

Training - Cogeneration - Combined Cycles



COGENE-EN-P



Face-to-face only



3 days

This course deals with cogeneration units in existing plants or new projects

Level

Skilled

Public

Graduate engineers and technicians whose activities are related to the design and/or operation of these installations: engineers and technicians from engineering companies, technical and HSE support, operation team, personnel from insurance companies

Objectives

Attendees will be able to implement the following skills:

- Describe the conditions for combined thermal and mechanical power generation
- List the criteria for evaluating and monitoring the performance of the various elements constituting a cogeneration

Pedagogical & technical resources

Several practical applications related to actual industrial cases

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

Responsible

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

DIFFERENT CYCLES AND MAIN CONSTITUENTS

1 day

Operating principle and operating conditions of cogeneration and combined cycles - Typical schemes.
Main parts of the different cycles: Biomass and conventional cogeneration cycle:

- Boiler, steam turbine (back-pressure or condensation).
- Gas turbine, waste heat recovery boiler.
- Alternator: Available technologies, operating modes: hard-coupled grid connection or stand-alone operation..

Energy balance and energy performances of each elementary operation: compression, combustion and expansion.

Efficiency enhancement, heat recovery from exhaust gases (air preheater, waste heat recovery boiler).
Different operating modes (simple waste heat recovery, post-combustion, separate boiler) and performances.
Application: comparison of performance, mechanical and thermal energy split.

GAS TURBINE

0.5 day

Operation: operating principle, ISO power rating vs site power rating, low-NOx combustion, control principle.
Technologies: classification, types of construction, auxiliary equipment, safety devices.

STEAM PRODUCTION

0.5 day

Boiler Feed Water (BFW) quality, description of the physical and chemical required treatments.
Description of conventional boilers and waste heat boilers (HRSG / OTSG): water circuit, steam circuit, fuel circuits.
Operating conditions - Fuel consumption per ton of steam, depending on boiler type and operating conditions.
Main process control loops: boiler feed water, pressure and steam temperature, combustion, flue gas circulation draft.
Combustion monitoring, analyzers, aim and meaning of each measured parameter. Safety equipment and sequences.

STEAM END-USES

0.5 day

Steam as a heating medium and mechanical driving fluid.
Conditions for its distribution and efficient utilization.
Steam turbines: operating principle, expansion work and efficiency, and produced energy.
Static expansion: expanded steam characteristics, steam de-superheating.

INDUSTRIAL OPERATIONS AND MAINTENANCE

0.5 day

Operation of a CCGT unit – Cycle and plant optimization
Key stages of start-up and shutdown.
Monitoring the unit's performance.
Routine monitoring.

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