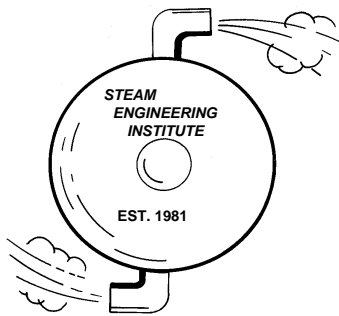


STEAM ENGINEERING INSTITUTE



SECOND CLASS FIREMAN CORRESPONDENCE COURSE

Length of course:	20 Lessons
Completion time:	Students are expected to complete all assignments of this course in 15 weeks. Extensions of this time will be granted for legitimate reason by writing to the President.
Diploma	Students are required to complete all Requirements: lessons, assignments, quizzes and tests. A diploma will be granted to all students with a final grade of 70% or above.
Text:	BOILER OPERATORS WORKBOOK, Third Edition, by. R. Dean Wilson, American Technical Publishers Inc.
Handouts:	Mass. General Laws Ch. 146 and additional handouts compiled by the Steam Engineering Institute.
Videos:	“Steam” by Armstrong International. “Boiler Operation Video Tape Series” (five video set) by American Technical Publishers.

Course outline:

Lesson 1.

Video: “**Applications & Theory.**” Highlights of High Pressure Boiler Room.
Review Test.

Lesson 2

Steam Fundamentals

Lesson 3.

Boiler Theory and Principles

Principles of boilers, pressure, heat. Boiler basics. Fire tube and water tube boilers. Boiler safety Issues.

Lesson 4.

Boiler Construction and Design

Regulatory organizations, Boilers construction. Boiler configuration. Calculations.

Lesson 5.

Steam Systems and Controls

Pressure measurement, pressure control, safety valves, boiler vents, steam quality, valves, Piping, condensate and gas removal, superheaters..

Lesson 6.

Water Supply Systems and Controls

Leveling indicating devices, level controls, level alarms and safety devices, pump theory and principles, feed water piping and valves, feed water preheating.

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Lesson 7.

Video review “**Types and Construction**” MAWP; boiler horsepower; water/fire tubes; boilers; steam; fuels.

Lesson 8.

Water Treatment Systems and Controls

Water supply; hi & lo water; gage glasses; water columns; make-up; low water cut-off; pumps.

Lesson 9.

Fuel Systems and Controls

Furnace fundamentals, fuel selection, fuel oils, flue gasses, combustion safety systems, combustion air requirements, furnace maintenance.

Lesson 10

Draft and Flue Gas Systems and Controls

Natural draft, mechanical draft, draft measurement and control, draft related problems, Stack emissions and environmental issues, flue gas analysis.

Lesson 11

Video review “**Water & Steam Fittings & Accessories.**” Water columns; safety valves; low water cut-offs; feed water; heaters/regulators/pumps. Bottom blow down valves; steam pressure gages; steam traps; try cocks; high/low water; OS & Y valves.

Lesson 12.

Instrumentation and Control Systems

Combustion related controls. Review Questions.

Lesson 13.

Boiler Operation and Maintenance

Safe practices, normal operating duties, boiler plant maintenance, troubleshooting techniques, emergency and dangerous situations, boiler and vessel inspection, cleaning, maintenance and repairs.

Lesson 14

Video review “Maintenance and Testing.”

Lesson 15.

Boiler System Optimization

Boiler operation & maintenance; relieving a shift; blowing down water column/ boiler; pressure & temperature readings; replacing a gage glass; leaving a shift; log books; putting boiler on the line; idle boilers; boiler explosions; loosing the fires; boiler cleaning; important rules.

Lesson 16

Call the Chief Engineer of a high-pressure plant (if possible) in your area. Tell the Chief you are studying for a Second Class Fireman’s license and would like to visit their plant. Hospitals or other commercial plants are good recourses; even a high school would be good. Make a sketch of the fuel oil piping from tank to oil burners.

Include all valves, piping, strainers, heaters etc. Transfer all this information to a straight line drawing. Identify all-important parts. While at this plant ask the Fireman to show you how to blow down a water column, gage glass and the boiler.

Video review “**Taking Over A Shift.**” Water level; blowing down LWCO; running auxiliaries; blowdowns; valve operation; gage glass; boiler start-up; boiler venting; readings; plant efficiency; flame scanner; log books; boiler shut down.

Lesson 17

Call the Chief Engineer of a high-pressure plant (if possible) in your area. Tell the Chief you are studying for a Second Class Fireman’s license and would like to visit their plant. Hospitals or other commercial plants are good recourses. Make a sketch of the feed water system. Include all piping, valves, heaters, tanks and important items on this system. Transfer this information to a straight line drawing. Label all-important parts. While on this trip ask the fireman to show you how he lights off the boiler and puts it on the line. Inquire about the safety valve and other important parts of the boiler.

Lesson 18

Chapter 146 Mass Gen Laws

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Lesson 19

Licensing

Review for final exam. All videos; all lessons in textbook; all Chapter Trade Tests; review all notes & notebook.

Lesson 20

Video review “**Steam.**” Steam; temperature; btu’s; gage pressure; specific volume; boiling point; sensible/latent heat; boiling temperature; heat of vaporization; steam tables; water hammer; vacuum; gasses in water.

Course review