

Course No. 1560

Industrial Water Treatment Systems Training Course

UTILITIES & PLANT ENGINEERING
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Industrial Water Treatment Systems Training Course provides a comprehensive professional program designed to develop the technical knowledge and practical skills required to understand, operate, monitor, maintain, and improve industrial water treatment systems. Water is a critical resource across many industrial environments, supporting cooling, steam generation, production, processing, and utility operations. As a result, water quality and treatment performance have a direct impact on equipment reliability, process continuity, operating costs, and overall plant performance.

The course examines the fundamental principles of industrial water quality, including the physical and chemical characteristics of water, common contaminants, and the impact of impurities on industrial equipment and processes. Participants explore major water treatment stages, including preliminary treatment, filtration, softening, hardness removal, chemical treatment, pH control, dissolved solids removal, and membrane-based treatment. The program also explains how treatment technologies are selected according to raw water characteristics and specific industrial requirements.

A significant component of the Industrial Water Treatment Systems Training Course focuses on the operation and monitoring of water treatment equipment and systems. Participants examine filters, softeners, desalination units, membrane systems, chemical dosing equipment, treatment tanks, pumps, valves, and measurement and control instruments. The course emphasizes the operational parameters required to evaluate treatment performance and identify early signs of declining water quality, equipment deterioration, or process instability.

The program also addresses maintenance, troubleshooting, and performance improvement. Participants examine the causes and consequences of scaling, corrosion, fouling, biological contamination, membrane degradation, filtration problems, and inefficient chemical dosing. Practical approaches are introduced for monitoring equipment condition, identifying root causes, implementing corrective actions, and improving preventive maintenance practices.

Through practical exercises, case studies, water quality analysis, troubleshooting activities, and performance improvement workshops, participants develop a structured approach to managing industrial water treatment systems. The course is particularly relevant to oil and gas companies, refineries, petrochemical facilities, power plants, manufacturing organizations, food and pharmaceutical facilities, and other industrial operations that depend on reliable water treatment,

cooling water, process water, or steam-generation systems.

Objectives

- Analyze the fundamental characteristics of industrial water and identify major sources of impurities and contaminants during the course.
- Evaluate key water quality parameters and determine their potential impact on industrial equipment and processes.
- Apply the fundamental principles of preliminary treatment, filtration, water softening, hardness removal, and desalination.
- Evaluate the operating performance of industrial water treatment systems and identify factors affecting treatment efficiency.
- Analyze the effects of pH, hardness, conductivity, dissolved solids, and contaminants on equipment and process performance.
- Apply appropriate methods for monitoring chemical dosing systems and maintaining required treatment conditions.
- Assess the condition and performance of filters, membranes, pumps, and auxiliary treatment equipment.
- Apply a structured methodology for identifying scaling, corrosion, fouling, blockage, and biological contamination problems.
- Analyze operational and water quality data to determine potential causes of declining treatment performance.
- Develop practical measures to improve water, chemical, and energy efficiency within industrial water treatment systems.
- Strengthen preventive maintenance and condition-monitoring practices for water treatment equipment.
- Develop an improvement plan for the operation, maintenance, reliability, and performance of an industrial water treatment system.

Who Should Attend

The Industrial Water Treatment Systems Training Course is designed for engineers, technicians, operators, supervisors, and professionals responsible for industrial water systems, utilities, facilities, and process support operations. It is particularly relevant to mechanical, process, chemical, environmental, utilities, maintenance, and reliability engineers, as well as professionals working in

water treatment, industrial utilities, energy management, and plant operations.

The course is also suitable for water treatment plant operators, utility operators, water treatment technicians, maintenance technicians, operations and maintenance supervisors, utilities engineers, water treatment managers, maintenance managers, engineering managers, operations managers, and energy and environmental professionals. Laboratory personnel and specialists responsible for water quality testing, chemical analysis, and treatment performance monitoring can also benefit from the program.

The course is especially valuable for professionals working in oil and gas companies, refineries, petrochemical facilities, power generation plants, manufacturing facilities, food and pharmaceutical organizations, and other industrial environments where water is essential for production, cooling, steam generation, or utility operations. It is also appropriate for managers and decision makers responsible for equipment reliability, water efficiency, operational costs, and business continuity.

