Training - Ethylene Compression and Hypercompression

ETHCO-EN-P | Face-to-face only | 4 days

This course provides a comprehensive understanding of ethylene compression related to compressors technology, operation and efficiency

Level
Skilled

Public
Engineers and technical staff (operation, maintenance and/or engineering) interested or involved in ethylene compression

Objectives
Attendees will be able to implement the following skills:

- Recognize ethylene compressor and hypercompressor technology
- Explain the compression of gases in hypercritical mode and the method of pre-dimensioning these machines
- List the monitoring points provided on these machines and the related operations
- Identify the typical failure modes of these machines, their causes, and associated remedies

Pedagogical & technical resources

- Study of actual cases based on industrial situations
- Various illustrations of actual systems
- Display of components of compressors

Assessment of achievements
Quiz

Prerequisites
No prerequisites are necessary to follow this course

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

ETHYLENE BEHAVIOR DURING COMPRESSION — 1 day

Ideal gas equation and implementation; isentropic compression; mass and volume capacity. Supercritical gas behavior.
Practical compression laws: discharge temperature, power of compression.
Pressure-enthalpy diagram for ethylene: for primary compressors and hypercompressors.
Main limitations: risks of condensation, overheating, decomposition, grease deposits.
Case studies: ethylene compression from 1 to 3000 bar.

PRIMARY COMPRESSORS BEHAVIOR & OPERATION — 1 day

Indicator diagram for ideal and actual cases.

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Influence of process temperatures and pressures.
Dead volume: impact on the intake of the machine.
Capacity control: different methods.
Power, efficiency.
Behavior of multistage reciprocating compressors.
Typical troubleshooting.
Operation: start-up and shutdown difficulties.
Cases studies: industrial ethylene compression, troubleshooting.

HYPERCOMPRESSORS BEHAVIOR & OPERATION — 1 day

Compression ratio limitation due to axial loads on the crankshaft.
Interstage pressure control, risk of rods overbendings or plunger/seals breaks.
Discharge temperature limitation due to decomposition and oligomer deposits.
Lubrication operation and survey: crankshaft, oil seal and cooling. Criticity of the oil type.
Machine safety - PROGNOST™ type monitoring: axial vibrations, rod drop, oil temperatures and pressures, process temperatures and pressures.
Typical defaults, solutions and diagnosis.
Cases studies: various cases of troubleshooting.

TECHNOLOGY OF PRIMARY COMPRESSORS — 0.5 day

Main components: frame, cylinders, piston, piston rings, piston rod, crankhead, crankshaft, distance pieces, valves, rod seals.
Auxiliaries: pulsation dampeners, crankshaft, seals and cylinder lubrication systems, cooling systems, safety devices.
Capacity control technology: main components (unloaders, clearance pockets).
Application: various compressor parts demonstrations.

TECHNOLOGY OF HYPERCOMPRESSORS — 0.5 day

Main differences with classical reciprocating compressors.
Hypercompressor description: valves, cylinders, seals.
Auxiliaries:

- Construction and survey.
- Crankshaft lubrication.
- Rod seal lubrication.
- Oil seal and cooling.
- Drains.

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