Boilermaking

MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Introduction to Boilermaking (10 Hours)
(Module ID 34101-10) Provides an overview of the boilermaker craft, including a description of career opportunities.

Boilermaking Safety (12.5 Hours)
(Module ID 34102-10) Covers safety issues specific to boilermakers on the job.

Boilermaking Tools (15 Hours)
(Module ID 34103-10) Introduces the hand and power tools used by boilermakers, and the associated safety concerns.

Basic Materials (10 Hours)
(Module ID 34104-10) Identifies materials used in the construction of boilers, including material properties, standards and codes, and material markings.

Oxyfuel Cutting (17.5 Hours)
(Module ID 34105-10) Explains the safety requirements associated with oxyfuel cutting. Describes straight line, bevel, piercing, and washing techniques.

Cutting and Fitting Gaskets (12.5 Hours)
ISBN 978-0-13-213699-0
(Module ID 34106-10) Describes gasket materials used in mating flanges and procedures for laying out and cutting a flange gasket.

Base Metal Preparation (10 Hours)
(Module ID 34107-10) Describes how to clean and prepare base metals for cutting and welding.

Welding Basics (22.5 Hours)
ISBN 978-0-13-213701-0
(Module ID 34108-10) Describes welding and cutting processes and related equipment. Includes filler metals, joint design, and the codes that govern welding practices.

Pipe Hangers and Supports (25 Hours)
(Module ID 34203-11) Identifies pipe hangers and supports and explains how to interpret pipe support drawings and symbols. Explains how to select, store, handle, install, and maintain spring supports.

Drawings and Detail Sheets (15 Hours)
(Module ID 34204-11) Explains how to read drawings and their symbols. Covers plot plans, structural drawings, elevation drawings, as-built drawings, equipment arrangement drawings, piping and instrumentation drawings, isometric drawings, spool sheets, detail sheets, and orthographic drawings.

Fasteners and Anchors (5 Hours)
(Module ID 34205-11) Covers threaded and non-threaded fasteners and anchoring devices. Explains how to select fasteners and anchors for given applications. Describes how to install threaded, non-threaded, and insulated fasteners and anchors.

Welding Symbols (5 Hours)
(Module ID 34206-11) Explains how to read symbols on welding drawings, specifications, and welding procedure specifications. Describes the symbols for fillet welds, groove welds, miscellaneous other welds, and non-destructive tests.

Socket Weld Pipe Fabrication (25 Hours)
(Module ID 34207-11) Describes different types of socket weld piping materials and fittings and how to read socket weld piping drawings. Explains how to determine pipe lengths between socket weld fittings, as well as how to mate socket weld fittings to pipe.

Butt Weld Pipe Fabrication (40 Hours)
(Module ID 34208-11) Covers preparing pipe ends for butt welding; determining pipe lengths between butt weld fittings; and using welding jigs to align pipe and butt weld fittings for welding. Explains how to select and install backing rings.

Air Carbon Arc Cutting and Gouging (12.5 Hours)
ISBN 978-0-13-257796-0
(Module ID 34207-10) Describes air carbon arc cutting (CAC-A) equipment and processes. Explains how to select and install CAC-A electrodes, and how to prepare the work area and CAC-A equipment for safe operation. Provides instructions for using CAC-A equipment for washing and gouging activities.

LEVEL 1

BOILERMAKING

Curriculum Notes

- 182.5 Hours
  - Includes 72.5 hours of Core Curriculum, which is a prerequisite for Level 1 completion and must be purchased separately.
- Revised: 2010, Second Edition
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

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LEVEL 2

BOILERMAKING

Curriculum Notes

- 185 Hours
  - Includes 72.5 hours of Core Curriculum, which is a prerequisite for Level 1 completion and must be purchased separately.
- Revised: 2011, Second Edition
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

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Individual Modules: $24.99

LEVEL 3

BOILERMAKING

Curriculum Notes

- 182.5 Hours
  - Includes 72.5 hours of Core Curriculum, which is a prerequisite for Level 1 completion and must be purchased separately.
- Revised: 2010, Second Edition
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

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LEVEL 4

BOILERMAKING

Curriculum Notes

- 187.5 Hours
  - Includes 72.5 hours of Core Curriculum, which is a prerequisite for Level 1 completion and must be purchased separately.
- Revised: 2010, Second Edition
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

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Boiler Nonpressure Components (15 Hours)
(Module ID 34302-11) Describes the nonpressure components of a boiler system and their locations. Explains the procedures required to repair nonpressure components of a boiler.

Boiler Auxiliaries (25 Hours)
(Module ID 34306-11) Describes the air flow systems within a boiler system and the different fuels used to fire boiler system furnaces. Describes ash removal systems and the equipment used to protect the environment. Covers the feed water system into a boiler and the blow down from a boiler system.

Brick, Refractory, Insulation, and Lagging (BRIL) (5 Hours)
(Module ID 34305-11) Describes types of BRIL and explains their functions. Also addresses hazards associated with BRIL.

Advanced Tube Work (20 Hours)
(Module ID 34303-11) Explains the methods used to identify problem tubes and extract them. Also describes the methods used for replacing and plugging tubes.

Advanced Boilermaking Construction Drawings (20 Hours)
(Module ID 34402-12) Covers symbols and abbreviations used on piping and instrumentation drawings and piping arrangement drawings. Explains how to read and interpret different types of construction drawings. Explains how to sketch an isometric drawing from a plan view drawing, and how to calculate line lengths from isometric drawings.

Advanced Pipe Fabrication (50 Hours)
(Module ID 08402-07; from Pipefitting Level Four)

Stress Relieving (10 Hours)
(Module ID 34406-12) Covers metal distortion and ways to prevent it. Explains thermal growth in metals, and how to calculate thermal growth in given metals. Explains how misalignment creates stress in metals. Describes ways to relieve stress in piping that is experiencing distortion due to welding, thermal growth, or misalignment.

Quality Assurance (10 Hours)
(Module ID 34407-12) Covers codes governing welding and boilers. Describes weld imperfections and their causes. Identifies and explains different nondestructive and destructive testing methods. Explains how to make visual inspections of fillet welds. Describes welder qualification testing, and stresses the importance of quality workmanship.

Advanced Exchangers (25 Hours)
(Module ID 34412-12) Identifies different types of heat exchangers and their components. Describes methods used to test exchangers, and how to pull exchanger bundles. Explains how to replace a flange and a nozzle on an exchanger.

Advanced Towers (25 Hours)
(Module ID 34412-12) Identifies different types of towers and their components. Explains how to remove and replace different types of packing used in towers. Describes methods used to make field repairs to tower trays. Explains how to remove a tower distributor for maintenance.

Fundamentals of Crew Leadership (20 Hours)
(Module ID 46101-11, Second Edition) Covers basic leadership skills and explains different leadership styles, communication, delegating, and problem solving. Job site safety and the crew leader’s role in safety are discussed, as well as project planning, scheduling, and estimating. Includes performance tasks to assist the learning process.