

OBJECTIVES

To give the participants a broader understanding of the uses, the advantages and the limits of the hydrotreating processes in the modern refining scheme and to present how their **operation can be optimized**.

On completion of the course, the participants:

- have got a comprehensive understanding of the aim and the performances of the large panel of the existing hydrotreatment processes in the refining industry
- have an increased knowledge of the operation of the hydrotreatment units and the management of the hydrogen balance
- have got a good view of the main breakthrough available to meet the **ultra-low desulfurization**.

COURSE CONTENT

PURPOSES OF THE HYDROTREATMENT PROCESSES 0.5 day

Impurities content in the petroleum cuts and products; their impacts on the health, the environment and on the other refining processes. Highly refractory compounds.

Recent regulations and future trends: quality specifications of the petroleum products and fuels in relationship with concerns mentioned above.

Aim of the various treatments with hydrogen and integration in the refining scheme: hydropurifications of straight run cuts, stabilization or saturation of cracked cuts.

CHEMICAL REACTIONS AND HYDROTREATMENT CATALYSTS 1 day

Types and structure of the molecules to be treated containing sulfur, nitrogen and oxygen atoms, metals, unsaturated and aromatic compounds. Highly refractory compounds.

Characteristics of the chemical reactions involved: thermodynamic and kinetic aspects, their consequences on the operation of the units, side reactions and optimum operating conditions to deplete their evolution, specific features of reversion reactions.

Role and mode of action of a catalyst; chemical and physical characteristics.

Characteristics of the catalysts for hydropurification and for hydrogenation: effect of the metals, importance of the substrate, criteria for the best choice facing a hydrotreatment problem.

Presulfiding procedures: role, steps and details of the different methods.

OPERATION OF A DISTILLATE HYDROTREATMENT UNIT 0.75 day

Process scheme, equipment and reactor internals. Control loops and analyzers.

Operating conditions and compositions of the main streams; mass balance and yields, sulfur balance and hydrogen balance.

Definition, significance of the operating variables and their influence on the process: mean temperatures and profile, pressures, partial pressure of hydrogen, recycle rate, quench ratio, feed flow rate and space velocity, hydrogen consumption.

Advanced process control and optimization of the process.

Management of the hydrogen network in the refinery. Effect of feed composition and origin.

Catalyst follow up and cycle length optimization, ageing and deactivation.

Regeneration principles and procedures.

DISTURBANCES, INCIDENTS AND TROUBLESHOOTING 0.75 day

Causes of quality decrease and corresponding actions.

Main safety automatic systems.

Feed pump failure, heater failure.

Compressor failure: fresh gas or recycle, adapted reaction and safe shut down.

PERFORMANCES OF THE OTHER TYPES OF HYDROTREATMENT UNITS 0.75 day

For each one of the following processes, the operating conditions are explained and the specific operating features are detailed.

Naphtha desulfurization for catalytic reformer and isomerization feed.

Cracked gasoline treatments, special hydrotreatments for the FCC gasoline.

Stabilization of the pyrolysis gasoline.

Hydroisomerization of the C4 cut out of the FCC to feed alkylation unit.

Hydrotreatment of middle distillates: kerosene and gas-oil, LCO processing.

Desulfurization of vacuum gasoil to FCC units.

Residues demetallization processes.

Hydrotreatments in lube oil manufacturing.

Hydrogen manufacturing or enrichment processes.

NEW DEVELOPMENTS TO MEET THE ULTRA-LOW DESULFURIZATION OF GASOLINE AND DIESEL FUELS 0.25 day

Catalysts, technology of the reactor and exchangers, operating conditions, recycle gas treatment, hydrogen purification, advanced process control.

▲ Who should attend?

Shift leaders, graduated engineers and technical supervisory staff involved in the production of clean fuels and hydrotreatments in the refining industry. The technical content of the course also makes it suitable for the staff of the refineries, research centers, oil companies and engineering firms concerned by this up to date topic.

▲ Duration

4 days

▲ Dates & Location

June 23 to 26, 2008
Rueil-Malmaison (Paris)

▲ Tuition Fees

€ 1,590

▲ Course Coordinator

Jean-Pierre Baumann

Ref. **PTF / HDT-E**

Der Vortrag über dieses Thema kann auch auf Deutsch gehalten werden.