

Light Cuts Processing

5.00 days

RAF/REF1

Overview

AUDIENCE

Engineers and supervisors involved in light and middle distillates processing units.

PURPOSE

This course provides a thorough knowledge of operation and refining processes involved in gasoline and diesel production.

LEARNING OBJECTIVES

Upon completion of the course, the participants will be able to:
link processing units operation to various constraints set by product specifications,
analyze operating parameters and their impacts,
acquire the basics for operating processing units,
know about the latest developments in these processes.

PREREQUISITE

No prerequisites for this course.

WAYS AND MEANS

Numerous exercises and case studies based on real industrial situations.

Agenda

PETROLEUM PRODUCTS

0.25 d

Origin and characteristics of naphtha cuts.
Octane properties and hydrocarbon (HC) families. Quality requirements.
Gasoil and Diesel oil: cetane, cold flow and other properties.

CATALYTIC REFORMING

1.25 d

Refinery octane pool: processes for octane improvement-gasoline sources.
Process basics: thermodynamics and kinetics of chemical reactions. Hydrogen production.
Role and types of catalysts - Activation, ageing, poisoning.
Industrial units: process flow scheme of SR and CCR, operating conditions, performances.
Operating variables (WABT, WHSV, H₂/HC ratio, recycle gas composition, pressure).
Management of hydrogen production, impact of feed properties and operating conditions.
Shutdown, regeneration and startup.
Catalyst regeneration steps and control.

ISOMERIZATION OF LIGHT GASOLINES

0.50 d

Integration in the gasoline production scheme. Isomerization reaction characteristics.
Different types of catalysts: properties, activation, poisons, operating conditions.
Industrial process: principle and specific constraints.
Downstream separation main types and impact of recycling.

2.00 d

HYDROREFINING PROCESSES

Removal of impurities, hydrogenation of unsaturated compounds: chemical reactions characteristics.
Role and types of catalysts in relation with feeds, hydrogen consumption and required results.
Operating conditions and main variables (temperature, WHSV, H₂/HC ratio, PPH₂, etc.).
Catalyst loading map; cycle length optimization.
Main refining applications and specific operating features, example of gasolines and middle distillates desulfurization.

SWEETENING OF LIGHT CUTS

0.25 d

Role of sweetening process, basic chemical reactions, nature and efficiency of the catalyst.
Main applications for LPG's, naphtha's and kerosene cuts.
Operating conditions: temperature, caustic concentration, mixing efficiency, air injection, etc.

SULFUR RECOVERY

0.75 d

Refinery sulfur balance. Importance of sulfur recovery chain processes.
Amine scrubbing chemical reactions and operating parameters.
Industrial process and operating parameters as air/H₂S ratio, steam production.
Claus chemical reactions.
Process control and impact on environment: causes for sulfur emission increase.
Tail gas treatments: process principles, operating conditions.