



WE016: Boiler Water Treatment Technology

Training Description:

This intensive course will provide a comprehensive review of the principles of boiler water conditioning. The ASME and EPRI Boiler Chemistry Guidelines will be developed. Oxygen control by means of desecration and chemical treatment will be reviewed. Boiler design principles will be developed, including heat transfer, circulation effects, and high-pressure requirements. The special requirements of HRSGs will be reviewed in depth.

The chemistry and control of phosphates, chelant, and sludge conditions were reviewed in depth. Problems and solutions associated with steam purity and condensate corrosion will be covered in detail with several practical examples. Guidelines for chemical cleaning will be developed.

The course reviews resin structure, function, and the gamut of water purification applications from softening to the preparation of ultra-quality water. The course has been modified to focus on monitoring performance and reacting to system upsets.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Apply and gain an in-depth knowledge on boiler water treatment practice
- ✓ Explain the purpose of ion exchange dealkalizers, decarbonators and degasifiers
- ✓ Discuss the properties, resources, chemistry of water and the elements of contaminated water
- ✓ Discuss the pretreatment requirements for ion exchange as well as synthesis, types, water hydration and commercial equivalents of ion exchange resins
- ✓ Carryout resin testing, pre-treatment for corrosion control, oxygen control and deaeration
- ✓ Explain the process of two bed demineralization and mix beds as well troubleshooting methods
- ✓ Explain the three faces of water treatment and the pretreatment for control of scale
- ✓ Discuss chemical cleaning of boilers, condensate corrosion, heat recovery system generators, failures analysis and boiler tube testing
- ✓ Describe the equipment, service and regeneration reactions and troubleshooting of ion exchange softening

Training Designed for:

This course will provide knowledge in all significant aspects and considerations of boiler water treatment technology for Utility Superintendents, Power House Supervisors and Plant Engineers. Foremen/women and Shift Supervisors will also gain job enrichment by understanding the importance of water treatment equipment, early detection of problems and operator training techniques. Those in a design capacity at architect-engineering firms will find merit in the review of the technology. At the corporate level, this course provides update for company water consultants or engineering review committee members.

This course is especially valuable for engineers working on plant expansions since technology trends are reviewed. Special emphasis has been added on cogeneration and combined cycle systems. Also, R&D, laboratory and corrosion professionals will highly benefit from this course.

Training Program:

DAY ONE:

- ❖ Introduction
 - Water Chemistry, Boiler Water Quality Requirements
- ❖ Oxygen Control:
 - Mechanical Deaeration, Chemical Scavenging, Testing
 - Boiler Calculations:
 - Cycles of Operation, Blowdown Monitoring
- ❖ Principles of Internal Treatment:
 - Boiler Design and Heat Flux, Circulation
- ❖ Deposition Control:
 - Either Low Pressure—Phosphates, Chelants, Dispersants; or High Pressure—Iron Deposition, Dispersants. EPRI Guidelines (Participants will Choose One)

DAY TWO:

- ❖ Corrosion Control:
 - Either Low Pressure—Corrosion Control in Cast Iron Boilers, Boiler System Testing or High Pressure—Coordinated Phosphate/pH, Congruent Control, AVT, Neutral Oxygen
- ❖ Heat Recovery Steam Generators:
 - Flow and Load Considerations, Multiple Pressure System Chemistries
- ❖ Carry-Over Control:
 - Carry-Over Mechanisms, Steam Purifications, Monitoring Carry-Over
- ❖ Chemical Cleaning of Boilers:
 - Commissioning Cleaning, Deposit Monitoring, Deposit Removal

DAY THREE:

- ❖ Condensate Corrosion:
 - Corrosion Mechanisms, Amine Treatment, Testing
- ❖ Condensate Polishing:
 - Mixed Beds, Powdered Resin Units, Magnetic Filtration
- ❖ Failure Analysis:
 - Boiler Tube Failure Modes, Metallurgical Analysis, Metallurgical Workshop
- ❖ Boiler Tube Testing:
 - Destructive Sampling and Non-Destructive Testing Methods, Visual Boiler Inspection

DAY FOUR:

- ❖ Introduction of Ion Exchange:
 - Water Chemistry Units, Pretreatment Requirements of Ion Exchange
- ❖ Ion Exchange Resins:
 - Synthesis, Types, Water of Hydration, Commercial Equivalents
- ❖ Ion Exchange Softening:
 - Equipment, Service and Regeneration Reactions, Troubleshooting
- ❖ Two-Bed Demineralization:
 - Equipment, Service and Regeneration Reactions, Performance Expectations

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 - Equipment, Service and Regeneration Reactions, Performance Expectations
- ❖ Individual Conferences:
 - Participants' Water and Resin Analyses

DAY FIVE:

- ❖ Two-Bed Demineralization (continued):
 - Exhaustion Profiles, Distributor Design, Regenerant Dilution Systems
- ❖ Troubleshooting Demineralizers:
 - Short Run, Poor Water Quality, Resin Problems
- ❖ Mixed Beds:
 - Makeup Mixed Beds, Performance Expectations, Regeneration Protocols, Three Component Systems, Uniform Particle Size Resins
- ❖ Resin Testing:
 - Vessel Inspection, Sample Procurement, Interpretation of Resin Analysis, Decision to Clean or Replace
- ❖ Course Conclusion
- ❖ POST- ASSESSMENT and EVALUATION

Training Requirement:

“Hand's on practical sessions, equipment and software will be applied during the course if required and as per the client's request.”

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:

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