## L1 WELDING

**LEVEL 1**

### Curriculum Notes
- **357.5 Hours**
  - Includes 72.5 hours of Core Curriculum, which is a prerequisite for Level 1 completion and must be purchased separately.
- Revised: 2015, Fifth Edition
- Sequenced in accordance with the American Welding Society's (AWS) S.E.N.S.E school requirements. When combined with NCCER Welding Level 2, the content aligns with the key indicators specified in AWS E62.0:2008 Level 1-Entry Welder.
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

### HARDCOVER
- Trainee Guide: $69

### PAPERBACK
- Trainee Guide: $67
- Individual Modules: $20

### DIGITAL
- NCCERconnect Access Card: $67
- NCCERconnect + Hardcover Trainee Guide: $94
- NCCERconnect + Paperback Trainee Guide: $92

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

#### Welding Safety (5 Hours)
(Module ID 29101-15) Covers safety equipment, protective clothing, and procedures applicable to the cutting and welding of metals.

#### Oxyfuel Cutting (17.5 Hours)
(Module ID 29102-15) 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.

#### Plasma Arc Cutting (7.5 Hours)
(Module ID 29103-15) Introduces plasma arc cutting equipment and safe work area preparation. Identifies correct amperage, gas pressures, and flow rates. Covers plasma-arc cutting methods for piercing, slitting, squaring, and beveling metals. Explains how to store equipment and clean the work area.

#### Air-Carbon Arc Cutting and Gouging (10 Hours)
(Module ID 29104-15) Introduces air-carbon arc cutting equipment and processes. Identifies the electrodes and safe operation of the equipment. Provides step-by-step instructions for performing air-carbon arc washing and gouging activities.

#### SMAW Electrodes (2.5 Hours)
(Module ID 29108-15) Describes SMAW welding and welding equipment. Also explains how to use tools for cleaning welds.

#### SMAW – Beads and Fillet Welds (50 Hours)
ISBN 978-0-13-418025-0
(Module ID 29109-15) Describes the preparation and setup of arc welding equipment and the process of striking an arc. Explains how to detect and correct arc blow. Describes how to make stringer, weave, overlapping beads, and fillet welds.

#### Joint Fit-Up and Alignment (5 Hours)
(Module ID 29110-15) Describes job code specifications. Explains how to use fit-up gauges and measuring devices to check fit-up and alignment and use plate and pipe fit-up and alignment tools to properly prepare joints. Explains how to check for joint misalignment and poor fit.

#### SMAW – Groove Welds with Backing (50 Hours)
(Module ID 29111-15) Introduces groove welding and explains how to set up welding equipment for making groove welds. Describes how to make groove welds with backing. Provides procedures for making flat, horizontal, vertical, and overhead groove welds.

#### SMAW – Open-Root Groove Welds – Plate (60 Hours)
(Module ID 29112-15) Introduces various types of groove welds and describes how to prepare for groove welding. Describes the techniques required to produce various open V-groove welds.

Continued on following page
## Welding Level 2

### Curriculum Notes
- 227.5 Hours
- Revised: 2015, Fifth Edition
- Sequenced in accordance with the American Welding Society’s (AWS) S.E.N.S.E school requirements. When combined with NCCER Welding Level 1, the content aligns with the key indicators specified in AWS EG2.0:2008 Level 1-Entry Welder.
- 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.

<table>
<thead>
<tr>
<th>Modules</th>
<th>ISBN</th>
</tr>
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<tbody>
<tr>
<td>SMAW – Open-Root Pipe Welds (100 Hours)</td>
<td>978-0-13-448560-7</td>
</tr>
<tr>
<td>GMAW – Pipe (60 Hours)</td>
<td>978-0-13-448564-5</td>
</tr>
<tr>
<td>FCAW – Pipe (60 Hours)</td>
<td>978-0-13-448566-9</td>
</tr>
<tr>
<td>GMAW and FCAW – Equipment and Filler Metals</td>
<td>978-0-13-418018-2</td>
</tr>
<tr>
<td>GMAW – Plate (60 Hours)</td>
<td>978-0-13-417970-4</td>
</tr>
<tr>
<td>GMAW – Carbon Steel Pipe (80 Hours)</td>
<td>978-0-13-448568-3</td>
</tr>
<tr>
<td>GTAW – Equipment and Filler Metals (10 Hours)</td>
<td>978-0-13-417969-8</td>
</tr>
<tr>
<td>GTAW – Plate (60 Hours)</td>
<td>978-0-13-417968-1</td>
</tr>
<tr>
<td>GTAW – Carbon Steel Pipe (70 Hours)</td>
<td>978-0-13-448570-6</td>
</tr>
<tr>
<td>SMAW – Preheating and Postheating of Metals</td>
<td>978-0-13-417953-7</td>
</tr>
<tr>
<td>Physical Characteristics and Mechanical</td>
<td>978-0-13-417954-4</td>
</tr>
<tr>
<td>Properties of Metals (7.5 Hours)</td>
<td>978-0-13-417959-8</td>
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<tr>
<td>GMAW and FCAW – Equipment and Filler Metals</td>
<td>978-0-13-418019-9</td>
</tr>
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<td>978-0-13-420171-9</td>
</tr>
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## Welding Symbols (5 Hours)
(Module ID 29201-15) Identifies and explains the different types of fillet weld, groove weld, and non-destructive examination symbols. Explains how to read welding symbols on drawings, specifications, and Welding Procedure Specifications (WPS).

