Boilermaking

L1 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.

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.

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.

Socket Weld Pipe Fabrication (15 Hours)
(Module ID 34209-11) 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.

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.

Drawing 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 (25 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.

LEVEL 2 BOILERMAKING

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

Boiler Systems and Components (22.5 Hours)
(Module ID 34201-10) Introduces boiler configurations and applications. Identifies boiler components and explains their functions.

Identifying and Installing Valves (20 Hours)
(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.

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.

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.

Socket Weld Pipe Fabrication (15 Hours)
(Module ID 34209-11) 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.

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.
## Boilermaking Level 3

**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 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 34402-12) Covers basic leadership skills for maintenance. Includes performance tasks to assist the learning process.

**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 replace and remove 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. Jobsite 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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**Boilermaking Level 4**

**Curriculum Notes**  
* 165 Hours  
* Revised: 2012, Second Edition  
* Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

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

**Plasma Arc Cutting (7.5 Hours)**  

**Boiler Pressure Components (25 Hours)**  
(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.

**Advanced Rigging (20 Hours)**  
(Module ID 34308-11) Lists protest requirements for boiler system piping systems and equipment. Describes service and flow tests, head pressure tests, and hydrostatic tests performed for boiler system piping systems and equipment.

**Rigging (22.5 Hours)**  
(Module ID 15206-07; from Millwright Level Two) ISBN 978-0-13-266363-2

**Towers and Exchangers (25 Hours)**  
(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.

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**Boilermaking Level 3**

**Curriculum Notes**  
* 165 Hours  
* Revised: 2011, Second Edition  
* Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

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

**Advanced Mechanical Trade Math (15 Hours)**  
(Module ID 34404-12) Covers tables of equivalents and units of conversion. Explains the basics of trigonometry and how to apply them to the installation of pipe. Explains how to calculate the weight of objects.

**Advanced Boilermaking Quality Assurance (10 Hours)**  
(Module ID 34407-12) Covers codes governing welding and boilers. Describes weld imperfections and their causes. Identities 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.

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