



Fluid Machinery: Selection, Operation,
& Maintenance of Pumps, Compressors,
& Turbines



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Introduction to Fluid Machinery

Fluid machinery plays a pivotal role in various chemical and process engineering industries. Understanding the essentials of fluid mechanics and what fluid machinery encompasses is vital for specialists in the field. Fluids and fluid movers, such as pumps and compressors of various designs and applications, are encountered throughout these industries, including oil refineries, gas production facilities, power generation, and other engineering fields.

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 all limitations of pressure, capacity, temperature, and fluid nature have disappeared. At the same time, this advance in construction and application has presented numerous problems: mechanical, hydraulic, operating, and economic.

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

This fluid machinery course dissects the fundamental concepts and applications of fluid mechanics, emphasizing the selection, operation, and maintenance of critical components such as pumps, compressors, and turbines. Participants will explore the diverse landscape of fluid mechanics types and learn to navigate the complexities of these systems. This fluid machinery course offers an in-depth understanding of fluid mechanics fundamentals and applications, machinery selection, and the intricacies of various fluid machinery operation and maintenance types.

Targeted Groups

This fluid machinery course caters to a broad audience, including:

- Chemical, Process, and Mechanical Engineers.
- Product Engineers and Technologists.
- Operation, Technical Service, and Maintenance Professionals.
- Engineers, Consultants, and Professionals in related fields.
- Technical professionals responsible for interdisciplinary energy projects.

Conference Objectives

By the conclusion of this fluid machinery conference, attendees will be empowered to:

- Comprehend the technical features of various types of fluid machinery, recognizing their capabilities and limitations.
- Acquaint themselves with the fundamental hydraulic and mechanical design principles of fluid machinery by world standards.
- Acquire the knowledge to select the optimal machinery type and size for specific industrial applications.
- Diagnose and assess the condition of machinery, understanding how to enhance their efficiency and effectiveness.
- Apply best practices to identify and resolve operational issues such as cavitation, surge, and corrosion.

Targeted Competencies

Participants in this fluid machinery conference will develop competencies in the:

- Understand fluid machinery selection principles for the right application.
- Manage practical issues for the uninterrupted operation of various machinery.
- Blend theoretical principles of fluid flow with empirical experience from industrial practices.
- Adhering to installation, operation, and maintenance guidelines addresses common operational issues.
- Perform a cost and benefit analysis regarding fluid machinery.

Conference Content

Unit 1: Centrifugal Pumps

- The array of pump types is based on design and use.
- Standards and codes that govern pump design.
- Know the key elements of centrifugal pump construction.
- Proper design of pump-suction piping.
- Overview of methods for selecting and sizing centrifugal pumps.
- Understand strategies for troubleshooting operational pump problems.

Unit 2: Positive Displacement Pumps

- Learn the role of reciprocating and rotary positive displacement pumps.
- Understand specific pump requirements across various industries.
- Unique applications requiring specialized pumps.
- Overview of installation and operational guidelines for pumps.
- Understand inspection, control, and performance testing of pumps.
- Know about maintenance and problem-solving procedures for pumps.

Unit 3: Centrifugal Compressors

- Overview of the main features of various types of compressors.
- Know about the classification of compressors based on design and application.
- World standards and codes related to compressor design.
- Understand the main elements of centrifugal compressor construction.
- Analysis of centrifugal compressor efficiency.
- Overview of guidelines for trouble-free centrifugal compressor operation.

Unit 4: Positive Displacement Compressors

- Learn about types of positive displacement compressors and their applications.
- Determine cost-effective compressors for specific needs.
- Address noisy operations and ensure safety measures.
- Overview of special considerations for compressors in unique scenarios.
- Understand guidelines for installation, operation, and maintenance of compressors.
- Know in-depth inspection and troubleshooting of compressors.

Unit 5: Industrial Gas Turbines

- Overview and classification of gas turbines.
- World standards and codes related to gas turbine design.
- Overview of main elements and technical characteristics of gas turbine design.
- Learn about radial and axial-flow gas turbines.
- Combustor performance - types of fuels, combustion and pollution control.
- Know gas turbine deterioration - corrosion and erosion prevention.
- Understand mechanical vibrations, such as monitoring, measurements, diagnostics, and analysis.
- Learn about installation, operation, maintenance, and troubleshooting of gas turbines.

Throughout the fluid machinery course, participants will be introduced to exclusive training opportunities such as pump maintenance training, pump repair and maintenance training, and machinery operator training programs. Lastly, the course invites attendees to this fluid mechanics and machinery operator conference to further enhance their professional network and knowledge base.