**Introduction**

A complete understanding of design, functioning and maintenance of centrifugal compressors and steam turbines is a prerequisite for successful operation of process plants. This is especially important nowadays when the demand for minimum and continuous production is vital for competitiveness of organizations.

This GLOMACS Centrifugal Compressors & Steam Turbines training seminar will feature the importance of proper design, operation and maintenance of centrifugal compressors and steam turbines of various designs and applications, which are encountered throughout chemical and process industries, including oil refineries, gas production facilities, power generation and other fields of engineering.

This GLOMACS training seminar is intended to familiarize engineers, technicians and operators with the guidelines and best practices employed in utilizing this equipment, including design, operation, maintenance and repair. The emphasis in the training seminar will be on physical understanding of the problems in operation and the best way of troubleshooting them.

**This GLOMACS training seminar will feature:**

- Principles of selection of right centrifugal compressor and steam turbine for the given application
- Practical issues related to trouble-free functioning of centrifugal compressors and steam turbines
- Explanation of aerodynamic instabilities of centrifugal compressors and thermal instabilities of steam turbines
- Guidelines for design, operation, maintenance and troubleshooting
- Maintenance and repair economic issues: cost and benefit analysis

**Objectives**

By the end of this GLOMACS training seminar, participants will be able to:

- Understand technical features of centrifugal compressors and steam turbines
- Select optimal type and size of equipment for a given industrial application
- Use methods of estimating the degree of deterioration and inefficiency of equipment
- Apply best practices and techniques of pinpointing the root cause of problems
- Choose the most efficient remedies and troubleshooting techniques in operation

**Training Methodology**

This GLOMACS Centrifugal Compressors & Steam Turbines training seminar will be conducted along workshop principles with formal lectures and interactive worked examples included in several workshops. Presented also will be several illustrative and instructive videos.

The emphasis in this GLOMACS training seminar will be on the explanation of all technical points and providing answers to problems that are encountered in everyday industrial practice related to installation, operation and maintenance, as well as repair and alterations of pipeline systems.

Each learning point will be reinforced with practical examples. There will be ample opportunities for active discussion and sharing professional experiences and exchange that will help solidify the gained knowledge. All training seminar materials will be provided.

**Organisational Impact**

Centrifugal compressors and Steam Turbines are critical machinery in any plant. Their selection using design standards, operation at best efficiency points and maintenance at required intervals and with the appropriate spare parts at optimum clearances deliver the organization target for maximum production at minimum OPEX and CAPEX.

On completion of this GLOMACS Centrifugal Compressor & Steam Turbine training seminar, the delegate will be able to:

- Specify compressors / turbines for purchase / upgrading according to API / ASME / ISO codes
- Operate compressors / turbines at their best efficiency point
- Select specify construct through reverse engineering the critical spare parts
- Optimize critical clearances for maximum time at BEP

**Personal Impact**

Technical knowledge is key to effective control and peer respect within any technical organization. When this is achieved personal satisfaction follows.

This GLOMACS Centrifugal Compressor & Steam Turbine training seminar will give the delegate the required level of knowledge for:

- Proper selection of compressors / turbines
- Navigate through operating curves at optimum conditions
- Align and balance machines for minimum vibration
- Apply reverse engineering techniques for spare parts manufacturing / repair
- Assembly disassembly with the usage of appropriate protocols
- Troubleshoot any problem that may occur

**Who Should Attend?**

This GLOMACS Centrifugal Compressors & Steam Turbines training seminar is designed to benefit all levels of Technical Personnel in the oil and gas industry as well as in chemical and process industries but will greatly benefit:

- Chemical, Process and Mechanical Engineers
- Product Engineers and Technologists
- Operation, Technical Service and Maintenance Professionals
- Engineers, Consultants and Sales Professionals
- Technical Professionals responsible for interdisciplinary energy projects
SEMINAR OUTLINE

DAY 1

Gas Thermodynamics

• Gas Properties and Laws
• Centrifugal Compressor Aerodynamics - Thermodynamics
• Changes in Gas Velocity and Pressure in a Centrifugal Compressor
• Mass and Volume Flow Rate as a Function of Pressure, Temperature and Gas Composition
• Molecular Weight of Gas and its Effect on Performance
• Discharge Temperature, Power Absorbed as a Function of the Gas Composition and the Operating Conditions
• Investigating and Controlling Surge and Choke

