

# TRAINING



The training quality of plant operators is indeed reflective of the maintenance and operational costs as well as uptime. Quality training is a pre-requisite for honing their skills on the operation and maintenance of a turbo expander.

To ensure safe, efficient and reliable operation we offer high quality training and certification for plant operators.

We have a core of instructors that are field seasoned experts with a deep understanding of theory and as well extensive field experience.

Ensuring that the best learning environment is available, our multi-customer class size is limited to 10 students.

On-site training, tailored specifically to the customer's machinery is also available on request.

## OBJECTIVE

The objective of our training courses is to improve the depth of knowledge of plant operators and maintenance technicians with a more complete vision of industrial gas turbo expanders, their operation and maintenance.

## Curriculum

1. Introduction to basic air separation processes, liquefaction and the role of turbines
2. Theory of operation – Principles of operation, rotor dynamic principles, basic thermodynamic theory, major components, factors that affect turbo expanders performance
3. Design and construction – includes function definition identification and assembly of all major turbo expander components
  - Turbine and compressor wheels
  - Other load/brake mechanisms
  - Bearings
  - Seals
  - Shaft
  - Nozzles
4. Auxiliary systems and instrumentation – definition of major subsystems and their operation
  - Seal gas system
  - System shut down and alarms
  - Lubrication oil
  - Shaft vibration, speed and bearing temperature
  - Instrumentation
5. Turbo expander operation basic start up operating procedures, safety precautions
  - Start up
  - Shut down
  - Compressor anti-surge control theory and operation
  - Performance control
  - Speed control
  - Start up and shutdown sequencing
  - Inlet and bypass control
  - Machine protection
6. Maintenance - philosophy
  - Preventive
  - Scheduled maintenance intervals
  - What to look for
  - Cartridge removal



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## TEAM CARE

Turbo Expander After Market CARE

- Global services – wherever you are... we are near you! Ready to service you 24/7.
- Downtime equals hundreds of thousands of dollars in lost productivity
- Productivity enhancement program thru renewals and upgrades
- Our extensive worldwide team will provide all planned maintenance, emergency support and other added value services.
- Over 300 years of accumulated experience in cryogenic turbomachinery
- We focus on improving operating profits through energy savings, production efficiency and mechanical reliability.