This course can be adapted to virtual classroom mode

Catalytic Reforming for Refining & Petrochemicals

Optimization & Troubleshooting

5 days **REFCAT-EN-A**

Overview

LEVEL

Skilled

PURPOSE

This course provides a thorough technical understanding of semi-regenerative and continuous regenerative catalytic reforming processes, for refining and petrochemistry.

LEARNING OBJECTIVES

Upon completion of the course, the participants will be able to:

assess the influence of operating parameters on a unit performance,

optimize the process to achieve the targeted yield in BTX, from the design to the operation,

distinguish between the specificities of semi-regenerative and continuously regenerative units, depending on the refining or petrochemistry environment,

grasp the essence of catalyst regeneration,

detect potential deficiencies by troubleshooting,

acquire the best practices for unit start-up, normal operation and shutdown,

analyze the optimization process options of an aromatic complex.

WAYS AND MEANS

Applications, teamwork, case studies and interactive workshops based on typical real situations.

The duration and content of the training course can be customized to the needs of the client site and the profile of the participants.

Possible contribution of experienced staff reporting his industrial experience of the operation on a daily basis.

Parts of or whole session adaptable to virtual classroom.

LEARNING ASSESSMENT

Quiz.

PREREQUISITES

The trainee is required to fulfill at least one of the following criteria:

to have at least 1 year of proven experience in a technical position in a refinery,

or to be in the process of being moved to a position in operation,

or to have followed a training course orientated to introduction to the refining.

MORE INFO

Realizado en Español si requerido.

Agenda

THE CATALYTIC REFORMER WITHIN THE REFINERY SCHEME

0.5 d

Quality specifications of gasolines; reformulated gasoline and future trends.
Octane improving processes, integration within the refining processes.
Needs in hydrogen. Aromatic complex overview, need for benzene, toluene and xylenes.

CATALYTIC REFORMING REACTIONS & CATALYSTS

1 d

Review of the characteristics of all the chemical reactions: thermodynamics and kinetics.
Influence of the operating parameters on the production of aromatics, hydrogen, octane number, and other yields. Consequences for SR and CCR units.
Catalyst properties: role of the acidic and metallic functions, of the support, of the different promotors and their impact on chemical reactions and yields. Water/chlorine balance and management.
Poisons and ageing factors. Activity follow up and cycle length prediction for semi-regenerative units.
Catalyst regeneration. Management of each step for an optimal activity recovery for SR units. Operating parameters for CCR regeneration loops.

OPERATING PARAMETERS OF A CATALYTIC REFORMER

1 d

Process flow diagrams and operating parameters of semi-regenerative (SR) and Continuous Catalyst Regeneration (CCR) units. Main control loops. Typical range of yields.
Material balance. Energy consumption.
Operating variables: WABT, WAIT, H_2/HC ratio, flow rates, treat gas characteristics.
Main equipment and metallurgy.
Specific features for low pressure equipment. Moving bed technology, recontacting section, catalyst circulation: lifts, #P control, seal legs, nitrogen loops for regeneration, etc.
Analyzers and process control.

OPERATION & OPTIMIZATION FOR CATALYTIC REFORMING

1 d

Monitoring the operating variables and optimization, for semi-regenerative and regenerative units.
Operation case studies.
Adjusting to changes in feedstocks origins, N+2A.
High severity of the CCR towards optimized yield in Aromatics. Performance follow-up.
Maximizing the performances of the unit under constraints or limit conditions.
Main steps for start-up and shutdown.

TROUBLESHOOTING FOR CATALYTIC REFORMING

0.5 d

Case studies: main symptoms encountered in operation, diagnosis and remedies.
Specific troubles of CCR units linked to catalyst circulation and regeneration loops.
Catalyst regeneration problems.
ESD, main safety sequences.

THE REFORMER IN THE AROMATIC COMPLEX

1 d

Outlets and main uses of BX (Benzene, Xylenes), ethylbenzene.
Basic scheme to upgrade benzene and paraxylene. Aromatic loop.
Transformation processes involved: hydrodealkylation, disproportionation, transalkylation and isomerization. Associated separation processes.
Operating conditions for a typical arrangement.