

## L1 PIPEFITTING

LEVEL 1



### Curriculum Notes

- 155 Hours (includes Core)
- Core Introduction to Basic Rigging module is required for the Level 3 credential.
- Updated in 2019.
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at [www.nccer.org/irc](http://www.nccer.org/irc).
- A Spanish translation is available. Please see NCCER's online catalog for more information.

### PAPERBACK

ISBN

Trainee Guide: \$69.99

978-0-13-580941-9

## MODULES

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

### Orientation to the Pipefitting Craft (5 Hours)

ISBN 978-0-13-581005-7

(Module ID 08101) Provides an overview of work performed by the pipefitter, as well as the responsibilities, career opportunities, safety principles associated with the pipefitting trade, and the types of pipes and tools pipefitters will encounter.

### Pipefitting Hand Tools (20 Hours)

ISBN 978-0-13-580989-1

(Module ID 08102) Covers hand tool safety as well as procedures for selecting, inspecting, using, and maintaining hand tools used by pipefitters. Introduces the most common hand tools used in pipefitting, including pipe wrenches, pipe stands, pipe vises, levels, pipe fabrication tools, pipe bending tools, and pipe joining tools.

### Pipefitting Power Tools (15 Hours)

ISBN 978-0-13-581003-3

(Module ID 08103) Covers the safe operation of power tools used to cut, grind, thread, and shape all types of materials, and includes procedures for selecting, inspecting, using, and maintaining power tools used by pipefitters. Provides guidelines for using electrical and pneumatic tools, including pipe threading machines.

### Oxyfuel Cutting (17.5 Hours)

ISBN 978-0-13-581001-9

(Module ID 29102) Explains the safety requirements for oxyfuel cutting. Identifies oxyfuel cutting equipment and setup requirements. Explains how to light, adjust, and shut down oxyfuel equipment. Trainees will perform cutting techniques that include straight line, piercing, bevels, washing, and gouging.

### Ladders and Scaffolds (12.5 Hours)

ISBN 978-0-13-580990-7

(Module ID 08105) Describes hazards and safety procedures governing the use of stepladders, extension ladders, fixed scaffolds, and rolling scaffolds. Includes general procedures for scaffold assembly and use.

### Motorized Equipment One (10 Hours)

ISBN 978-0-13-580990-7

(Module ID 08106) Explains the safety factors, operator maintenance, and operating procedures associated with motorized equipment used on job sites. Covers electrical generators, air compressors, aerial lifts, forklifts, trenchers, backhoes, mobile cranes, and portable equipment including welding machines, pumps, and compactors.

## L2 PIPEFITTING

LEVEL 2

### Curriculum Notes

- 162.5 Hours
- Updated in 2019.
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at [www.nccer.org/irc](http://www.nccer.org/irc).

### PAPERBACK

ISBN

Trainee Guide: \$99.99

978-0-13-581811-4

### Identifying and Installing Valves (20 Hours)

ISBN 978-0-13-581131-3

(Module ID 08203) Identifies different types of valves, including those that start and stop flow, regulate flow, regulate flow direction, and relieve pressure, and describes their installation as well as proper storage and handling procedures. Covers common valve operators and actuators.

### Pipefitting Trade Math (15 Hours)

ISBN 978-0-13-581128-3

(Module ID 08204) Explains how to use ratios and proportions, solve basic algebra, area, volume, and circumference problems, and solve for right triangles using the Pythagorean theorem.

### Threaded Pipe Fabrication (15 Hours)

ISBN 978-0-13-581127-6

(Module ID 08205) Describes the materials used in threaded piping systems. Explains how to determine pipe lengths between threaded pipe fittings, prepare the pipe and fittings for fit-up, and assemble the piping system. Includes how to calculate simple and rolling offsets.

### Socket-Weld Pipe Fabrication (25 Hours)

ISBN 978-0-13-581125-2

(Module ID 08206) Describes the fittings and materials involved in socket-welds, interpreting drawings, determining pipe lengths between fittings, aligning pipe and fittings, and cutting out a socket weld to save the structure.

