

Scandinavian Academy Training Center

Mobile | 00966536473335 : Mobile | 00966112695229 : Phone : 00966552365295
Email | info.en@scandinavianacademy.co Web site:https://scandinavianacademy.co/en :
Riyadh - Al Khaleej District - Sheikh Abdul Aziz Bin Abdul Rahman Bin Bishr Street - 13223 - Office No. 5 | P.O.BOX : 13224

Course: Compressor & Pump Technology

Code	City	hotel	Start	End	price	Language - Hours
OG-487SA	Jeddah	Hotel Meeting Room	2027-09-05	2027-09-16	22450 SR	En - 50

INTRODUCTION

This programme provides a comprehensive understanding of the various types of reciprocating, rotary, and dynamic compressors and pumps. This includes trunk piston, sliding crosshead piston, diaphragm, rotary screw, straight lobe, sliding vane, liquid ring, centrifugal, and axial compressors as well as piston pumps, plunger pumps, rotary pumps, screw pumps, two- and three-lobe pumps, cam pumps, vane pumps, bellows-type metering pumps, diaphragm pumps, canned motor pumps, and centrifugal pumps. Bearings are also covered thoroughly. The characteristics, selection criteria, sizing calculations, sealing arrangements, common problems, repair techniques, as well as the preventive and predictive maintenance of these compressors and pumps are covered in detail.

This programme is a MUST for those who use this equipment. It covers how compressors, pumps, and bearings operate and provides the guidelines and rules that must be followed for their successful application.

This programme provides the following for all types of compressors, pumps, and bearings:

- Basic Design
- Specification
- Selection Criteria
- Sizing Calculations
- Sealing Arrangements
- Common Operational Problems
- All Diagnostics, Troubleshooting, and Maintenance Required for this Equipment

Including Vibration Analysis, and Used Oil Analysis
- Compressor and Pump Drivers

PROGRAMME OBJECTIVES

- Maximize the efficiency, reliability, and longevity of all types of compressors, pumps, and bearings
- Size and select out of the various types of dynamic and positive displacement compressors, and pumps using the performance characteristics and the selection criteria that you learn in this programme
- Carry out diagnostic testing and inspection of critical components with the knowledge of common failure modes of compressors, pumps, and bearings by applying advanced fault detection techniques
- Select bearings and lubrication, compressor and pump sealing arrangements, meet commissioning requirements, conduct vibration and used oil analyses, troubleshoot, provide predictive and preventive maintenance, enhance reliability, and reduce cost
- Determine the maintenance required to minimize compressor and pump downtime and operating cost and maximize their efficiency, reliability, and longevity
- Gain a thorough understanding of compressor and pump characteristics and compressor surge and surge prevention systems
- Understand all the causes of failures in compressors and pumps
- Determine all the design features that improve the efficiency and reliability of all compressors and pumps
- Design different types of compressor and pumping systems
- Gain a thorough understanding of the various types of sealing arrangements used in compressors and pumps

TRAINING METHODOLOGY

The instructor relies on a highly interactive training method to enhance the learning process. This method ensures that all the delegates gain a complete understanding of

all the topics covered. The training environment is highly stimulating, challenging, and effective. The participants will learn by case studies. They will be able to apply all the concepts to their own organization.

PROGRAMME SUMMARY

This programme provides indepth understanding of the operation, selection, sizing, applications, sealing arrangements, troubleshooting, and maintenance of all types of compressors, pumps, and bearings. All the methods used to enhance the performance, reliability, troubleshooting, and maintenance of this equipment are discussed in detail. This programme includes also detailed coverage of mechanical seals, compressor and pump drivers, compressor surge, choking, surge prevention systems, and anti-choking systems. Dry seals and magnetic bearings are also covered in detail in this programme.

