Sheet Metal

**Introduction to the Sheet Metal Trade** (5 Hours)
(Module ID 04101-08) Summarizes the history and development of the sheet metal trade. Explains the benefits of apprenticeship training, and identifies career opportunities in the trade.

**Tools of the Trade** (5 Hours)
(Module ID 04102-08) Describes the hand and power tools used in the sheet metal trade, including layout tools and cutting, bending, and forming machines. Includes safety and maintenance guidelines.

**Fabrication One – Parallel Line Development** (22.5 Hours)
(Module ID 04105-08) Covers the steps involved in using the parallel line development method to lay out fittings. Includes step-by-step procedures for selected fittings.

**Trade Math One** (20 Hours)
ISBN 978-0-13-604935-0
(Module ID 04104-08) Builds on trainees’ basic math skills to solve trade-related problems. Covers calculations using denuminate numbers, area and volume calculations, English metric system conversions, basic geometry, and calculation of stretchouts.

**Insulation** (7.5 Hours)
(Module ID 04108-08) Describes how to install fiberglass blanket, foam, and pipe insulation using approved adhesives and fastening techniques. Also includes the fabrication and installation of fitting covers and preferred fitting covers.

**Installation of Air Distribution Accessories** (15 Hours)
ISBN 978-0-13-604870-0
(Module ID 04109-08) Teaches how to lay out and fabricate sheet metal components of a roof drainage system, including flashing, gutters, and downspouts.

**Installation of Ductwork** (15 Hours)
(Module ID 04106-08) Addresses ductwork assembly, use of different types of sealants, using lifts, and installation of ductwork. Describes the types of fasteners (screws, nuts, bolts, and rivets), and supports used in an air distribution system. Discusses proper spacing of hangers, load ratings, and installation of hangers and support systems.

**Air Properties and Distribution** (7.5 Hours)
(Module ID 04107-08) Describes how air distribution accessories such as louvers, dampers, and access doors function as part of an air distribution system. Includes installation guidelines and checklists.

**Architectural Sheet Metal** (15 Hours)
ISBN 978-0-13-604870-0
(Module ID 04109-08) Teaches how to lay out and fabricate sheet metal components of a roof drainage system, including flashing, gutters, and downspouts.

**Sheet Metal Duct Fabrication Standards** (7.5 Hours)
(Module ID 04204-08) Explains how to determine the requirements for a duct system, including operating pressures, metal gauges, connectors, reinforcements, tie rods, and seams. Also reviews how to use standards, codes, and ordinances to design a duct system.

**Trade Math Two** (20 Hours)
(Module ID 04201-08) Demonstrates how to apply formulas to solve a variety of mathematical problems. Covers linear, area, volume, and angle measurement and percentage, ratio, and proportion. Provides practical instruction in using protractors, vernier calipers, and micrometers and in solving field measuring problems.

**Plans and Specifications** (20 Hours)
(Module ID 04202-08) Reviews how to read and interpret section, elevation, and detail drawings. Also covers other specifications and other sources of project information. Includes 17 construction drawings.

**Fabrication Two – Radial Line Development** (35 Hours)
(Module ID 04203-08) Introduces radial line development principles used to determine layouts for sheet metal fittings. Includes practice layout and fabrication tasks that allow trainees to develop and demonstrate their skills.

To Order Call: 1-800-922-0579

Stay Connected

www.nccer.org/instructors

©NCCER
### Soldering (15 Hours)
(Module ID 04207-08) Identifies soldering tools, materials, and techniques. Also provides a wide range of soldering tasks for practice.

### Basic Piping Practices (7.5 Hours)
ISBN 978-0-13-609939-0
(Module ID 04208-08) Reviews the methods for measuring, cutting, and joining selected types of pipe using fittings, hangers, and supports. Also reviews pipe materials and applications.

### Fiberglass Duct (20 Hours)
(Module ID 04209-08) Describes fiberglass duct layout and fabrication methods. Also discusses closure, hanging, and support methods. Explains how to repair major and minor damage to fiberglass duct.

