Training - Production of Base Chemicals and Commodity Polymers

PETRO-EN-B | Blended-Learning | 4 days

This course provides a technical information of the main processes used to produce olefins and aromatics along with a comprehensive information on polymers and polymerization processes, and technologies available mainly in the polyolefins field

Level

Knowledge

Public

- Professionals, in the oil or petrochemical industry, interested in olefins, aromatics and polymers processes
- Specifically for engineers and technical staff who are beginners in this industry, as well as subcontractors, traders, etc

Objectives

Attendees will be able to implement the following skills:

- Describe the origins and main uses of petrochemical bases: Ethylene, propylene, butadiene, benzene, para-xylene
- list the main units producing these 5 bases

Pedagogical & technical resources

- This course can be adapted for distance learning
- Detailed course material
- Pictures of main equipment and samples

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

E-LEARNING: HYDROCARBONS - DISTILLATION - CATALYSTS - POLYMERS

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MODULE 1 - HYDROCARBONS - TYPES & IMPURITIES

Composition of crude oils.
Hydrocarbon groups and composition of petroleum products.
Crude oil impurities.

MODULE 2 - DISTILLATION PROCESS

Flash of a hydrocarbon mixture.
Principles of continuous distillation.
Industrial features of the distillation process.

MODULE 3 - INTRODUCTION TO CATALYSTS

Catalytic action.
Industrial applications.
Catalytic reactors examples.

MODULE 4 - POLYMERS

Introduction to polymers.
Polyethylene.
Polypropylene.

CLASSROOM TRAINING (4 DAYS)

STEAMCRACKING & TREATMENT OF THE CUTS PRODUCED — 1.75 days

Steamcracking:

- Implementation of cracking reactions: furnaces, quench systems, primary separation.
- Yields, operating variables affecting the severity of treatment, influence of the feedstock nature.

Compression and purification of the cracked gases:

- Implementation of compression.
- H2S and CO2 removal by caustic washing.
- Gas drying by adsorption.
- Cooling: propylene and ethylene chilling cycles, cold box.

Separation and treatment of steam cracker effluents:

- Steamcracker effluent separation train, main characteristics and purifications of the cuts: selective hydrogenations of acetylene from the C2 cut, of propyne and propadiene from the C3 cut, removal of carbon monoxide.
- Treatments of the C4 cut: production of 1,3- butadiene, recovery of isobutene from raffinate, upgrading of 1-butene in raffinate 2...
- Upgrading of pyrolysis gasoline production of motor fuels, benzene and other aromatics recovery.
- Alternative olefins production.

PRODUCTION OF AROMATICS — 0.5 day

Analysis of the catalytic reforming process, implementation of the catalyst, yields, operating variables.
Associated processes: hydrodealkylation, isomerization...
Treatment of cuts produced in those transformation processes:

- Aromatics and non-aromatics separation processes: liquid-liquid extraction, extractive distillation.
- Aromatics separation processes: distillation, adsorption, crystallization, application to paraxylene.

Aromatic complex arrangement. Highlighting of the aromatic loop.

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CATALYTIC CRACKING FCC — 0.25 day

Analysis of FCC process: nature of the feedstock, implementation of the catalyst and principle of reactor and regenerator set.
Composition and treatment of cracked gases.
Modification of the process for maximization of light cuts C3 & C4 production.
FCC dedicated processes for maximizing the production of C3 and C4 light olefins.

ON PURPOSE PROPYLENE PROCESSES — 0.25 day

Technical-economic context.
Processes for metathesis, propane dehydrogenation (PDH), methanol to olefins (MTO and MTO-OCP) and methanol to propylene (MTP), light olefin cracking (LOC).
Comparison of technologies - Selection criteria.

POLYMER PRODUCTION - ASSOCIATED PROPERTIES — 0.5 day

Type of reaction and basic characteristics of polymer reactions: polyaddition, polycondensation, heat of reaction, activation mode, etc.
Different arrangements of monomer building blocks in polyaddition: atactic, syndiotactic or isotactic polymers; random; block; graft polymers and others.
Relationship between end uses implementation and main polymer properties. Impact on properties.
Main tests used to get polymer characterization: melt index, viscosity index, etc. Test signification, relationship with polymer structure.
Consequences regarding polymer implementation techniques (extrusion, injection, etc.).

POLYMERIZATION IMPLEMENTATION - MAIN COMMODITY PLASTIC PROCESSES — 0.75 day

Techniques implemented to produce polymers: solution, bulk, emulsion, suspension, gas phase techniques.
Advantages and drawbacks of those different techniques consequences on processes implementation.
Examples applied to main processes used to manufacture major thermoplastics: polyethylenes (PE), polypropylenes (PP), polystyrenes (PS) and polyvinylchloride (PVC).
Flow charts and principles of processes. Some common and average operating conditions.
Influence of operating parameters (temperatures, pressures, monomers ratio and proportion of any chemicals involved in the reaction) regarding the quality of polymer obtained.
Some pretreatments of polymers outside the reactor before the transformation step.

Sessions

Classe virtuelle - From 04/20/2026 to 04/23/2026 — **3790 €/HT**

To French entities : IFP Training is referenced to DataDock ; you may contact your OPCO about potential funding.
Please contact our disabled persons referent to check the accessibility of this training program : referent.handicap@ifptraining.com

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