PROGRAMME OUTLINE

DAY 1 - Gas Laws, Compressor Types and Applications

- Perfect and Imperfect Gases
- Compressor Polytropic Efficiency and Power Requirements
- Compressor Volumetric Flow Rate and Volumetric Efficiency
- Rotary and Reciprocating Compressors
- Dynamic Compressors (Centrifugal and Axial)
- Compressor Performance Measurement
- Receivers, Compressor Control, and Compressor Unloading Systems
- Preventive Maintenance and Housekeeping

DAY 2 - Positive Displacement Compressors

- Performance of Positive Displacement Compressors
- Reciprocating Compressors
- Reciprocating Compressors Troubleshooting and Maintenance

- Diaphragm Compressors
- Rotary Screw Compressors and Filter Separators
- Straight Lobe Compressors
- Recent Developments in Liquid/Gas Separation Technology

DAY 3 - Dynamic Compressors

- Dynamic Compressor Technology
- Centrifugal and Axial Compressors
- Simplifies Equations for Determining the Performance of Dynamic Compressors
- Centrifugal Compressors – Components, Performance Characteristics, Balancing, Surge Prevention Systems and Testing
- Choking, and Anti-Choking Systems
- Compressor Auxiliaries, Off-Design Performance, Stall, and Surge

DAY 4 - Dynamic Compressors Performance, Compressor Seals, and Compressor System Calculations

- Dynamic Compressors Performance
- Surge Limit, Stonewall, Prevention of Surge, Anti-Surge Control Systems
- Compressor Seal Systems
- Gas Seals, Liquid Seals, Liquid Bushing Seals, Contact Seals, Restricted Bushing Seals, Seal Liquid leakage System
- Dry Seals, Advanced Sealing Mechanisms, and Magnetic Bearings
- Compressor System Calculations
- Sizing of Compressor System Components, Sizing of Gas Receiver
- Workshop – Case Studies: Design and Selection of Different Compressor Systems for the Oil and Gas industry, and the Power Generation Industry

DAY 5 - Bearings, Lubrication, Vibration Analysis and Predictive Maintenance

- Bearings, Types of Bearings, Thrust Bearings
- Lubrication, Viscosity of Lubricants, Non-Newtonian Fluids, and Greases

- Used Oil Analysis
- Vibration Analysis and Predictive Maintenance
- Vibration Causes, Resonant Frequency, Vibration in Predictive Maintenance, Diagnostics
- Diagnostic Testing

DAY 6 - Pump Categories, and Centrifugal Pumps

- Pump Categories: Dynamic (Centrifugal) and Positive Displacement (Reciprocating and Rotary)
- Centrifugal Pumps: Operation, Casings and Diffusers, Hydrostatic Pressure Tests, Impellers, Hydraulic Balancing Devices, Mechanical Seals, Minimum Flow Requirement, Performance Characteristics, Cavitation, and Net positive Suction Head

DAY 7 - Centrifugal Pump Mechanical seals

- Centrifugal Pump Mechanical Seals, Components, Temperature Control, Seal Lubrication/Leakage, Applications, Types of Mechanical Seals, Common Failure Modes of Seals, Seal Refurbishment
- Maintenance Recommended for Centrifugal Pumps
- Vibration Analysis and Predictive Maintenance

DAY 8 - Positive Displacement Pumps

- Reciprocating Pumps, Piston Pumps, Plunger Pumps, Rotary Pumps, Screw Pumps, Two- and Three-Lobe Pumps
- Cam Pumps, Vane Pumps, Bellows-Type Metering Pumps
- Diaphragm Pumps
- Canned Motor Pumps, Seal-less Pump Motors

DAY 9 - Troubleshooting of Pumps

- Pump Maintenance, Inspection, Overhaul, Diagnoses of Pump Troubles

- Troubleshooting of Centrifugal Pumps
- Troubleshooting of Rotary Pumps
- Troubleshooting of Reciprocating Pumps
- Water Hammer
- Bearings
- Used Oil Analysis
- Smart Instrumentation

DAY 10 - Pump Selection

- Pumping System Calculations
- Workshop: Design and selection of Different Pumping Systems for the Oil and Gas Industry, and the Power Generation Industry
- Vibration Analysis and Predictive Maintenance
- Control Valve Selection, Cavitation, and Noise
- Actuators, Positioners, and Accessories
- Diagnostics of Pumping Systems
- Pump Drivers
- Motors
- Variable-Frequency Drives

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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المملكة العربية السعودية - الرياض - حي الخليج - شارع الشيخ عبد العزيز بن عبد الرحمن بن بشر - 13223 - مكتب رقم 5
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