BOILERS: A TECHNICAL AND OPERATIONAL WORKSHOP

CLASS FORMAT:

Lab + classroom

The participant is able to "learn-by-doing" in the course; this knowledge can be transferred to the workplace.

STANDARD CLASS SIZE:

NTT recommends a course size of 12 participants to obtain the best results.

NTT PROVIDES:

- 3-days (24 contact hours) of on-site instruction
- Textbooks and lab manuals
- Classroom consumables
- Completion certificates
- Shipping and instructor travel logistics

CLIENT TO PROVIDE:

- Classroom, with easy access, of 1,000 square feet or greater
- Projection screen, white board and/or flip chart(s)
- A dock facility or a forklift to unload the training equipment
- A pallet jack to move the crates around after they have been unloaded may also be needed
- The equipment should be placed in the training room for the NTT instructor to test and setup prior to the start of training

SHIPPING:

2 crates at 1,000 lbs
- 1 crate @ 51" x 30" x 31" (500 lbs)
- 1 crate @ 45" x 42" x 38" (500 lbs)

Boiler maintenance is critical because it determines the life of a boiler. Today's attention to maintenance affects tomorrow's bottom line.

A well maintained boiler system is reliable and can last 25 years or more. However, it experiences a lot of wear and tear. We teach preventative maintenance to counteract some of the deterioration. We also discuss the common failures and how to diagnose, troubleshoot and fix them.

Gain a basic understanding of operator responsibilities related to safety, reliability and efficiency of commercial and industrial boiler systems.

COURSE AGENDA | 3-Day Hands-On

OPERATOR RESPONSIBILITIES

- Efficiency of operation and safety
- Safety—priorities and hazard of explosion
- Waste stream pollution and stack emissions

THERMODYNAMICS

- Continuity of dependable operation thermodynamics
- Laws of thermodynamics
- Specific/sensible/latent heat
- Superheated
- Steam expansion & quality
- Boiler rating terms
- British thermal unit
- Heat and temperature
- Pressure Saturated Steam (Enthalpy) Table
- Fundamentals of Heat Transfer Boiler Basics
- Steam vs. hot-water boilers
- Strainer
- Hydronic system
- Steam cycle and trap
- Typical steam piping

BOILER TYPES AND DETAILS

- Fire-tube
- Water-tube boilers

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COURSE AGENDA, continued

CODES & STANDARDS

- ASME boiler and pressure
- ASME definitions
- Vessel code
- Safety valves
- Hydrostatic testing
- Pressure gauge
- Annual Inspection R (Repair) Stamps Fuels
- Classification of boiler

FUELS

- Solid fuels
- Fossil fuels

COMBUSTION SYSTEMS AND FUEL-BURNING EQUIPMENT

- Combustion system
- Air for combustion supplied
- Fuel supply systems
- Classification of combustion air
- Ventilation
- Fuel trains

COMBUSTION THEORY AND TUNING CONTROLS

- Combustion
- Burner tuning
- Firing-rate control
- Gas pressure switches
- Oil pressure switch
- Manual/auto selector switch
- System pressure selector
- Damper position switches
- Condensate receiver
- Feedwater pump and control systems
- Burner operating controls
- Burner on/off switch
- Fuel selector switch
- Lead/lag controls
- Low fire hold
- Low-water cutoff
- Flame sensors
- Boiler management control systems
- Gauge glasses

EMISSIONS

- Clean Air Act
- Deposition control
- Attainment and maintenance of the Nation Ambient Air Quality Standards

WATER TREATMENT

- Water treatment based on analysis of each application
- Three basic impurities
- Pretreatment
- Internal treatment
- Silica
- Oil contamination
- Conducting minimum
- Tests for small low-pressure systems
- Boiler water limits and steam purity
- pH scale
- Water treatment classifications
- Boiler blowdown
- Condensate corrosion
- Condensate testing
- Treatment for hydronic systems

PLANT OPERATIONS MAINTENANCE AND REPAIRS

- Routine and scheduled maintenance and repairs
- Preventive maintenance
- Record keeping

EFFICIENCY

- Efficiency improvements

HANDS-ON LAB EXERCISES

- Flame safeguard trainer sequence
- Component identification
- Jackshaft linkage adjustments
- Solenoid valve troubleshooting
- Wiring the panel
- Troubleshooting faults