

Process Engineering - Equipment Sizing

5 days

PIDE-EN-P

Overview

LEVEL

Skilled

PURPOSE

This course provides an overview of Oil & Gas projects engineering studies, from conceptual design to detail drawing.

LEARNING OBJECTIVES

Upon completion of the course, the participants will be able to:
know the various aspects of project engineering and to apply their directly to concrete cases,
be able to work with PID schemes.

WAYS AND MEANS

Lectures with exercises.
Project by team (2 or 3 students): conception of a PID scheme from a PFD.
Specific and detailed documentation, industrial examples.

LEARNING ASSESSMENT

Quiz.

PREREQUISITES

To fulfill at least one of the following criteria:
have a Master degree or equivalent,
or at least 1 year of proven experience in a technical position in a refinery or petrochemical site,
or in the process of moving towards a position linked to the improvement of processes.

Agenda

PROJECT DEFINITION

0.5 d

Definition of the different type of projects.
Planning, description of the different project steps.
Organization: task force or conventional.
Departments description and role: purchasing, cost control, planning, engineering, construction...
Relation between client and contractor: progress report, change order...

ENGINEERING DIAGRAMS (PID'S)

2 d

Process flow schemes: purpose, available information.
General rules for the PID's conception:
PID's importance during the contract.
Milestones: PID's review...
Potential development, "clever PID's".

Study of the PID's by splitting them in elementary parts (each part is made of one or several equipment): fractionation column, furnace, reactors, compressors...; piping; regulation, instrumentation will be studied in each part.

Safety elements: safety valves, valve action per air failure.

Utilities, start-up and shutdown piping: steam/condensate networks, hot oil, drain systems.

Other auxiliary piping: off-spec., start-up and shutdown piping.

ENGINEERING RULES & STANDARDS

2 d

Units and conversion factors.

Hydrocarbon properties.

Equipment design rules: rotating machines (compressors, pumps...); thermal equipment (furnaces, heat exchangers); storage tanks; pressure vessels.

Piping design as per the fluid inside: gas, subcooled liquid, boiling liquid...

Instrumentation: control valves, on-off valves, flow meters, indicators...

RELIEF SYSTEM DESIGN BASIS

0.5 d

Definition of risks.

Flare stack and flare main header and sub-headers design.

Safety valves design.

Emergency shut down diagram.

Depressurization.

PROJECT (TREATED ALL ALONG THE COURSE)

Conception of a PID from a process flow scheme. Application of rules for sizing piping and pieces of equipment .