JUPITER PRIME
Consulting • Training • Advisory
جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

Boiler Control and Burner Management Systems Training Course

12 – 16 July 2027
Madrid

Boiler Control and Burner Management Systems Training Course

Ref: 1383_51793 **Date:** 12 – 16 July 2027 **Location:** Madrid **Fees:** 6200 GBP

Boiler Control and Burner Management Systems is a 1-week training course for instrument and control engineers who configure, test and maintain firing controls, ending with a burner trip test procedure for their own units. Furnace explosions, drum level trips and nuisance flame failures still cause many boiler outages, so control loops and safety logic that behave as designed are central to safe steam supply. The course is delivered by Jupiter Prime Training.

Why Boiler Control and Burner Management Systems Matters Now

Older relay-based firing panels are being replaced by programmable safety controllers and distributed control systems, which changes how logic is written, documented and proved. Insurers and plant owners want evidence that every interlock trips when it should, not only that it was installed. Tighter combustion efficiency targets place more demand on air-fuel ratio control. A site that tests its burner logic and tunes its loops avoids furnace incidents and lost production. The course uses EN 13306 for maintenance terminology and ISO 55001 for asset management criticality.

Who Gains Most from Boiler Control and Burner Management Systems

- Control engineers who configure combustion and drum level loops in the plant control system
- Instrument engineers who maintain flame scanners, transmitters and fuel shut-off valves
- Safety system engineers who write and verify burner interlock logic
- Commissioning engineers who prove purge and light-off sequences on new or modified boilers
- Maintenance engineers who plan periodic proof testing of firing protection

The greatest return comes when the instrument and control engineers responsible for one boiler fleet attend together and share one proof test method.

Boiler Control and Burner Management Systems Capabilities

Participants trace a boiler from fuel train and flame scanner to the trip relay, judging each layer.

- Design cross-limited air-fuel ratio control — preventing fuel-rich firing during load changes
- Apply three-element drum level control — holding level through swell and shrink events
- Specify purge, pilot proving and main flame trial timings — supporting a safe light-off
- Test flame scanners, fuel valve leak checks and low-water trips — proving each interlock works
- Assess bypass, override and maintenance mode practice — protecting the integrity of the safety logic
- Communicate trip causes from first-out records — informing operations before a restart

Key Boiler Control and Burner Management Systems Terms

- Burner management system BMS — the safety logic that supervises purge, ignition, flame presence and fuel shut-off for a boiler.
- Furnace purge — a timed flow of air through the furnace to remove combustible gas before any ignition attempt.
- Flame scanner — a sensor that detects ultraviolet or infrared radiation from a flame and signals its presence to the BMS.
- Double block and bleed — two shut-off valves in series with a vent between them, isolating fuel from the burner.
- Three-element control — drum level control that combines level, steam flow and feedwater flow measurements.
- First-out indication — a record of which interlock tripped first when several alarms appear together.

Boiler Control and Burner Management Systems Day by Day

Day 1: Firing Hazards and Control Architecture

- Furnace Explosion Mechanisms — Why Purge and Flame Proving Exist
- Separation of Basic Control and Safety Logic — Allocating Functions Correctly
- Fuel Train Components and Valve Arrangements — Isolating Gas and Liquid Fuel
- Boiler Instrument Inventory — Linking Each Transmitter to Its Loop
- ISO 55001 Criticality Ranking — Prioritising Firing Protection Devices

Day 2: Combustion and Draft Control Loops

- Steam Pressure Master and Firing Rate Demand — Sharing Load Across Burners
- Cross-Limited Air-Fuel Ratio Control — Avoiding Fuel-Rich Transients
- Oxygen Trim and Carbon Monoxide Feedback — Raising Combustion Efficiency
- Furnace Draft Control With Forced and Induced Fans — Keeping Pressure Stable
- Loop Tuning by Step Test — Choosing Gain and Integral Settings

Day 3: Drum Level and Feedwater Control

- Swell and Shrink Behaviour — Explaining Inverse Level Response
- Single, Two and Three-Element Strategies — Matching Strategy to Load Swings
- Level Transmitter Compensation for Density — Correcting Indicated Level
- Feedwater Valve and Pump Speed Control — Selecting the Final Element
- Low and High Level Trip Settings — Protecting Tubes and Turbines

Day 4: Burner Management Logic and Flame Supervision

- Purge Permissives and Timers — Confirming Airflow Before Ignition
- Pilot and Main Flame Trial Sequences — Limiting Unburnt Fuel Release
- Flame Scanner Selection and Discrimination — Avoiding False Flame Signals
- Valve Proving and Leak Testing — Confirming Tight Fuel Shut-Off
- Case Studies From Power Plants and Chemical Sites — Lessons From Bypassed Interlocks

Day 5: Practising the Burner Trip Test Procedure

- Combustion Loop Upset Exercise — Applying Day 2 Air-Fuel Settings
- Drum Level Disturbance Exercise — Applying Day 3 Three-Element Tuning
- Light-Off Sequence Walkthrough — Applying Day 4 Purge and Flame Timings
- Bypass and Override Register — Controlling Temporary Defeats of Protection
- Burner Trip Test Procedure — Assembling Steps, Acceptance Criteria and Records

Applying Boiler Control and Burner Management Systems After the Course

- Run a step test on one combustion or drum level loop and record tuning before and after.
- Audit the bypass and override register for one boiler and close unauthorised defeats.

Boiler Control and Burner Management Systems Questions FAQ

What are boiler control and burner management systems and why do they matter now?

They are the control loops that regulate firing and drum level, and the safety logic that supervises purge, ignition and flame. Migration to programmable controllers and demands for proof testing make disciplined design and testing urgent.

Which roles gain most from boiler control and burner management systems?

Instrument and control engineers gain most. Safety system and commissioning engineers also benefit.

How does boiler control and burner management systems differ from a boiler operations course?

This course works inside the control system and safety logic: loops, permissives and proof tests. An operations course concentrates on shift routines and water chemistry.

What do you bring back from boiler control and burner management systems?

You bring back a trip test procedure for your own burners, with acceptance criteria and records. You also tune loops with a structured step test.

Boiler Control and Burner Management Systems: The Way Forward

The burner trip test procedure first informs whether a boiler may return to service after an outage or logic change. Technicians execute it; control engineers sign it off. After its first full use, revisit the acceptance criteria and test intervals, because real valve and scanner results show where the procedure is too loose or too frequent.