### Butt-Weld Pipe Fabrication (37.5 Hours)

ISBN 978-0-13-581138-2

(Module ID 08207) Describes materials, fittings, drawings, calculating takeouts, determining pipe lengths between fittings, beveling pipe, aligning components for welding, performing alignments, and cutting a butt weld to save the structure.

### Excavations (10 Hours)

ISBN 978-0-13-581134-4

(Module ID 08208) Explains soil and trenching hazards involved in excavations, as well as the use of shoring and shielding systems per OSHA standards, sloping requirements by soil type, and combined systems for trench reinforcement. Covers how to determine grade and elevation, how to use a laser level, and how to backfill.

### Underground Pipe Installation (20 Hours)

ISBN 978-0-13-581120-7

(Module ID 08209) Explains pipe installation procedures and guidelines, including the procedures for cast iron, ductile iron, concrete, carbon steel, fiberglass, and thermoplastic pipe. Includes an introduction to horizontal directional drilling for pipe installation, and the use of a weak link for plastic pipe.

## MODULES

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

### Piping Systems (5 Hours)

ISBN 978-0-13-581129-0

(Module ID 08201) Introduces chemical, compressed air, fuel oil, steam, and water systems. Explains how to identify piping systems according to color codes, the effects of thermal expansion, and the purpose of pipe insulation.

### Drawings and Detail Sheets (15 Hours)

ISBN 978-0-13-581123-8

(Module ID 08202) Introduces plot plans, structural drawings, elevation drawings, as-built drawings, equipment arrangement drawings, P&IDs, isometric drawings, spool drawings, detail sheets, and orthographic drawings. Explains how to read and interpret various types of drawings as well as the symbology used to convey information.

Continued on following page

<b>L3 PIPEFITTING</b>	
LEVEL 3	
<b>Curriculum Notes</b>	
<ul style="list-style-type: none"> <li>• 152.5 Hours</li> <li>• Revised: 2021, Fourth Edition</li> <li>• Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at <a href="http://www.nccer.org/irc">www.nccer.org/irc</a>.</li> </ul>	
<b>PAPERBACK</b>	<b>ISBN</b>
Trainee Guide: \$99.99	<b>978-0-13-748728-8</b>

**MODULES**

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

**Introduction to Basic Rigging (7.5 Hours)**

ISBN 978-0-13-412905-1

(Module ID 00106) A common activity at nearly every construction site is the movement of material and equipment from one place to another using various types of lifting gear. The procedures involved in performing this task are known as rigging. Not every worker will participate in rigging operations, but nearly all will be exposed to it at one time or another. This module provides an overview of the various types of rigging equipment, common hitches used during a rigging operation, and the related Emergency Stop hand signal.

**Rigging Practices (15 Hours)**

ISBN 978-0-13-498801-6

(Module ID 38102) Describes basic rigging and safety practices related to rigging activities. Describes the use and inspection of equipment and hardware used in rigging. Explains how to apply common hitches. Covers jacks and josting equipment.

**Standards and Specifications (10 Hours)**

ISBN 978-0-13-748737-0

(Module ID 08303) Discusses the meaning and importance of operating within the standards outlined and specifications. Explains commonly used codes, welding procedure specifications, and the identification of pipe and components.

**Advanced Trade Math (25 Hours)**

ISBN 978-0-13-748729-5

(Module ID 08304) Covers the role of trigonometry in pipefitting, including the use of trigonometric functions, triangle calculations, determining angles, interpolation, and calculating takeouts and odd angles.

**Motorized Equipment Two (10 Hours)**

ISBN 978-0-13-748741-7

(Module ID 08305) Discusses the safe and proper use of scissors lifts, telescoping boom lifts, cable lifts, drain cleaners, and hydraulic torque tools.

**Introduction to Aboveground Pipe Installation**

(25 Hours)

ISBN 978-0-13-748745-5

(Module ID 08306) Identifies various types of pipe, flanges, gaskets, and bolts. Covers the fabrication of gaskets, assembling and installing flanged and grooved pipe, fabricating and installing pipe spools, and installing pipe sleeves and floor penetrations.

