Training - Main Polymers PE/PP/PS

MAIPOLY-EN-P | Face-to-face only | 5 days

To provide comprehensive information on polymers and polymerization processes used to produce polyethylenes, polypropylenes and polystyrene

Level
Skilled

Public
Engineers and technical staff interested in the manufacturing of commodity polymers

Objectives
Attendees will be able to implement the following skills:

- Understand the global technical and economical structure of commodity polymers, by far the biggest outlet of petrochemistry
- Master the link between product slate and process selection in function of company marketing strategy
- Know the main industrial commodity polymers processes available for licensing, and their main characteristics
- Be aware of the main industrial safety and operational problems

Pedagogical & technical resources
Applications and case studies treated in small groups, based on typical situations encountered in the normal or unsettled operation of these units

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

MAJOR POLYMERS — 0.5 day

Various polymer families: commodities, engineering, high performance polymers.
History of polyethylene development.
History of polypropylene development, the youngest of all commodity polymers. Various types of grades (homo, block, random, isotactic, syndiotactic, atactic...); their main applications.
Project management in petrochemical industry. Patent strategy. Staging of projects Order of magnitude of

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investment costs.
Fixed and variable cost for site production and outside logistics.
Polymer pricing mechanisms. Notion of economical spread. Explanations of the causes of polymers wide price fluctuations.

CATALYTIC SYSTEMS USED FOR POLYOLEFINS PRODUCTION — 0.5 day

Review of the various types of catalytic systems for polyolefins.
Mass and heat transfer in the heterophasic polymerization of polyolefins.
Multigrain model of the growing particles and variations around this model.

IMPLEMENTATION OF POLYMERIZATION - MAIN POLYETHYLENE & POLYPROPYLENE PROCESSES — 1 day

Techniques implemented in polymers production: solution, bulk, emulsion, suspension or slurry, gas phase. Advantages and drawbacks of these techniques, consequences for process implementation.
Main processes involved in production of polyethylene and polypropylene. Basic schemes and average operating conditions. Influence of operating parameters (temperature, pressure, reactants proportion) on product quality.

POLYETHYLENES - POLYPROPYLENES & OTHER COMMODITY POLYMERS — 2.5 days

General presentation of high pressure and low pressure polyethylene processes, with the various types of polymers grades they can produce. Low, medium, high, ultra-low density...; narrow, broad molecular weight distribution; low, high melt indexes...
Main applications per family of grades.
High pressure processes. Heat transfer in reactors and conversion rate. Comparison of autoclave, tubular mono-injection, tubular multiple injection reactors; consequences on product quality. Specific equipment technology used in HPPE (hypercompressors, letdown valve...).
Safety risks associated with ethylene decomposition.
Main low pressure catalytic processes. Main characteristics of catalyst and reactor types. Which market do they serve? Announced developments.
Various polymerization processes available for polypropylene production (gas phase, loop, liquid pool...). Staged polymerization for broad molecular weight distribution and impact copolymers. New development with single reactor double reaction zone.
Polymer finishing. Extrusion. Storage. Logistics. Supply chain.
Main safety issues. Catalyst killing system in case of emergency.

POLYSTYRENE PROCESSES — 0.5 day

Main design and operation characteristics.
How to treat run-away in case of thermal initiation.

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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