

This course can be adapted to virtual classroom mode

Hydrotreatment Processes Optimization & Troubleshooting

4 days

HDT-EN-A

Overview

LEVEL

Skilled

PURPOSE

This course provides a deeper understanding for operating, monitoring and optimizing hydrotreatment units.

LEARNING OBJECTIVES

Upon completion of the course, the participants will be able to:
grasp the essence of hydrotreatment processes,
analyze the operation and optimization of hydrotreatment units,
manage the hydrogen balance in relation with the hydrogen network,
detect potential deficiencies by troubleshooting.

WAYS AND MEANS

Applications, teamwork, case studies and interactive workshops based on typical real situations.

Potential use of a generic dynamic simulator.

The duration and content of the training course can be customized to the needs of the client site and the profile of the participants.

Possible contribution of experienced staff reporting his industrial experience of the operation on a daily basis.

Parts of or whole session adaptable to virtual classroom.

LEARNING ASSESSMENT

Quiz.

PREREQUISITES

The trainee is required to fulfill at least one of the following criteria:

to have at least 1 year of proven experience in a technical position in a refinery,

or to be in the process of being moved to a position in operation,

or to have followed a training course orientated to introduction to the refining.

MORE INFO

Realizado en Español si requerido.

Agenda

OBJECTIVES OF HYDROTREATMENT PROCESSES

0.5 d

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

Recent regulations and future trends: quality specifications of 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 & HYDROTREATMENT CATALYSTS

1 d

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

Characteristics of the catalysts for hydropurification and for hydrogenation: effect of molybdenum, cobalt and nickel, importance of the substrate, selection criteria for a hydrotreatment specific issue. Top gradings. Catalyst dense loading. Reactor internals.

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

OPERATION OF A DISTILLATE HYDROTREATMENT UNIT

1 d

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

Significance of the operating variables and their influence on the process: mean temperatures and profile, pressures, PPH₂, recycle rate, quench ratio, feed flow rate and space velocity.

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 steps and monitoring.

Maximizing the performances of the unit under constraints or limit conditions.

DISTURBANCES, INCIDENTS & TROUBLESHOOTING

1 d

Causes of quality decrease and corresponding actions.

Main automatic safety systems.

Feed pump failure, heater failure.

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

PERFORMANCE OF THE VARIOUS HYDROTREATMENT UNITS

0.5 d

For each of the following processes, the operating parameters and the specific operating features are addressed .

Naphtha desulfurization for catalytic reformer and isomerization feed.

Cracked gasoline treatments, special hydrotreatments for the FCC gasoline.

Stabilization of the pyrolysis gasoline.

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

Desulfurization of vacuum gasoil to FCC units.

Residues demetallation and hydroconversion processes.