

Introduction to rotating machines (PC-1)

Objective:

SCS Academy

- 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

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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 |
| | etudiants/doctorants/AVS CHF 600.00 (incl. Lunch) |
| Lecturer | Michel Huet, PRIMCO |
| Course language | French |
| Location | PRIMCO Thônex, Thônex |