



Principles, Operation and Maintenance of Oil & Gas Hydraulic Systems

28 December 2026 – 1 January 2027
Geneva (Switzerland)



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Introduction:

This principles, operation, and maintenance of the oil and gas hydraulic systems training seminar provides participants with excellent working expertise and understanding of hydraulic power systems. It delivers an interactive training experience designed to help participants understand the various components of a typical hydraulic system and how they function and interact.

Participants will also learn about the major groups of hydraulic components, including the function and principles of operation of direct- and pilot-operated relief valves, pressure-reducing valves, directional-control valves, fixed- and variable-displacement pumps, and accumulators. Understanding of the primary hydraulic circuits most often used in industrial hydraulic systems is covered.

Hydraulic principles of mechanical maintenance, types of hydraulic fluids, and their characteristics will also be covered. This training on the principles, operation, and maintenance of oil and gas hydraulic systems is designed for participants to learn to recognize faults and damage to major components in hydraulic systems during inspection, adjust control valves, and test hydraulic circuits for correct and safe operation.

Understanding Hydraulic Systems in Oil & Gas:

Hydraulics are vital in many oil and gas operations, including hydraulic fracturing and pump use. Understanding hydraulic systems and their applications and acquiring skills for hydraulic repair are pivotal for ensuring operational integrity and performance enhancement in oil and gas operations. It offers an in-depth look into the principles, operations, and maintenance of hydraulic systems within the oil and gas industry.

This principles, operation, and maintenance of the oil and gas hydraulic systems course is meticulously designed to enhance the expertise of professionals in operating and maintaining hydraulic systems, a critical component of modern oil and gas operations. We delve into the complexities of hydraulic mechanics and provide essential knowledge required for a proficient maintenance engineer in the oil and gas sector.

Targeted Competencies:

Participants competencies in this principles, operation, and maintenance of the oil and gas hydraulic systems training will:

- Principles of Hydraulic Power Systems.
- Problems Related to Hydraulic Fluids.
- Variable and Fixed Displacement Hydraulic Pumps.
- Principles of Operation of Control Valves.
- Operation of Basic Hydraulic Circuits used industrial hydraulic systems.
- Maintenance, inspection, and testing of Hydraulic Systems.

Course Objectives:

At the end of this principles, operation, and maintenance of the oil and gas hydraulic systems course, you will learn to:

- Identify the hydraulic system components
- Recognize the impact hydraulic fluids have on the components
- Understand and interpret hydraulic symbols
- Understand the correct operation procedures of hydraulic systems
- Explain maintenance and troubleshooting practices that apply to the entire hydraulic system

Targeted Groups:

This principles, operation, and maintenance of the oil and gas hydraulic systems training course is intended for all employees involved in the operations and maintenance of hydraulic systems. It is suitable for a wide range of professionals but will greatly benefit:

- Maintenance Engineers.
- Process and Mechanical Technicians.
- Design Engineers.
- Supervisors and Operators.
- Mechanical Engineers.

Oil & Gas Operations Management and Training in Hydraulic Systems

The oil and gas industry relies heavily on efficient and safe operations, which are ensured through the diligent management and maintenance of hydraulic systems. Mastery of these systems is essential for operational excellence.

This principles, operation, and maintenance of the oil and gas hydraulic systems course is tailored to provide oil and gas operations training, equipping participants with the principles of hydraulic power unit operation and the knowledge necessary to execute effective maintenance within the industry.

Course Content:

Unit 1: Principles of Hydraulics and Hydraulic Fluids:

- Pascals Law.
- Main Components of a Hydraulic System.
- Filters, Reservoirs, and Accumulators.
- Closed and Open Loop.
- Properties of Hydraulic Fluid.
- Types of Hydraulic Fluids.
- Fluid Selection.
- Problems Related to Hydraulic Fluids.

Unit 2: Hydraulic Pumps & Actuators:

- Classification and performance of Hydraulic Pumps.
- Variable and Fixed Displacements Hydraulic Pumps.
- Gear Pumps.
- Vane Pumps.
- Piston Pumps.
- Pressure Compensator and Load Sense Control.
- Hydraulic Cylinders.
- Hydraulic Motors.

Unit 3: Control Valves:

- Classification of Control Valves.
- Direct-Acting and Pilot-Operated Valves.
- Pressure Control Valves.
- Directional Control Valves.
- Flow Control Valves.
- Meter In and Meter out.

Unit 4: Operation and Hydraulic Circuits:

- Operator Responsibilities.
- Symbol of Hydraulic Components.
- Operation of Regenerative Circuits.
- Counterbalance Circuits.
- Decompression Circuits.
- Hydraulic Circuits of Various Machines.
- Case Studies.

Unit 5: Maintenance and Troubleshooting of Hydraulic Systems:

- Flow Chart of Hydraulic Circuits.
- Troubleshooting of Different Components of Hydraulic Systems.
- Assembling and Disassembling Hydraulic Units.
- Inspection and Testing of Hydraulic Systems.
- Maintenance of Hydraulic Systems.
- Case Studies.
- Course Summary and Recap.