Introduction to rotating machines (PC-1)

Objective:
- Acquire the general principles of machine operation: centrifugal pumps, centrifugal and reciprocating compressors, steam turbines.
- Identify the operating limits specific to each type of machine.
- Define the main cases of major disorders.

Target group:
- This course is aimed at operators, foremen, technicians or engineers from operations, maintenance or process departments with at least 1 month's professional experience.
- Maximum 8 to 10 people per session.

Contents:

Day 1

Centrifugal pumps
09:00 - 10:30
- Pump types : Technology: casings, impellers, bearings, seals
- Characteristics: Flow rate / Head
- Centrifugal pump performance curves

10:30 - 10:45 Break
10:45 - 12:15
- Power and efficiency
- Influence of parameters: rotation speed, impeller diameter, density, viscosity
- Operating limits: cavitation and NPSH

12:15 - 13:15 Lunch
Centrifugal compressors
13:15 - 14:45
- Different technologies: housings, impellers, diffusers, bearings
- Gas compression: centrifugal effect, role of impellers and diffusers, return channels.

14:45 - 15:00 Break
15:00 - 16:30
- Characteristic curves of a centrifugal compressor:
  - o Compression ratio, volume flow, mass flow
  - o Influence of speed, efficiency, power
  - o Operating limits
- Protection and monitoring devices: anti-pumping, vibration and axial displacement sensors.
- Major incidents

Day 2

Reciprocating compressors
09:00 - 10:30
- Technology :
  - o Components of a reciprocating compressor: frame, cylinders, pistons, sealing valves, Direct drive or geared motor

  o Anti-pulsation devices
- Compression cycle: flow, power, efficiency
10:30 - 10:45 Break
10:45 - 12:15
- Adaptation to operating conditions: influence of parameters P, T, mw
- Multi-stage compressor operation
- Protective devices and major incidents: effects and prevention
12:15 - 13:15 Lunch
Steam turbines
13:15 - 14:45
- Turbine classification: action or reaction, counterpressure or condensation
- Technology: rotor, blades, diaphragms, thrust bearing, bearings
14:45 - 15:00 Break
15:00 - 16:30
- Steam turbine principle :
  o Steam expansion: Mollier cycle, enthalpy variation
  o Steam turbine performance: steam flow, power, efficiency
- Operating limits: inlet and outlet steam pressure and temperature
- Protective devices
- Major incidents

Implementation / working method:

2-day interactive face-to-face course, powerpoint support will be shared at the beginning of the course in paper and digital formats.

Course language and materials

French

Event Properties

Event Date	Wednesday, 24 September 2025 - Thursday, 25 September 2025
Registration Start Date	Monday, 30 November -0001
Cut off date	Monday, 30 November -0001
Individual Price	Membre CHF 1'130.00, non-membre CHF 1'350.00, étudiants/doctorants/AVS CHF 600.00 (incl. Lunch)
Lecturer	Michel Huet, PRIMCO
Course language	French
Location	PRIMCO Thônex, Thônex