## Reading Welding Detail Drawings (10 Hours)
(Section 29201-15) Identifies and explains weld detail drawings. Describes lines, fills, object views, and dimensioning on drawings. Explains how to use notes on drawings and the bill of materials. Explains how to sketch and draw basic welding drawings.

## SMAW – Preheating and Postheating of Metals (10 Hours)
(Section 29204-15) Explains preheating, interpass temperature control, and postheating procedures that sometimes need to be done to preserve weldment strength, ductility, and weld quality. Covers the equipment used for heat treating metals.

## GMAW and FCAW – Equipment and Filler Metals (10 Hours)
(Section 29205-15) Describes general safety procedures for GMAW and FCAW. Includes GMAW and FCAW equipment and how to prepare for and make open-root V-groove welds on carbon steel plate and various positions.

## GMAW – Plate (60 Hours)
(Section 29201-15) Explains how to use GMAW equipment and how to select and use different filler metals and shielding gases. Describes how to make multiple-pass fillet and V-groove welds on carbon steel plate in various positions.

## GMAW – Carbon Steel Pipe (80 Hours)
(Section 29301-16) Explains how to set up GMAW equipment for open-root V-groove welds, and explains how to prepare for and make open-root V-groove welds on carbon steel pipe. Provides procedures for making open-root V-groove welds with SMAW equipment on pipe in the 1G-ROTATED, 2G, 5G, and 6G positions.

## GMAW – Carbon Steel Pipe (80 Hours)
(Section 29304-16) Explains how to set up GTAW equipment for open-root V-groove welds, and explains how to prepare for and make open-root V-groove welds on carbon steel pipe. Provides procedures for making open-root V-groove welds with GTAW equipment on pipe in the 2G, 5G, and 6G positions.

## GTAW – Carbon Steel Pipe (70 Hours)
(Section 29305-16) Explains how to build pads on carbon steel plate using GTAW and carbon steel filler metal. Also explains how to make multiple-pass GTAW fillet welds on carbon steel plate coupons in the 1F, 2F, 3F, and 4F positions, and how to make GTAW V-groove welds in the 1G, 2G, 3G, and 4G positions.

### Continued on following page
Welding Level 3 (continued)

SMAW – Stainless Steel Plate and Pipe 
Groove Welds (100 Elective Hours)
(Module ID 29306-16) Explains stainless steel metallurgy; how to select SMAW electrodes for stainless steel welds; and how to weld different types of stainless steels. Covers safety issues associated with welding on stainless steels; how to prepare weld coupons; and how to set up SMAW equipment for welding stainless steel. Provides procedures for making open-root V-groove welds with SMAW equipment on stainless steel plate in the 1G, 2G, 3G, and 4G positions. Includes procedures for making open-root V-groove welds with SMAW equipment on stainless steel pipe in the 1G-ROTATED, 2G, 5G, and 6G positions.

GMAW – Aluminum Pipe (50 Hours)

GTAW – Aluminum Pipe (50 Hours)
(Module ID 29403-16) Covers the setup of GTAW equipment for welding aluminum pipe. Explains how to clean and prepare aluminum pipe coupons for welding. Addresses GTAW techniques used to make V-groove and modified U-groove welds on aluminum pipe with and without backing. Provides GTAW procedures on how to make V-groove or modified U-groove welds on aluminum pipe in the 2G, 5G, and 6G positions.

Soldering and Brazing (12.5 Hours)
(Module ID 29405-16) Introduces the equipment, techniques, and materials used to safely join copper tubing through both brazing and soldering processes. Covers the required PPE, preparation, and work processes in detail. Also presents procedures for brazing copper to dissimilar materials such as steel.