Learning Outcomes

- Explain the fundamental physical and chemical characteristics of industrial water and their effect on equipment and processes.
- Identify major sources of contaminants and impurities affecting industrial water quality.
- Explain the main stages of water treatment and the purpose of each treatment process.
- Evaluate water quality using appropriate operational parameters and analytical indicators.
- Apply fundamental principles of filtration, water softening, hardness removal, and desalination.
- Evaluate the operating condition and performance of industrial water treatment equipment.
- Analyze the causes and effects of scaling, corrosion, fouling, blockage, and biological contamination.
- Apply appropriate methods for monitoring chemical dosing systems and maintaining treatment quality.
- Analyze operational data to identify treatment problems and potential causes of performance deterioration.
- Apply structured troubleshooting techniques to industrial water treatment equipment and systems.
- Identify opportunities to improve water consumption, chemical utilization, energy efficiency, and system recovery.

- Develop an integrated plan for monitoring, operating, maintaining, and improving an industrial water treatment system.

Course Outline

DAY 01

Industrial Water Fundamentals and Water Quality

- Industrial water applications across manufacturing, energy, oil and gas, and process industries
- Physical and chemical characteristics of industrial water
- Water sources and common impurities and contaminants
- Dissolved and suspended solids and their impact on equipment
- Water hardness and its effects on industrial systems
- pH and its importance in water treatment processes
- Alkalinity, conductivity, and other key water quality indicators
- Chemical and biological contamination in industrial water systems
- Relationship between water quality and equipment reliability
- Water quality monitoring and testing requirements

PRACTICAL APPLICATION

Analyze industrial water quality data and identify potential treatment requirements and operational risks

DAY 02

Industrial Water Treatment Technologies

- Principles and stages of preliminary water treatment
- Coagulation, flocculation, and sedimentation processes
- Filtration technologies for suspended solids removal
- Water softening and hardness removal systems
- Chemical treatment and water quality control
- Dissolved solids and salt removal technologies
- Membrane-based water treatment processes

DAY 02 — CONTINUED

- Operation and performance monitoring of membrane systems
- Chemical dosing systems and dosing control principles
- Treatment tanks, pumps, valves, and auxiliary equipment

PRACTICAL APPLICATION

Develop a basic industrial water treatment sequence based on raw water characteristics and intended use

DAY 03

Operation and Monitoring of Water Treatment Systems

- Principles of safe and efficient water treatment system operation
- Start-up, normal operation, and shutdown procedures
- Monitoring flow rates, pressure, tank levels, and operating conditions
- Monitoring water quality throughout the treatment process
- Chemical dosing control and treatment performance monitoring
- Filter and softener performance monitoring
- Membrane operation and performance assessment
- Monitoring pumps, valves, and auxiliary equipment
- Using operational data to evaluate system performance
- Identifying operational deviations and early signs of deterioration

PRACTICAL APPLICATION

Evaluate the performance of an industrial water treatment system and establish key monitoring points and corrective actions

DAY 04

Maintenance and Troubleshooting of Water Treatment Systems

- Fundamentals of preventive maintenance for water treatment equipment
- Condition monitoring of pumps, motors, and rotating equipment
- Maintenance of filtration and softening systems

DAY 04 — CONTINUED

- Membrane maintenance and performance degradation
- Scaling, fouling, and blockage problems
- Corrosion mechanisms and their impact on equipment
- Biological contamination and water quality problems
- Chemical dosing problems and treatment instability
- Low pressure, reduced flow, and performance deterioration
- Root cause analysis and development of corrective actions

PRACTICAL APPLICATION

Analyze a water treatment system failure and apply a structured root cause analysis methodology to develop corrective actions

DAY 05

Performance Optimization and Water Efficiency

- Key performance indicators for industrial water treatment systems
- Assessment of water consumption and treatment efficiency
- Improving chemical consumption and dosing efficiency
- Improving energy efficiency in pumps and treatment equipment
- Reducing water losses and improving system recovery
- Improving membrane performance and extending operational life
- Water quality management for cooling and steam-generation systems
- Integration of operation, maintenance, and quality monitoring
- Developing performance indicators and continuous improvement practices
- Improving reliability and efficiency of industrial water treatment systems

FINAL WORKSHOP

Conduct a comprehensive assessment of an industrial water treatment system and develop an action plan for improving water quality, operation, maintenance, reliability, and efficiency



Register or Request More Information

Course page: <https://quest-training.com/courses/industrial-water-treatment-systems-training-course>

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