Boilermaking

Welding Basics (22.5 Hours)
Trainee S20  ISBN 978-0-13-213701-0
Instructor S20  ISBN 978-0-13-213746-1
(Module ID 34108-10) Describes welding and cutting processes and related equipment. Includes filler metals, joint design, and the codes that govern welding practices.

Welding Symbols (5 Hours)
Instructor S20  ISBN 978-0-13-257802-8
(Module ID 34206-11) Describes 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.

Tube Weld Preparation and Fitting (15 Hours)
(Module ID 34209-11) Describes methods used to gain access to boiler tubes needing repair, and to prepare boiler tubes for replacement. Explains how to fit-up a section of boiler tube. Describes welding procedures for making butt welds on standard carbon steel tubes and composite tubes.

Air Carbon Arc Cutting and Gouging (12.5 Hours)
Trainee S20  ISBN 978-0-13-257796-0
Instructor S20  ISBN 978-0-13-257806-6
(Module ID 34210-11) 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.

To Order Call: 1-800-922-0579  Stay Connected  www.nccer.org/instructors

LEVEL 1

BOILERMAKING

MODULES
All of the modules listed below are included in the Trainee Guide and the Instructor's Guide. The following ISBN and pricing information is for ordering individual modules only.

Introduction to Boilermaking (10 Hours)
Instructor S20  ISBN 978-0-13-213738-6
(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)
Instructor S20  ISBN 978-0-13-213741-6
(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)
Trainee S20  ISBN 978-0-13-213699-0
Instructor S20  ISBN 978-0-13-213743-0
(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.

LEVEL 2

BOILERMAKING

MODULES
All of the modules listed below are included in the Trainee Guide and the Instructor’s Guide. The following ISBN and pricing information is for ordering individual modules only.

Boiler Systems and Components (22.5 Hours)
Instructor S20  ISBN 978-0-13-257797-7
(Module ID 34201-11) Introduces boiler configurations and applications. Identifies boiler components and explains their functions.

Identifying and Installing Valves (20 Hours)
Instructor S20  ISBN 978-0-13-257798-4
(Module ID 34202-11) Identifies valves found in boiler systems. Describes valve components and explains their functions. Explains how to select, store, handle, and install valves, and describes valve markings and nameplate information.

Pipe Hangers and Supports (25 Hours)
Instructor S20  ISBN 978-0-13-257799-1
(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 can supports.

Drawings and Detail Sheets (15 Hours)
Instructor S20  ISBN 978-0-13-257800-4
(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, spiral sheets, detail sheets, and orthographic drawings.

Fasteners and Anchors (5 Hours)
Instructor S20  ISBN 978-0-13-257801-1
(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.

LEVEL 3

BOILERMAKING

MODULES
All of the modules listed below are included in the Trainee Guide and the Instructor’s Guide. The following ISBN and pricing information is for ordering individual modules only.

Plasma Arc Cutting (7.5 Hours)
Instructor S20  ISBN 978-0-13-266365-6
(Module ID 29103-09; from Welding Level One, Fourth Edition) Provides instructions for using CAC-A equipment for washing and gouging activities.
### Boilermaking Level 3 (continued)

#### Boiler Pressure Components (25 Hours)
- **Trainee** $20
- **Instructor** $20
- (Module ID 34301-11) Describes the pressure components of a boiler system and their locations. Explains the procedures required to repair pressure components of a boiler.

#### Boiler Nonpressure Components (15 Hours)
- **Trainee** $20
- **Instructor** $20
- (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)
- **Trainee** $20
- **Instructor** $20
- (Module ID 34303-11) 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)
- **Trainee** $20
- **Instructor** $20
- (Module ID 34305-11) Describes types of BRIL and explains their functions. Also addresses hazards associated with BRIL.

#### Advanced Tube Work (20 Hours)
- **Trainee** $20
- **Instructor** $20
- (Module ID 34309-11) Explains the methods used to identify problem tubes and extract them. Also describes the methods used for replacing and plugging tubes.

#### Testing Piping Systems and Equipment (20 Hours)
- **Trainee** $20
- **Instructor** $20
- (Module ID 34308-11) Lists pretest requirements for boiler system piping systems and equipment. Describes service and flow tests, head pressure tests, and hydrostatic tests performed on boiler system piping systems and equipment.

#### Rigging (22.5 Hours)
- **Trainee** $20
- **Instructor** $20
- (Module ID 34307-11) Explains the functions of towers and exchangers and the basic distillation process. Describes various types of towers and exchangers and their components.

#### Towers and Exchangers (25 Hours)
- **Trainee** $20
- **Instructor** $20
- (Module ID 34410-12) Identifies different types of towers and their functions. Also addresses hazards associated with BRIL.

#### Advanced Boilermaking Construction Drawings (20 Hours)
- **Trainee** $20
- **Instructor** $20
- (Module ID 34411-12) Names and explains the 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)
- **Trainee** $20
- **Instructor** $20
- ISBN 978-0-13-266368-7
- (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. Discusses welder qualification testing, and stresses the importance of quality workmanship.

#### Stress Relieving (10 Hours)
- **Trainee** $20
- **Instructor** $20
- (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.

#### Fundamentals of Crew Leadership (20 Hours)
- **Trainee** $43
- **Instructor** $43
- (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.

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- **Instructor** $20
- (Module ID 34309-11) Explains the methods used to identify problem tubes and extract them. Also describes the methods used for replacing and plugging tubes.

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- **Instructor** $20
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- **Instructor** $20
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