# Training - Module 3: Gas Processing and Conditioning

ADV3-EN-P | Face-to-face only | 5 days

This course provides a comprehensive understanding of gas treatment processes, operation and troubleshooting

## Level
Skilled

## Public
Engineers involved in operating or designing gas field processing and conditioning facilities

## Objectives
Attendees will be able to implement the following skills:

- Assess various problems induced by unwanted elements in natural gas streams
- Master gas treatment and liquefaction processes, operations and related operating conditions
- Perform hand calculations for summary design of main gas processing equipment
- Ascertain main operating problems encountered in gas processing, conditioning and related solutions
- Simulate natural gas treatment processes using the PRO/II™ software

## Pedagogical & technical resources

- Highly interactive training by industry-specialist lecturers
- Numerous applications and illustrations
- Extensive practice of PRO/II™ process simulation software

## 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
To attend Module 1 (ADV1-EN-P) or to demonstrate a professional experience in process simulation

## 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

### NEED FOR FIELD PROCESSING OF GAS - QUALITY REQUIREMENTS — 0.25 day

Constituents raising problems for storage, transport or end use of natural gas.
Different specifications and quality requirements for natural gas.
Necessary treatments to conform these specifications.


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Examples of compositions of commercialized natural gases.

## GAS DEHYDRATION (DRYING) & HYDRATE FORMATION INHIBITION — 1.25 days

System behavior. Moisture content of a saturated gas:

- Applications: moisture content of different gases of various compositions.
- Hydrate formation inhibition by injection of inhibitors: MeOH, MEG, DEG, LDHI...
- Gas dehydration processes: TEG units, molecular sieves...
- Application: summary design of TEG unit.
- PRO/II™ simulation: simulation of TEG unit.

## GAS SWEETENING: REMOVAL OF ACID COMPONENTS (H2S AND/OR CO2) — 0.75 day

Overview of the techniques dedicated to gas sweetening:

- Chemical solvent processes. Amine units (MEA, DEA, DGA, MDEA...).
- Physical solvent processes.
- Hybrid (physico-chemical) solvent processes.
- Overview of other techniques.

Conversion of H2S: sulfur production (CLAUS process) and tail gas processing.
Application: summary design of an amine unit.

## NATURAL GAS LIQUIDS (NGL) EXTRACTION (REMOVAL OF HEAVY COMPONENTS) — 0.75 day

External refrigeration loop.
Joule-Thomson expansion.
Turbo-expander.
Application: calculation of cryogenic loop used for extraction.
PRO/II™ simulation: simulation of NGL extraction unit - Process selection.

## CASE STUDY: SIMULATION OF A WHOLE NATURAL GAS FIELD PROCESSING PLANT — 1 day

Study of a natural gas dehydration, NGL extraction and compression unit.
Optimization of the operating parameters.
Analysis of hydrate formation risks.

## LIQUEFIED NATURAL GAS (LNG) — 1 day

Liquefaction processes: operating principle, typical operating conditions, technology of specific equipment (plate fin heat exchangers, spiral-wound heat exchanges, refrigeration loop compressors...), power consumption...
LNG storage and transport: storage tanks, LNG carriers, jetty, loading arms...
Safety considerations specific to natural gas liquefaction plants.
Industrial examples of natural gas liquefaction units.

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