**Field Routing and Vessel Trim (15 Hours)**

ISBN 978-0-13-748742-4

(Module ID 08307) Explains how to secure the work area and determine field run specifications, load weights for erection equipment, and support needs. Provides details on evaluating the run, assembling the field run, installing test blinds, working with instruments, and how to erect vessel trim.

**Pipe Hangers and Supports (25 Hours)**

ISBN 978-0-13-748736-3

(Module ID 08308) Explains the roles of pipe hangers and supports, with details on clevises, saddles, U-bolts, clamps, turnbuckles, rods, welded beam attachments, spring can supports, travel stops, and snubbers.

**Testing Piping Systems and Equipment (20 Hours)**

ISBN 978-0-13-748734-9

(Module ID 08309) Discusses the importance of safety and following procedures with testing and inspections. Topics include pretest requirements, visual weld inspections, service flow tests, hard pressure tests, hydrostatic tests, and steam blow tests.

<b>L4 PIPEFITTING</b>	
LEVEL 4	
<b>Curriculum Notes</b>	
<ul style="list-style-type: none"> <li>• 175 Hours (required); 197.5 Hours (with Fundamentals of Crew Leadership elective)</li> <li>• Revised: 2021, Fourth Edition</li> <li>• Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at <a href="http://www.nccer.org/irc">www.nccer.org/irc</a>.</li> </ul>	
<b>PAPERBACK</b>	<b>ISBN</b>
Trainee Guide: \$99.99	<b>978-0-13-748749-3</b>

**MODULES**

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

**Advanced Blueprint Reading (50 Hours)**

ISBN 978-0-13-748750-9

(Module ID 08401) Introduces drawings used by pipefitters in the shop and in the field. Explains how to read and interpret P&IDs, general arrangement drawings, isometric drawings, and spool sheets. Discusses symbols, coordinates, control points, elevations, and step-by-step instructions for following a line of pipe through a set of drawings.

**Advanced Pipe Fabrication (50 Hours)**

ISBN 978-0-13-748751-6

(Module ID 08402) Explains the use of ordinate tables and trigonometry in creating fittings and pipe assemblies for process applications. Details are provided on calculating piping offsets, fabricating miter turns, laying out and fabricating saddles and supports made out of pipe, and laying out laterals, wyes, ninety-degree intersections, and supports without using references.

**Stress Relieving and Aligning (10 Hours)**

ISBN 978-0-13-748759-2

(Module ID 08403) Discusses the purpose of stress relieving and covers thermal expansion in piping, temperature and metal structure, and stress relief for aligning pipe to rotating equipment.

**In-Line Specialties (20 Hours)**

ISBN 978-0-13-748760-8

(Module ID 08405) Presents methods of safely working with specialty devices used in pipelines, including: snubbers, ball joints, bleed rings, drip legs, steam traps, expansion joints, filters, strainers, flowmeters, level measurement devices, flow pressure switches, rupture discs, thermowells, and desuperheaters.

**Special Piping (25 Hours)**

ISBN 978-0-13-748758-5

(Module ID 08406) Discusses methods of assembling copper tubing with flared and compression joints. Introduces brazing and soldering and explains the differences between these two procedures. Also describes bending pipe, working with glass-lined piping, handling hydraulic compression joints, and managing grooved piping systems.

**Hot Taps (10 Hours)**

ISBN 978-0-13-748755-4

(Module ID 08407) Provides details on environmental and other concerns associated with hot tapping. Discusses the installation of fittings, the operation of hot tap machines, working with line stop plugs, and identifying and mitigating known and potential hazards.

**Maintaining Valves (10 Hours)**

ISBN 978-0-13-748754-7

(Module ID 08408) Explains how to replace packing and O-rings, and how to open and close a valve's bonnet. Discusses how to safely troubleshoot and maintain several types of valves.

**Fundamentals of Crew Leadership (22.5 Hours)**

ISBN 978-0-13-487188-2

(Module ID 46101) The course 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.