Training - Selective Hydrogenation of the Steamcracker

HYDVAPO-EN-P | **Face-to-face only** | **3 days**

To improve the knowledge of the selective hydrogenation processes of C2, C3, C4 cuts and pyrolysis gasolines (Pygas) for better controlling the operation

Level
Skilled

Public
Operating personnel of the steam cracker manufacturing units: experienced operators, panel operators, shift leaders and all technicians involved in the operation of these sections

Objectives
Attendees will be able to implement the following skills:
- Identify key physico-chemical characteristics of the process
- Describe the process steps
- Justify process and operating safety measures

Pedagogical & technical resources
- The content of this course can be adapted to the customer's needs. The pedagogy is focused on the units concerned, under cover of a secrecy agreement if necessary
- Case studies handled in groups, based on typical situations of conduct of the sections studied
- Possible contribution of experienced staff reporting his industrial experience of the operation on a daily basis

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

SELECTIVE HYDROGENATION OF THE C2 CUT — 1.25 days

Origin, characteristics and valuation of the C2 cut: origin and physical state of the cut, average composition, specifications of ethylene produced.
Identification of the impurity to be removed. Selection of the implementation of the treatment in relation to the nature of the impurity.

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Location and operating principle of the selective hydrogenation section within the steamcracker: arrangement of the reactors, characteristics of the reactions involved in the process.
Nature, properties and mechanism of action of the catalyst: typical composition, activity, selectivity, main steps of the catalytic act, main well-known poisons (carbon monoxide, hydrogen sulfide, green oils...).
Analysis of the operating conditions: simplified process flow diagram (main process control loops, standard operating conditions, available analyzers) - Operating parameters (composition of the feedstock and hydrogen-rich gas, associated flow rates, CO content, molar ratio H2/acetylene, pressure, start-up temperature and Δt of the reactor...) - Performance monitoring (conversion rate, ethylene gain) - Analysis of some schematics of the DCS.
Case studies of adjustment: materialization of the evolution of the process using defined steps according to the variation of operating variables - Possible optimization points.
Possible major incidents, process safety and associated procedures.

SELECTIVE HYDROGENATION OF THE C3 CUT 0.5 day

Origin, characteristics and valuation of the cut C3: origin and physical state of the cut, average composition, specifications of the propylene produced.
Identification of the impurities to be removed. Selection of the implementation of the treatment in relation to the nature of the impurities.
Description of the main differences between the selective hydrogenation of the C2 section and that of the C3 section: location of the section, reactions involved, catalyst.
Simplified process flow diagram, operating conditions, driving parameters, performance monitoring, digital driving overviews and associated modules.
Case studies on the tuning of the unit: evolution of the process further to the modification of operating variables according to reference adjustments - Possible optimization points.
Possible major incidents, process safety and associated procedures.

SELECTIVE HYDROGENATION OF THE C4 CUT 0.5 day

Origin, characteristics and valuation of the cut C4: origin and physical state of the cut, average composition, specifications of the butadiene 1-3 produced.
Identification of the impurities to be removed, associated constraints - Simplified process flow diagram.
The main differences between the selective hydrogenation of the C4 cut and those of the C2 and C3 cuts.
Operating conditions and performances.
Process safety and associated procedures.

TREATMENT OF PYROLYSIS GASOLINES BY HYDROGENATION 0.75 day

Origin, characteristics and valuation of the C5+ cut (Pygas): origin and physical state of the cut, average composition.
Identification of the impurities to be eliminated, associated constraints - Simplified process flow diagram.
Selective hydrogenation 1st stage.
Types of catalysts according to the content and nature of the sulfur compounds of the feedstock.
Operating conditions and performance measurement.
Process safety and associated procedures.
Hydrogenation 2nd stage.
Role of section.
Types of catalysts.
Operating conditions and performance.

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