConcept Training Center delivers this fertilizer production course.

Course Objectives:

- Describe fertilizer product grades and trace material and utility flows through ammonia-urea and phosphate complexes
- Operate reforming, shift, CO2 removal, methanation and synthesis loop sections within their control limits using key process indicators
- Control urea synthesis, high-pressure stripping, evaporation and finishing to hold conversion, biuret content and granule specification
- Run phosphoric acid digestion and DAP and MAP granulation with a stable ammoniation ratio and on-grade product
- Track catalyst activity, specific energy consumption and critical equipment condition, and apply safeguards against ammonia release and high-pressure hazards
- Prepare a unit performance review and improvement plan for an ammonia-urea complex from operating data

Target Audience:

- Process engineering staff responsible for ammonia, urea and phosphate unit performance and daily production targets
- Panel operating staff responsible for reformer, synthesis loop and urea section control from the control room
- Field operating staff responsible for rounds, sampling and equipment line-ups in fertilizer units
- Shift supervision staff responsible for start-up, shutdown and upset response across the complex
- Technical service staff responsible for catalyst monitoring, energy reporting and product quality complaints

Course Outline:

Day 1: Fertilizer Industry, Product Types and Complex Flowsheets

- Nitrogen, Phosphate and Potash Nutrient Grades and Product Families
- Urea, Ammonium Nitrate, UAN and Ammonium Sulphate Product Characteristics
- Ammonia-Urea Complex Block Flow Diagram and Utility Interfaces
- Wet-Process Phosphoric Acid Digestion and Phosphogypsum Filtration Basics
- Baseline Survey of Plant Load, Specific Consumption and Downtime

Day 2: Ammonia Production Chain From Natural Gas to Synthesis Loop

- Feed Gas Desulphurisation With Zinc Oxide Guard Beds
- Primary and Secondary Steam Reforming With Nickel Catalyst
- High and Low Temperature CO Shift Conversion Control
- Solvent-Based CO2 Removal and Methanation of Residual Oxides
- Synthesis Loop Pressure, Inert Purge and Iron Catalyst Activity

Day 3: Urea Synthesis, Stripping, Finishing and Phosphate Granulation

- Ammonium Carbamate Formation and Dehydration Equilibrium in the Reactor
- High-Pressure Stripper, Carbamate Condenser and Recirculation Section Operation
- Evaporation, Biuret Control and Prilling Tower Operation
- Fluidised-Bed Urea Granulation With Formaldehyde Anti-Caking Additive
- Phosphoric Acid Ammoniation and DAP and MAP Granulation Loops

Day 4: Catalyst, Energy, Product Quality, Safety and Equipment Reliability

- Catalyst Loading, Reduction and End-of-Run Performance Tracking
- Specific Energy Consumption Benchmarking per Tonne of Ammonia
- Urea Granule Crushing Strength, Caking and Bulk Storage Conditions
- Ammonia Release, High-Pressure Rupture and Emissions Control Safeguards
- Reformer Tube, Syngas Compressor and CO2 Compressor Reliability Monitoring

Day 5: Case Study Performance Review of an Ammonia-Urea Complex

- Case Data Pack With Log Sheets and Laboratory Analyses
- Ammonia Unit Gap Analysis Against Design and Benchmark Values
- Urea Unit Stripping Efficiency and Product Quality Deviation Review
- Prioritised Improvement Actions With Energy and Reliability Gains
- Unit Performance Review and Improvement Plan Completion

Skills You Will Gain:

- Steam Reformer Performance Monitoring
- Synthesis Loop Optimisation
- Urea Stripper Efficiency Assessment
- Granule Quality and Caking Control
- Phosphoric Acid Ammoniation Control
- Fertilizer Energy Benchmarking
- Catalyst Life Tracking
- Critical Compressor Condition Review

Why Attend This Course:

- Deliver an Ammonia-Urea Unit Performance Review and Improvement Plan to the production manager and technical service head as the basis for the next improvement budget
- Decide when a catalyst charge, purge rate or stripper load needs adjusting by reading trends against design and benchmark values
- Avoid lost production, product claims and unplanned trips caused by caking, high biuret, reformer tube damage or compressor failure
- Share log sheet checks, benchmarking sheets and safeguard reviews with shift crews and newly appointed operators

Conclusion:

Back at work, the participant presents the Ammonia-Urea Unit Performance Review and Improvement Plan to the production manager and technical service lead, who use it to rank energy, catalyst, product quality and reliability actions for the coming operating period and turnaround scope. Shift supervisors can adopt its log sheet checks and benchmark values as routine controls. After the first month of use, the unit should review specific energy consumption, synthesis loop and stripper performance, product complaints and open reliability actions against the plan's targets.

Frequently Asked Questions FAQ:

What should participants know before the fertilizer production plant operations course?

Participants should already operate or support an ammonia, urea or phosphate unit and be able to read process flow diagrams and log sheets. Bringing recent unit data, such as reformer outlet analyses or urea product tests, helps them apply the case study to their own plant.

How does this fertilizer production plant operations course differ from a refrigeration or reactor design course?

This course follows the whole fertilizer complex, from feed gas to stored granules, with an operations and performance focus. Refrigeration cycles and reactor sizing theory appear only where an operator needs them; dedicated courses treat those subjects in depth.

Why do ammonia and urea units in fertilizer production plants lose energy efficiency over time?

Efficiency falls as catalyst activity declines, reformer tubes and heat exchangers foul, inerts build up in the synthesis loop and stripper performance drops. Tracking specific energy consumption against design and benchmark values shows which section causes the loss and which correction pays back first.

What does a participant take back from the fertilizer production plant operations course?

Participants take back an Ammonia-Urea Unit Performance Review and Improvement Plan built on case data, with a gap analysis, prioritised actions and log sheet checks that shift crews and technical service staff can adopt.