DAY 2

Centrifugal Compressors - Design - Operation

• Overview of the Main Features of Various Types of Compressors
• Classification of Compressors based on Design and Application
• World Standards and Codes related to Compressor Design
• Main Elements of Centrifugal Compressor Construction
• Analysis of Centrifugal Compressor Efficiency
• Guidelines for Trouble-free Centrifugal Compressor Operation

DAY 3

Steam Thermodynamics

• Steam Properties and the Mollier Charts
• The Rankine Cycle
• Steam Requirement per KWH Production
• Ultra-supercritical Conditions

DAY 4

Steam Turbines - Design - Operation

• Main Elements and Technical Characteristics of Steam Turbine Design
• The Rotating and Stationary Blades
• The Internal and External Seals
• Radial and Thrust Journal Bearings
• Stop – Control – Non Return Turbine Valves
• Turbine Controls and Interlocks

DAY 5

Maintenance of Rotating Machines

• Machines Piping and Ground Regulations
• Alignment of Thermal Machines
• Balancing of Rotating Machines
• Surface Treatments of Sealing Interfaces
• Online Washing
• Troubleshooting through Vibration Analysis, Oil Analysis and Thermography

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CENTRIFUGAL COMPRESSOR & STEAM TURBINE
Design, Operations & Maintenance

**REGISTRATION DETAILS**

LAST NAME: __________________________________________
FIRST NAME: _________________________________________
DESIGNATION: _______________________________________
COMPANY: _________________________________________
ADDRESS: __________________________________________
CITY: ______________________________________________
COUNTRY: _________________________________________
TELEPHONE: ________________________________________
MOBILE: __________________________________________
FAX: ______________________________________________
EMAIL: ____________________________________________

**AUTHORISATION DETAILS**

AUTHORIZED BY: _____________________________________
DESIGNATION: _____________________________________
COMPANY: _________________________________________
ADDRESS: __________________________________________
CITY: ______________________________________________
COUNTRY: _________________________________________
TELEPHONE: ________________________________________
MOBILE: __________________________________________
FAX: ______________________________________________
EMAIL: ____________________________________________

**PAYMENT DETAILS**

☐ Please invoice my company
☐ Cheque payable to GLOMACS
☐ Please invoice me

**CERTIFICATION**

Successful participants will receive GLOMACS’ Certificate of Completion

<table>
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<th>Code</th>
<th>Date</th>
<th>Venue</th>
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<td>15 - 19 Nov 2020</td>
<td>Dubai</td>
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</tbody>
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4 WAYS TO REGISTER

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Fax: +971 (04) 425 0701
Email: info@glomacs.com
Website: www.glomacs.com

**TERMS AND CONDITIONS**

- Fees – Each fee is inclusive of Documentation, Lunch and refreshments served during the entire seminar.
- Mode of Payment – The delegate has the option to pay the course fee directly or request to send an invoice to his/her company/sponsor. Credit card and cheque payments are both acceptable.
- Cancellation / Substitution – Request for seminar cancellation must be made in writing & received three (3) weeks prior to the seminar date. A US$ 250.00 processing fee will be charged per delegate for each cancellation. Thereafter, we regret that we are unable to refund any fees due, although in such cases we would be happy to welcome a colleague who would substitute for you.
- Hotel Accommodation – is not included in the course fee. A reduced corporate rate and a limited number of rooms may be available for attendees wishing to stay at the hotel venue. Requests for hotel reservations should be made at least three (3) weeks prior to the commencement of the seminar. All hotel accommodation is strictly subject to availability and terms and conditions imposed by the hotel will apply.
- Attendance Certificate – a certificate of attendance will only be awarded to those delegates who successfully completed/attended the entire seminar including the awarding of applicable Continuing Professional Education Units/Hours.
- Force Majeure – any circumstances beyond the control of the Company may necessitate postponement, change of seminar venue or substitution of assigned Instructor. The Company reserves the right to exercise this clause and implement such amendments.
- Fair Access / Equal Opportunities – In the provision of its services as a world-class Training Provider, the Company is committed to provide fair access / equal opportunities throughout the delivery of its courses and assessment leading to the completion of training seminars, or 3rd party qualifications/certifications.