XCELERATE TRAINING INSTITUTE

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MECHANICAL ENGINEERING

Industrial Steam Boiler System, Operation and Maintenance Training Course

DURATION	LANGUAGE	FORMAT
5 days	**English**	**Classroom / Online**

Upcoming dates

Dates	Venue	Format	Fee
14 – 18 Jun 2027	Live online	Online (live)	**€1,200**
19 – 23 Jul 2027	France	Classroom	**€4,800**
20 – 24 Dec 2027	Live online	Online (live)	**€1,200**

Register or ask a question

Online: x8ti.com/course/industrial-steam-boiler-system-operation-and-mainten…

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Industrial Steam Boiler System, Operation and Maintenance Training Course

Introduction

Introduction

Steam is an important fluid in process industries in oil, gas and chemical industries. Steam is used not only to run stream-turbine-driven power generators but also to affect the chemical processes wherein water molecules at high temperatures are required for particular transformational reactions.

How does an industrial steam boiler work?

While production of steam is a very simple process – just boil water over an extended period– industrial steam production is complex and requires sophisticated engineered steam generation plants with or without steam turbine generators (STGs).

How do you maintain a steam boiler?

Industrial steam is fraught with major hazards such as steam burning the human skin if exposed uncontrollably, steam condensate hammering the pipelines and damaging the assets and so on. Hence, steam generation with the associated operation and maintenance of steam plants is a specialized area.

This Xcelerate training course will empower attendees with comprehensive knowledge about Industrial Steam Boiler System, Operation and Maintenance.

Learning Objectives

- Understand the concepts around Industrial Steam Boiler System, Operation and Maintenance.
- Comprehend the chemical and physical properties of steam, including its hazards.
- Learn about steam generation thermodynamic cycles e.g., Rankine Cycle
- Discover the advantages and disadvantages of steam
- Understand the layout of equipment in a steam generation plant
- Learn the operational procedures including safe shutdown, turnaround, and the start-up of a steam plant.
- Orient on safety preparation for the turnaround of a steam plant.
- Understand the inspection and maintenance aspects of a steam plant.
- Appreciate the importance of personnel protection equipment in steam plant
- Comprehend managing emergencies in the steam plant.
- Under legal, regulatory and insurance implications

Training Methodology

- Lectures (Tutor-assisted online and classroom as per prevailing situations/requirements)

- Seminars & Presentations
- Group Discussions and workshops
- Assignments
- Case Studies & Functional Exercises

Benefits for Your Organization

- Ensure a trouble-free operation, inspection and maintenance of steam Plants
- Appreciate hazards of steam and safety around it
- Confidently use steam to produce economically crucial power
- Improved financial performance due to a well-maintained steam plant

Benefits for You

- Confident to identify and implement in their professional careers the underlying success factors for safe, efficient and trouble-free operation and maintenance of steam Plants.
- Emerge as a skilled professional for Steam Plant e.g., production manager, inspection manager, maintenance manager and the associated technicians, operators and engineers.
- Prepare themselves to acquire boiler competence certification subsequently.
- The knowledge and skill provided in this course are useful for legal, insurance and regulation personnel as well to interface the steam plants as per their areas of responsibility

Target Audience

- Trainees/intern/fresh employees who want to take up Design, Operation, Inspection, Maintenance and HSE management of Industrial Steam Boiler System, as their career.
- All Steam Plant workers, supervisors and managers who want to promote productivity of operation, inspection, maintenance, health & safety in their steam plants.
- All employees/workers who have been on rotation from their existing departments to the Steam Plant (Planning, operation, Inspection, and maintenance).

Course Outline

Basics/Concepts About Steam and Its Generation

- A short history of boiler design
- Why use steam? Where is steam used?
- How Boilers Work: A generic steam system
- Types of Boilers
- Key Components of Boilers
- Safety Issues

Types of and Layout of Industrial Steam Boilers

- Coil steam generator (once through boiler)
- Water-tube boiler
- MTHS boilers (fire-tube or smoke-tube boilers)
- Basic overview of Steam Plant

Basic Steam Distribution

- How steam moves (simple explanation)
- The motion of steam (detailed explanation)
- Strainers
- Steam traps
- Pipe expansion loops and drains

Boiler Operation

- The boiler operator
- The manager
- The role and function of technology in the modern boiler house
- Boiler Feed Pumps
- Contamination of condensate
- De-aerators/Condenser
- Economizer
- Super heaters and Attemperators
- Condensate Shunt pump
- Boiler level controls
- Isolation and Control valves
- Safety valves/ Pressure reducing valves (PRV)
- Pressure and temperature gauges
- Non-return valves/check valves
- Total dissolved solids (TDS)
- Boiler Loading, Sequencing, Scheduling, and Control

Boiler Management and Control

- Typical instrumentation for boiler management (Monitor Boiler Gauges)
- Optimized Air-to-Fuel Ratio: Boiler Combustion Efficiency
- Steam Boiler Efficiency (Indirect method and Direct or fuel-to-steam efficiency)
- Safety, Efficiency and Life of the Equipment
- Boiler Energy Best Practices
- Guarantee and Service
- Fuel System and Burners; Flame failure device
- Flare system and Regeneration
- Steam turbine and Power Generator
- Seasonal Operation
- Operating Multiple Boiler Plants
- Chillers/Cooling Towers
- Air Handling Systems
- Water treatment
- Feed water pump arrangements

Inspection of Steam Generation Plants

- Corrosion Issues: Cathodic Protection System
- Inspect and Repair Insulation: Thermography
- Thickness and crack monitoring of piping and vessels
- Metallography
- Inspection of drums: Visual and NDE (Non-Destructive Examination)
- Inspection of Headers, Piping, tubing
- Loaded Spring inspection
- Vibration monitoring
- PSV and PRV Testing
- Valid Permit to Work (PTW) for a confined space inspection
- Energy isolation during inspection: Lock and Tag
- Combustion analyzers
- Trending Boiler Stack Temperature

Maintenance of Steam Generation Plant Equipment

- Sample Maintenance Logs & Boiler Checklists
- PSV and PRV maintenance
- Maintenance of Air openings, Flue gas vent system, Pilot and main burner flames
- Maintenance of Fans, Blowers, Air Compressors and Pumps
- Maintenance of Electrical Systems and Motors
- Opportunity Identification

Some Hazards of Steam

- Boiling liquid expanding vapor explosion (BLEVE)
- Column collapse water hammer
- Sub-cooled condensate induced water hammer
- Flash steam explosion
- Over-pressure in the distribution system
- Over-pressure (inside a pressure vessel)
- Plug flow water hammer
- Steam hammer
- Temperature
- Vacuum draw
- Water-logging
- Other Safety Issues
- Safe & Functional Boiler Room | Requirements

Other Miscellaneous Best Practices for Steam Plants

- Boiler Water-Use Best Practices
- Best Practices for Efficient Operation
- Boiler Rules of Thumb
- Best Practices for Inspection and Maintenance

Case Studies, Incidents, Problem Resolutions, Q&A’s

- Case Studies
- Incidents
- Emergency Response
- References
- Other Resources

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Registration Form

Industrial Steam Boiler System, Operation and Maintenance Training Course

Preferred dates: ..... Venue or online: .....

Duration: 5 days Language: .....

Please complete and email this form to us, or register online. We confirm your place and send the invoice within one working day.

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Full name (Mr / Ms / Dr / Eng): .....

Position: ..... Telephone / mobile: .....

Official email: ..... Personal email: .....

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Person responsible for training & development

Full name (Mr / Ms / Dr / Eng): .....

Position: ..... Telephone / mobile: .....

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