QUEST
Professional Center

PROFESSIONAL TRAINING COURSE

Course No. 1143

Boiler Operation & Maintenance Training Course

MECHANICAL ENGINEERING
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION
5 Days

DELIVERY
Classroom

LOCATION
Rome, Italy

DATES
11 – 15 Jan 2027

Scheduled Event Details

CITY	Rome, Italy
DATE	11 – 15 Jan 2027
DELIVERY TYPE	Classroom
COURSE FEE	€7,000

Course Overview

The Boiler Operation & Maintenance Training Course is a comprehensive professional development program designed to equip engineers, maintenance professionals, boiler operators, technical specialists, and engineering managers with the knowledge and practical skills required to safely operate, maintain, troubleshoot, and optimize industrial boiler systems. Boilers are among the most critical assets in power generation facilities, oil and gas operations, petrochemical plants, manufacturing industries, refineries, pharmaceutical facilities, food processing plants, and large commercial buildings, where reliable steam generation is essential for efficient production, energy management, and operational continuity.

Efficient boiler operation requires a thorough understanding of combustion systems, steam generation, water treatment, heat transfer, fuel management, pressure control, and equipment integrity. Improper operation or inadequate maintenance can lead to excessive fuel consumption, reduced thermal efficiency, equipment failures, unplanned shutdowns, safety incidents, and increased operating costs. This course provides participants with internationally recognized engineering principles and industry best practices to maximize boiler performance, improve reliability, and ensure safe and efficient plant operations.

Throughout the program, participants will develop a comprehensive understanding of boiler technologies, including fire-tube and water-tube boilers, steam generation principles, combustion processes, boiler components, fuel systems, burners, feedwater systems, water treatment, boiler controls, thermal efficiency, emissions management, inspection procedures, preventive and predictive maintenance, condition monitoring, failure analysis, troubleshooting, and lifecycle management. Practical engineering exercises and real industrial case studies enable participants to apply engineering concepts to real operational challenges.

The Boiler Operation & Maintenance Training Course also demonstrates how boiler engineering

integrates with maintenance management, reliability engineering, asset management, energy management, process optimization, engineering safety, environmental compliance, and operational excellence. By completing this course, participants will be prepared to improve boiler reliability, optimize steam generation, reduce maintenance costs, enhance energy efficiency, strengthen engineering decision-making, and support sustainable engineering operations across government entities, ministries, public sector organizations, financial institutions managing engineering infrastructure, oil and gas companies, power generation facilities, petrochemical industries, manufacturing organizations, utilities, and multinational corporations.

Objectives

- Analyze the engineering principles governing industrial boiler operation and steam generation.
- Develop practical knowledge for operating and maintaining boiler systems in accordance with industry best practices.
- Evaluate boiler performance using thermal calculations, operational data, and engineering performance indicators.
- Apply combustion, heat transfer, and water treatment principles to optimize boiler efficiency.
- Design operational improvement strategies that enhance boiler reliability, thermal efficiency, and equipment availability.
- Improve boiler operation through effective startup, shutdown, monitoring, and maintenance practices.
- Strengthen troubleshooting capabilities by identifying common boiler failures and conducting root cause analysis.
- Implement preventive, predictive, and reliability-centered maintenance strategies for boiler systems.
- Assess fuel utilization, energy efficiency, emissions performance, and opportunities for operational optimization.
- Align boiler operation and maintenance practices with organizational objectives for safety, reliability, asset management, environmental compliance, and operational excellence.

Who Should Attend

This course is designed for mechanical engineers, maintenance engineers, operations engineers, power plant engineers, utility engineers, process engineers, plant engineers, reliability engineers, energy engineers, project engineers, boiler operators, maintenance supervisors, operations supervisors, engineering technicians, maintenance planners, equipment inspectors, commissioning engineers, engineering consultants, and technical professionals responsible for boiler systems and steam generation equipment.

The program is equally valuable for engineering managers, maintenance managers, operations managers, plant managers, facility managers, asset management professionals, project managers, procurement engineers, HSE professionals, quality specialists, technical advisors, executive managers, and decision makers responsible for equipment reliability, energy management, maintenance planning, engineering operations, and industrial asset performance.

Professionals working within government entities, ministries, public sector organizations, financial institutions managing engineering infrastructure, oil and gas companies, refineries, petrochemical industries, power generation facilities, manufacturing plants, food processing industries, pharmaceutical facilities, district heating plants, utility providers, infrastructure developers, and multinational engineering organizations will benefit significantly from the practical engineering methodologies and internationally recognized boiler operation and maintenance practices presented throughout the course.

Learning Outcomes

- By the end of this course, participants will be able to:
- Explain the operating principles, components, and industrial applications of boiler systems.
- Operate industrial boilers safely and efficiently in accordance with engineering best practices.
- Analyze boiler performance using thermal efficiency calculations and operational performance indicators.
- Apply combustion optimization and water treatment principles to improve steam generation efficiency.
- Identify common boiler failures and conduct systematic troubleshooting and root cause analysis.
- Develop preventive and predictive maintenance programs for boiler systems.

- Evaluate the performance of combustion systems, burners, feedwater systems, and auxiliary equipment.
- Apply engineering safety practices during boiler startup, operation, inspection, maintenance, and shutdown activities.
- Improve fuel efficiency, reduce emissions, and optimize boiler operating performance.
- Support operational excellence and asset reliability through effective boiler operation, maintenance planning, and lifecycle management.

Course Outline

DAY 01

Fundamentals of Boiler Operation

- Principles of steam generation and boiler operation
- Types of industrial boilers and their applications
- Boiler components and auxiliary systems
- Fundamentals of combustion, heat transfer, and steam production

> **PRACTICAL**
>
> Practical workshop on boiler identification and interpretation of engineering drawings and technical specifications

DAY 02

Boiler Operation and Performance Optimization

- Startup, shutdown, and normal operating procedures
- Fuel systems, burners, and combustion control
- Boiler performance analysis and thermal efficiency evaluation
- Boiler water treatment and feedwater management

> **PRACTICAL EXERCISE**
>
> Practical exercise on boiler performance assessment and efficiency improvement

DAY 03

Boiler Maintenance and Reliability

- Preventive, predictive, and reliability-centered maintenance strategies
- Boiler inspection techniques and condition monitoring
- Maintenance planning and equipment integrity management
- Common boiler failures and maintenance best practices

PRACTICAL

Practical workshop on developing a comprehensive boiler maintenance program

DAY 04

Safety, Troubleshooting, and Risk Management

- Boiler safety systems and operational safety requirements
- Root cause analysis of boiler failures
- Emergency response procedures and operational risk management
- Non-destructive testing (NDT) and inspection methodologies

PRACTICAL APPLICATION

Practical application involving boiler troubleshooting and safety assessment

DAY 05

Advanced Boiler Management and Operational Excellence

- Boiler asset lifecycle management
- Energy efficiency improvement and emissions reduction
- Performance measurement and engineering best practices
- Continuous improvement strategies for boiler systems

DAY 05 — CONTINUED

FINAL WORKSHOP

Final workshop involving the development of a comprehensive Boiler Operation & Maintenance management plan integrating performance analysis, maintenance planning, combustion optimization, water treatment, reliability improvement, safety management, energy efficiency, and continuous improvement to maximize boiler reliability, operational efficiency, and engineering excellence.

Register or Request More Information

Course page: https://quest-training.com/courses/boiler-operation-maintenance-training-course
Website: https://quest-training.com
Email: info@quest-training.com
Phone: +905016771440