---

#### L3 SHEET METAL LEVEL 3

**Curriculum Notes**
- 157.5 Hours
- Revised: 2009, Third Edition
- NATE-Recognized Training Provider
- Downloadable instructor resources that include module tests, PowerPoint®, and performance profile sheets are available at www.nccer.org/irc.

<table>
<thead>
<tr>
<th>PAPERBACK</th>
<th>ISBN</th>
<th>Trainee Guide:</th>
<th>Individual Modules:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>978-0-13-609962-8</td>
<td>$97</td>
<td>$20</td>
</tr>
</tbody>
</table>

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

#### Trade Math Three – Field Measuring and Fitting (15 Hours)
ISBN 978-0-13-610514-4
(Module ID 04301-09) Describes the techniques used for field measuring and layout of ductruns and fittings. Also provides practice in solving field measuring problems.

#### Air Systems (10 Hours)
(Module ID 04302-09) Reviews the operating principles, components, and applications of common air systems. Discusses constant volume systems, variable volume systems, variable temperature (VVT) systems, variable air volume (VAV) systems, and dual VAV systems.

#### Principles of Airflow (22.5 Hours)
(Module ID 04303-09) Explains the basic principles of airflow and reviews how airflow is affected by duct size, shape, and fittings. Also reviews the components of an air distribution system.

#### Louvers, Dampers, and Access Doors (20 Hours)
(Module ID 04304-09) Discusses the different types of louver, damper, and access doors used in air distribution systems and reviews the standards that apply to them.

---

#### L4 SHEET METAL LEVEL 4

**Curriculum Notes**
- 150 Hours
- Revised: 2009, Third Edition
- NATE-Recognized Training Provider
- Downloadable instructor resources that include module tests, PowerPoint®, and performance profile sheets are available at www.nccer.org/irc.

<table>
<thead>
<tr>
<th>PAPERBACK</th>
<th>ISBN</th>
<th>Trainee Guide:</th>
<th>Individual Modules:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>978-0-13-609964-2</td>
<td>$97</td>
<td>$20</td>
</tr>
</tbody>
</table>

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

#### Shop Production and Organization (15 Hours)
(Module ID 04401-09) Introduces the production, organization, planning, and control functions that occur in a sheet metal shop. Emphasizes optimization of processes and accurate estimating for competitive bidding. Discusses project planning techniques, principles of efficient shop layout and materials flow, the critical path method, and the roles and responsibilities of shop personnel.

#### Air Testing and Balancing (25 Hours)
(Module ID 04402-09) Explains how to balance an air distribution system so that the right amount of air is correctly distributed at the proper velocities and returned to the heating and cooling units. Reviews the tools and techniques used for adjusting fans, volume dampers, registers, and grilles. Provides proper techniques for duct leakage testing.

#### Introduction to Welding, Brazing and Cutting (25 Hours)
(Module ID 04403-09) Provides a review of parallel line, triangular, and variable temperature (VVT) systems, variable air volume (VAV) systems, dual VAV systems, and ductwork systems. Also reviews pipe materials and applications.

#### Fume and Exhaust System Design (25 Hours)
(Module ID 04404-09) Reviews the codes and specifications pertaining to fume and exhaust system design for safe workspaces. Provides instruction in selecting the appropriate materials for fume or exhaust system components and to identify the different types of hoods and applications for each.

#### Fabrication Four – Comprehensive Review (40 Hours)
(Module ID 04405-09) Provides a review of parallel line, radial line, and triangulation development methods for laying out sheet metal patterns. Trainees practice laying out and fabricating selected sheet metal fittings using these methods.

#### Introductory Supervisory Skills (20 Hours)
(Module ID 04406-09) Teaches skills required to supervise personnel, including leadership, team building, communication and motivation. Discusses gender and cultural issues. Emphasizes principles of project planning and management, including problem solving and decision making. Presents case studies for student participation.