Recent Developments in Oil Refining Technologies

Overview

LEVEL
Expert

PURPOSE
This course provides an up-to-date information on present and future trends of oil refining processes.

LEARNING OBJECTIVES
Upon completion of the course, participants will be able to:
- get a broad vision of future from technical, safety and environmental constraints for the refining industry,
- quote the recent developments in oil refining processes,
- explain how the latest breakthroughs can help meet the new challenges.

WAYS AND MEANS
Each single topic is covered by a world-class expert in the field.

LEARNING ASSESSMENT
Quiz.

PREREQUISITES
No prerequisites for this course.

MORE INFO
The participation of many experts from IFP Energies nouvelles, Axens and Technip requires organizing the training session in IFP Training facilities near Paris - France. A part of the program can be delivered outside France if you need it.

Agenda

REFINERY PRODUCTS & PROCESS EVOLUTION OUTLOOK FOR 2020
Recent trends and new constraints reshaping the environment of the refining activity on various regions around the world.
Quality requirements and desulfurization.
New and future regulations concerning emissions: SO\textsubscript{x}, CO\textsubscript{2}, NO\textsubscript{x}, COV's.
Evolution of the refining process flow diagram: hydrogen addition or carbon removal, trends to petrochemical tendencies.

ATMOSPHERIC & VACUUM DISTILLATION: NEW CONCEPTS
Progressive distillation, concept and example.
Heat recovery optimization and energy consumption.
Modern internals for crude oil distillation column.
Efficient and low energy consumption vacuum equipment.

CATALYTIC REFORMING & ISOMERIZATION

0.5 d

0.25 d

0.5 d
Fixed bed reforming debottlenecking options.
Continuous catalytic reforming: concept, comparison with “semi reg” units.
Benzene separation, paraxylene production and purification.
Advanced isomerization technology for recycling paraffins.
New breakthroughs in catalytic fields.

**FCC: MORE PROPYLENE OR MORE LCO**
Feed injection and temperature control of the mixture.
Riser termination devices and catalyst separation. Post riser quench.
Stripping technology.
Regeneration and catalyst coolers.
Propylene yield enhancement.
Reduction of SO\(_x\) and NO\(_x\) emissions.

**GASOLINE & SULFUR REDUCTION STRATEGIES**
Sulfur distribution in FCC gasoline and selective HDS.
Alternate sources of gasoline:
Light olefins oligomerization.
New trends in alklyation.

**ULTRA - LOW SULFUR DIESEL PRODUCTION & VGO DEEP HYDROTREATMENT**
New generation catalysts and their performance.
Diesel hydrotreater units: investigation of new and existing means of achieving ULSD.
FCC feed pretreatment.

**HYDROCRACKING FOR VACUUM DISTILLATES & RESIDUES**
High pressure hydrocracking, mild hydrocracking.
Recent technologies: catalysts, energy recovery, fractionation.
Various technologies available: fixed bed, ebullient bed, moving bed.

**HYDROGEN BALANCE**
Routes for hydrogen production (steam methane reforming, partial oxidation).
Management of hydrogen network and optimization.

**THERMAL CONVERSION OF RESIDUES**
Renewal of an old process: delayed coker and residue destruction.
Purification of the products and hydrogen consumption.
Integration into the framework of crude upgrading.

**CRITICITY OF SULFUR UNITS**
Sulfur plants: efficiency of different arrangements, reliability in the refining operation, solid sulfur production.
Tail gas treatments: comparison of different processes and performances.