

Advanced FCC and Catalytic Reforming Operations Training Course

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Overview

Advanced FCC and Catalytic Reforming Operations Training Course is a one-week course for refinery process, operations, technical services, supervision, and reliability teams who leave with an FCC and Reformer Operating and Optimization Workbook. Participants connect FCC reactor-regenerator balance, catalyst circulation, conversion and yield control with catalytic reforming reactions, octane production, hydrogen balance, and catalyst regeneration. The course uses operating envelopes, trend evidence, material and heat balances, and structured fault diagnosis. Agile Leaders Training Center presents FCC and catalytic reforming operations.

Who Should Attend

- Functions responsible for FCC reactor, regenerator, fractionator, and gas-recovery performance
- Functions responsible for catalytic reformer reactors, heaters, separators, recycle gas, and regeneration
- Technical services functions responsible for balances, yields, catalyst evaluation, and operating targets
- Reliability functions responsible for equipment condition, fouling, erosion, corrosion, and constraint management
- Supervisory functions responsible for safe operating windows, shift decisions, and production coordination

The course assumes participants analyze refinery process data or support catalytic conversion units at work, and it leaves out introductory refining, thermal cracking, visbreaking, coking, generic reactor design, and detailed equipment inspection.

Departments and Industries

The course supports departments and industries that operate, optimize, or assure catalytic conversion assets.

- Petroleum refining process operations and technical services
- Refinery production planning, optimization, and laboratory support
- Catalyst supply, evaluation, and technical application services
- Process licensing, engineering, and revamp services
- Reliability, inspection coordination, and turnaround planning
- Fuel, hydrogen, and petrochemical feedstock integration

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Learning Objectives

By the end of this course, participants will be able to:

- Analyze FCC feed, catalyst, conversion, and product-yield relationships
- Build reactor-regenerator heat and material balance checks
- Evaluate catalytic reforming severity, octane, hydrogen, and catalyst condition
- Use operating envelopes and process trends to diagnose constraints
- Compare catalyst, additive, and operating-response alternatives
- Prioritize safe optimization and emissions-control actions

Course Agenda

Day 1: Establish Catalytic Conversion Bases

- FCC and Reforming Unit Boundary and Stream Map
- Feed Assay, Contaminant, and Treating Requirement Matrix
- Conversion, Selectivity, Yield, Octane, and Hydrogen Performance Definitions
- Operating Variable, Constraint, and Consequence Register
- Integrated FCC and Reformer Data Validation Checklist

Day 2: Control FCC Reactor-Regenerator Performance

- Riser Reaction, Residence-Time, and Catalyst-to-Oil Ratio Model
- Reactor Stripping, Cyclone, and Catalyst Circulation Diagnostic Map
- Regenerator Coke-Burn, Air, Carbon, and Combustion Balance
- FCC Heat Balance and Dense-Bed Temperature Worksheet
- Main Fractionator and Gas-Recovery Yield Reconciliation

Day 3: Manage Catalysts, Yields, and Emissions

- Equilibrium Catalyst Activity and Contaminant Evaluation Sheet
- Fresh Catalyst, Additive, and Withdrawal Decision Matrix
- Conversion, Gasoline, Light Olefin, Slurry, and Coke Yield Grid
- Regenerator CO, Particulate, Sulfur, and Nitrogen Indicator Dashboard
- FCC Constraint, Alarm, Interlock, and Response Envelope

Day 4: Optimize Catalytic Reforming Operations

- Naphtha Feed Quality and Catalyst-Poison Exclusion Checklist
- Dehydrogenation, Isomerization, Dehydrocyclization, and Hydrocracking Reaction Map
- Reactor Inlet Temperature, Pressure, Recycle, and Severity Matrix
- Octane, Aromatics, Hydrogen, LPG, and Coke Yield Balance
- Continuous and Semi-Regenerative Catalyst Condition Decision Tree

Day 5: Practice Integrated Unit Decisions

- Suggested Exercise: Reconcile FCC Feed, Conversion, and Product Yields
- Suggested Exercise: Close the Reactor-Regenerator Heat Balance
- Suggested Exercise: Diagnose Reformer Octane and Hydrogen Loss
- Suggested Exercise: Rank Catalyst and Operating Response Options
- Capstone Exercise: Complete the FCC and Reformer Operating and Optimization Workbook

Practical Exercises

The course uses suggested activities to turn unit data into traceable operating decisions.

- Suggested activity: validate FCC stream data and reconcile conversion, coke, wet gas, gasoline, light cycle oil, and slurry yields.
- Suggested activity: test reactor-regenerator heat-balance sensitivity to feed, catalyst circulation, carbon on catalyst, air, and temperature.
- Suggested activity: evaluate reformer severity, recycle hydrogen, reactor temperature profiles, octane, hydrogen production, and catalyst condition.
- Suggested activity: document constraints, competing responses, safety checks, emissions indicators, and monitoring actions in an integrated decision record.

FAQs

Who suits FCC and catalytic reforming operations training, and what does it assume?

FCC and catalytic reforming operations training suits process, operations, technical services, supervision, catalyst, and reliability personnel. It assumes participants can interpret refinery flows, trends, laboratory results, and basic balances.

How does FCC and catalytic reforming training differ from thermal cracking training?

FCC and catalytic reforming training centers on catalyst-mediated conversion, catalyst circulation or staged reactors, regeneration, octane, hydrogen, and catalytic selectivity. Thermal cracking training centers on heat-driven molecular breakdown, visbreaking, or coking without the same catalyst systems.

Which variables control FCC conversion and product yield?

FCC conversion and yield respond to feed quality, catalyst activity, catalyst-to-oil ratio, riser temperature, contact time, stripping, regeneration, carbon on regenerated catalyst, pressure balance, fractionation, and downstream constraints.

How are catalytic reforming octane and hydrogen production balanced?

Catalytic reforming balances octane and hydrogen through feed quality, reactor temperature profile, pressure, hydrogen-to-hydrocarbon ratio, recycle purity, space velocity, catalyst condition, chloride and moisture control, and acceptable coke formation.

How does FCC reactor-regenerator balance support safe optimization?

FCC reactor-regenerator balance links coke production, combustion air, flue-gas indicators, catalyst circulation, regenerator temperature, reactor heat demand, pressure balance, equipment limits, emissions controls, and credible response actions.

Conclusion

Participants take back an FCC and Reformer Operating and Optimization Workbook linking feed evidence, balances, catalyst condition, yields, operating envelopes, diagnostics, emissions indicators, and response options. It changes separate unit trends into traceable operating decisions. The workbook supports shift review, technical-service studies, catalyst planning, constraint management, and optimization assurance.

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