



THE CHEMICAL ENGINEERING MAJOR

Steam Boilers (Operations, Repair & Maintenance)

Website: www.btsconsultant.com

Email: info@btsconsultant.com

Telephone: 00971-2-6452630



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Steam Boilers (Operations, Repair & Maintenance)

Introduction:

This program is a tremendous learning experience and is essential for each and everyone who are involved in the selection, operation, inspection and maintenance of steam boilers or steam systems. The course is provides the practical knowledge for safe operation and trouble-shooting, maintenance and repairs, inspection and also cover the knowledge related to steam boilers Legislation, Codes and Standards

Who Should Attend?

- New engineers, team leaders/coordinators, operations engineers, maintenance team leaders, engineers, operations team leaders, inspection, senior operations and maintenance personnel.
- Experienced professionals who want to review or broaden their understanding of steam boiler systems.

Methodology:

This interactive Training will be highly interactive, with opportunities to advance your opinions and ideas and will include;

- Lectures
- Workshop & Work Presentation
- Case Studies and Practical Exercise
- Videos and General Discussions

Certificate:

BTS attendance certificate will be issued to all attendees completing minimum of 80% of the total course duration.

Objectives:

At the end of the course, the delegates will be able to:

- Identify the related laws, codes and standards for steam boiler design, installation, fabrication, operation, inspection, repair and maintenance.
- Describe key parameters affecting boiler performance and efficiency.
- Describe the principles of thermodynamics of steam boiler and steam systems.

- Identify the major hazards that's related to operation and maintaining the boiler and steam systems.
- Operate the steam boilers and steam systems with the safe conditions.
- Describe basic controls used in boiler operation.
- Describe the boiler commissioning, operations, trouble-shooting, inspections, repairs and maintenance processes.
- Describe the uses of steam in process plant and power generation sector.
- Identify the boiler operation rules in safety from industrial combustion phenomena to feed water quality.

Outline: •

Day # 1

- Applicable Codes and Standards for steam boilers and steam systems
- Steam Boiler Fundamentals:–
- Definition of steam boilers
- The efficient use of steam
- Steam boiler classifications
- Power boilers
- Selection of a steam boiler
- Basic steam process
- Heat transfer in steam boiler system
- Boiler circulations
- Types of steam boilers
- Application of various types of steam pressures and temperatures

Day # 2

- Principle of thermodynamics for steam and water:–
- Superheated steam
- Latent heat
- Sensible heat
- Boiler efficiency – calculation and monitoring
- Steam boiler components
- Boiler essential fittings

Day # 3

- Operations and trouble-shootings:–
- Fundamental operational responsibilities
- Steam boiler operating logs
- Boiler plant flow diagram
- Boiler operation:-
 - Start-up and shutdown procedures
 - Shutdown
 - Cold re-start
- Boiler operations carry-over
- Steam Temperature Control
- Boiler trip and protections
- Basic steam boiler controls
- Steam boiler storages
- Returning idle boilers
- Commissioning activities
- On-stream boiler operations
- Boiler control applications

Day # 4

- Combustion system in steam boiler plant:–
- Introduction to combustions
- Combustion theory
- Products of combustion
- Flue gas analysis
- General considerations regarding safety
- Flame safeguard
- General firing practice for boilers
- Burners and atomizer for fuel oil
- Soot blower
- Gas burners and Trial For Ignition Time (TFIT)
- Boiler water treatment:–
- Objectives of boiler water treatment
- Types of water treatments
- External water treatment process:-
 - Filtration process
 - Reverse Osmosis
 - Ion exchange process
 - Deaeration system
- Internal water treatment:-
 - Chemical treatment process
- Deaerator systems
- Reliability of steam boiler system
- Standard boiler water specifications
- Water treatment concerns

Day # 5

- Fundamental of metallurgy (ferrous metal)
- Boiler material specifications
- Heat Affected Zone
- Pre-heat and Post Weld Heat Treatment (PWHT)
- Understanding of welding procedures:–
- Procedure Specification (WPS)
- Procedure Qualification Records (PQR)
- Welder Performance Qualification Test (WPQT),
- Boiler Maintenance Programs
- Preparing for inspection
- Tube expansion
- Boiler Repairs:-
- Routine repairs
- Major repairs
- Alterations
- Rerating and Derating
- Repair steps
- Repair methods
- Repair methods
- Repair procedures
- Boiler failures
- Study Case on Steam Boiler Repairs