



Pump & Valve Technology in the Oil &
Gas Industry



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Introduction:

This oil and gas pump and valve technology training seminar offers an in-depth look at the critical role of pump and valve technology in the oil and gas industry. Participants will be introduced to the various types of pumps, such as oil and gas pumps, centrifugal pumps, and positive displacement pumps, and the assortment of valves, including oil and gas valves used within the industry.

They will meticulously examine pump and valve engineering aspects, such as packing, mechanical seals, sealing systems, bearings, and couplings. The oil and gas pump and valve technology course will explore identifying various pumps in oil and gas applications, ensuring participants understand their suitability for different operating duties. It will ensure a thorough grasp of the concepts, and hands-on discussions will be conducted about the operation, troubleshooting, and maintenance of pumps and valves.

Oil and Gas Pumps and Valves Fundamentals:

Under this new subheading, we will explore the foundational aspects of oil and gas pumps and valves. We will emphasize understanding the different types of pumps in the oil and gas industry and how they are indispensable to operational success. Additionally, we will thoroughly cover the range of oil and gas valve types and their specific applications. With insights from oil and gas valve suppliers, participants will learn industry standards and best practices.

Targeted Groups:

- Supervisors.
- Team Leaders.
- Technicians.

Course Objectives:

At the end of this oil and gas pump and valve technology course, participants will be able to:

- Understand the various types of pumps.
- Understand the centrifugal and positive displacement pumps and key concepts, including pump performance, head varieties, and cavitation.
- Comprehend the complex nature of valve types in the oil and gas industry and the various parameters that affect valve operation.
- Determine the correct oil and gas pump and valve selection for specific applications and perform necessary calculations for their sizing.
- Develop troubleshooting skills for systems involving pumps in the oil and gas industry.
- Formulate an effective maintenance plan for different oil and gas valves, enhancing longevity and reliability.

Targeted Competencies:

By the end of this oil and gas pump and valve technology training, participants competencies will:

- Operation and types of pumps in the oil and gas industry.
- Achieving oil and gas pump and valve reliability.
- Valve technology solutions in the oil and gas industry.
- Mastery of valve troubleshooting and maintenance.
- Familiarity with oil and gas technology advancements.

Course Content:

Unit 1: Pumping Systems:

- Fundamentals of Pumping Systems.
- Pumps in the oil and gas industry: Types and Terminology.
- Performance of Pump Systems: Centrifugal and Positive Displacement.
- Conceptualizing Head: Static, Pressure, Velocity, and Friction Head.
- Roles of Valves, Piping, and Fittings in Friction.
- Calculation of Actual System Head.
- Investigating Cavitation in Pumps and Valves.
- The Importance of Net Positive Suction Head NPSH.
- Analyzing Vapor and Gas Cavitation.
- Flashing vs. Cavitation.

Unit 2: Pump Types:

- A Dive into Positive Displacement Pumps.
- Reciprocating Pumps.
- Reciprocating Pump Valves.
- Explore Rotary Pumps: Scroll and Gear Types.
- Identifying and Monitoring Failure Mechanisms.
- Centrifugal Pumps: Hydrodynamics and Operation.
- Centrifugal Pump Theory.
- Key Pump Components and their Functions.
- Alignment of Pumps with Drivers.
- Analysing Pump Performance.
- Breaking Down Failure Mechanisms.

Unit 3: Achieving Pump Reliability:

- Advanced Sealing Systems.
- Packing Glands, Mechanical Seals, and Flush Plans.
- Addressing Seal Failure and Maintenance of Mechanical Seals.
- Bearings: Failures and Life Extension Techniques.
- The Significance of Lubrication in Pump Operations.
- Plain Bearings.
- Anti-friction bearings.
- The Role of Couplings and Alignment.
- Couplings.
- Alignment and Balancing.
- The Importance of Foundations and Bedplates.

Unit 4: Valve Technology:

- Identifying Different Types of Valves Globe, Gate, Ball, Plug, and Check.
- How do Flow Characteristics Influence Valve Performance?
- Flow through Valves.
- Valve Flow Characteristic Curves.
- Linear, Quick Opening and Equal Percentage.
- Comprehensive Valve Sizing.
- Cv Value Calculation.
- Mastering the Choice of Valve Size Using Valve Coefficients.
- Calculations for Correct Valve Selection.
- Understand Sealing Performance.
- Leakage Classifications in Valves.
- Examine Valve Stem Seals and Sealing Mechanisms.

Unit 5: Valves Troubleshooting & Maintenance:

- Addressing High-Pressure Drop Issues.
- Comprehending Pressure Recovery Characteristics.
- Solutions to Flow Choking.
- Managing High Velocities within Valve Systems.
- Elucidating Water Hammer: Causes and Solutions.
- Mastery of Control and Isolation Valves Troubleshooting.
- Common Faults Review in Valves.
- Crafting an Efficient Preventive Maintenance Plan for Valves.
- Concluding Review of the Week and Wrap-Up.