

Scandinavian Academy
Training Center

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Riyadh - Al Khaleej District - Sheikh Abdul Aziz Bin Abdul Rahman Bin Bishr Street - 13223 - Office No. 5 | P.O.BOX : 13224

Course: Pumps, Compressors and Turbines: Selection, Operation and Maintenance

Code	City	hotel	Start	End	price	Language - Hours
MA-107SA	Al Khobar	Hotel Meeting	2027-03-21	2027-03-25	12950 SR	En - 25

The Course

Fluids and fluid movers such as pumps, compressors of various designs and applications, are encountered throughout chemical and process industries, including oil refineries, gas production facilities, power generation and other fields of engineering. As fluids can be in-process material in the form of liquid, gas or a mixture of both with solids, corresponding pumps and compressors sometimes have to satisfy high demands of efficient transport of complex and difficult fluids. The progress in the design and application of pumps, compressors and turbines has been so rapid that currently, all limitations of pressure, capacity, temperature, and nature of fluids have disappeared. At the same time, this advance in construction and application has presented numerous problems: mechanical, hydraulic, operating, economic, etc.

A thorough understanding of basic principles of fluid flow in pumps, compressors and turbines as well as in piping systems is a prerequisite for successful design, installation and operation of these machines. Various numerical examples are selected carefully to be from real-life technical practice, and will help remove any misconception reflected in an inefficiently operating piping system. Design and operation of gas turbines due to their complexity, require special attention and information on their interaction with axial compressors.

Highlights of the course include:

- Principles of selection of the right pump, compressor and turbine for the given application
- Practical issues related to trouble-free functioning of pumps, compressors and

turbines in various industrial applications
- A good blend of comprehensive explanations of fundamental principles of fluid flow and valuable empirical industrial experience gained over the years in operation and service
- Guidelines for installation, operation and maintenance with the procedure to diagnose and solve problems in operation with troublesome fluids
- Economical issues: cost and benefit analysis

The Goals

This course will enable the participants to achieve the following:

- Understanding of technical features of different types of pumps, compressors and turbines and their capabilities and limitations
- Familiarity with principles of hydraulic and mechanical design of pumps, compressors and turbines according to existing world standards and codes
- Knowledge on the selection of optimal type and size for a given industrial application
- Proper use of methods of diagnosing and estimating the degree of deterioration and inefficiency of pumps, compressors and turbines and the ways to improve them
- Best practices and techniques of pinpointing the problems, and the choosing the most efficient remedies, in operation, such as cavitation, surge, stall, choking, corrosion, erosion, etc

The Process

The course will combine lectures with active delegate participation including discussions and workshops. Although numerical examples and calculations will be included, focus will be on physical principles and clear technical reasoning. Workshops are scheduled where case studies about pumps, compressors and turbines will be presented with calculation procedures and results discussed

The Benefits

This course will benefit the delegates through:

- Stronger familiarity with all types of pumps, compressors and turbines that are encountered in every-day industrial practice in the process and chemical industry
- Enhanced knowledge of methods used to assess the main design parameters of pumps, compressors and turbines
- Greater understanding of the guidelines for selection and sizing of pumps, compressors and turbines regarding their operational cost in terms of energy consumption
- Knowledge of modern trends in the pumps, compressors and turbines industry regarding increasing demands for greater efficiency and reduction in size when dealing with difficult fluids (viscous, corrosive, abrasive, toxic, explosive, etc.)
- Confidence in the best practices for their efficient operation, maintenance and troubleshooting the problems related to cavitation, surge, stall, choking etc.

The Results

The course will benefit the company through:

- Performance of the company in the long run will be improved by an adequate selection and sizing of pumps, compressors and turbines that have the best overall efficiency
- Well maintained pumps, compressors and turbines will prolong the life of the plant and significantly reduce overall costs, and in the same time reduce the risks and impact on the environmental
- Efficiently operated pumps, compressors and turbines by skilled personnel will result in energy saving and in the reduction of overall costs of the plant operation
- Personnel in the maintenance department will be able to follow the best practices for inspection, maintenance, repair and alteration
- Problem-free operation of pumps, compressors and turbines will result in reducing

of downtime for repairs and alterations and reduce the operation costs in the technological process.

The Programme Content

Day One : Centrifugal Pumps

- Overview of various types of pumps based on design and application
- World standards and codes related to pump design
- Main elements of centrifugal pump construction
- Design of pump-suction piping
- Selection and sizing of centrifugal pump
- Solving problems in operation

Day Two : Positive Displacement Pumps

- Positive displacement pumps: reciprocating and rotary
- Pump requirements for chemical, process and oil industry, power generation
- Pumps for special applications
- Guidelines for pump installation and operation
- Pump inspection, control and performance testing
- Maintenance and troubleshooting of pumps

Day Three : Centrifugal Compressors

- 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 Four : Positive Displacement Compressors

- Positive displacement compressors: Reciprocating and Rotary
- Basic criteria for selecting the optimum cost-effective compressor
- Compressor loadings and speeds; noise control and protection
- Compressors for special applications
- Guidelines for compressor installation and operation
- Compressor inspection, maintenance, control, performance testing and troubleshooting

Day Five : Industrial Gas Turbines

- Overview and classification of gas turbines
- World standards and codes related to gas turbine design
- Main elements and technical characteristics of gas turbine design
- Radial and Axial-flow gas turbines
- Combustor performance - types of fuels, combustion and pollution control
- Gas turbine deterioration - corrosion and erosion prevention
- Mechanical vibrations - monitoring, measurements, diagnostics and analysis
- Installation , operation, maintenance and troubleshooting of gas turbines

The Scandinavian Academy for Training Center adopts the latest scientific and professional methodologies in training and human resource development, aiming to enhance the efficiency of individuals and organizations. Training programs are delivered through a comprehensive approach that includes:

- Theoretical lectures supported by PowerPoint presentations and visual materials (videos and short films).
- Scientific evaluation of participants before and after the program to measure progress and knowledge acquisition.
- Brainstorming sessions and practical role-playing to simulate real-life scenarios.
- Case studies tailored to align with the training content and participants work nature.
- Assessment tests conducted at the end of the program to evaluate the achievement of training objectives.

Each participant receives the training material (both theoretical and practical) in printed form and saved on a CD or flash drive. Detailed reports, including attendance records, final results, and overall program evaluations, are also provided.

Training materials are prepared professionally by a team of experts and specialists in various fields. At the end of the program, participants are awarded a professional attendance certificate, signed and accredited by the Scandinavian Academy for Training Center.

Program Timings: 9:00 AM to 2:00 PM

The program includes:

- A daily buffet provided during the sessions to ensure participants comfort.
- A closing ceremony on the final day to distribute certificates and celebrate participants achievements.
- **Note: All prices are exclusive of 15% Value Added Tax (VAT).**

Our Success Partners

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