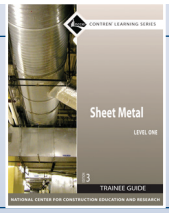
L1 SHEET METAL



LEVEL 1

Curriculum Notes

- 175 Hours (Includes 72.5 hours of *Core Curriculum*, which is a prerequisite for Level 1 completion and must be purchased separately. See p. 11 for ordering information.)
- Revised: 2008, Third Edition
- NATE-Recognized Training Provider
- Instructor's Guide includes access code to download TestGen software, module exams, PowerPoints®, and performance profile sheets from www.nccerirc.com.

PAPERBACK	ISBN
Trainee Guide: $67	978-0-13-604482-6
Instructor's Guide: $67	978-0-13-604483-3

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 the Sheet Metal Trade *(5 Hours)*
Trainee $20 ISBN 978-0-13-604832-9
Instructor $20 ISBN 978-0-13-604878-7
(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)*
Trainee $20 ISBN 978-0-13-604833-6
Instructor $20 ISBN 978-0-13-604879-4
(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.

Introduction to Sheet Metal Layout and Processes *(7.5 Hours)*
Trainee $20 ISBN 978-0-13-604834-3
Instructor $20 ISBN 978-0-13-604880-0
(Module ID 04103-08) Introduces parallel line development, radial line development, and triangulation. Covers the selection and use of layout, hand, and machine tools. Discusses how to transfer patterns, and how to cut, form, and assemble parts.

Trade Math One *(20 Hours)*
Trainee $20 ISBN 978-0-13-604835-0
Instructor $20 ISBN 978-0-13-604881-7
(Module ID 04104-08) Builds on trainees' basic math skills to solve trade-related problems. Covers calculations using denominate numbers, area and volume calculations, English-metric system conversions, basic geometry, and calculation of stretchouts.

Fabrication One – Parallel Line Development *(22.5 Hours)*
Trainee $20 ISBN 978-0-13-604837-4
Instructor $20 ISBN 978-0-13-604882-4
(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.

NATE CERTIFICATION

NCCER is an officially recognized training provider for North American Technician Excellence (NATE), an independent, third-party certification body for HVAC/R technicians. NATE-certified technicians can use module completions through NCCER-accredited training providers for the continuing education hours required for recertification through NATE. For details and lists of available NATE-recognized training, visit www.natex.org. For more information regarding NATE recertification, please contact NCCER Customer Service at 1-888-622-3720.

Installation of Ductwork *(15 Hours)*
Trainee $20 ISBN 978-0-13-604838-1
Instructor $20 ISBN 978-0-13-604883-1
(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.

Installation of Air Distribution Accessories *(5 Hours)*
Trainee $20 ISBN 978-0-13-604874-9
Instructor $20 ISBN 978-0-13-604884-8
(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.

Insulation *(7.5 Hours)*
Trainee $20 ISBN 978-0-13-604875-6
Instructor $20 ISBN 978-0-13-604886-2
(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 preformed fitting covers.

Architectural Sheet Metal *(15 Hours)*
Trainee $20 ISBN 978-0-13-604877-0
Instructor $20 ISBN 978-0-13-604887-9
(Module ID 04109-08) Teaches how to lay out and fabricate sheet metal components of a roof drainage system, including flashing, gutters, and downspouts.

L2 SHEET METAL

LEVEL 2

Curriculum Notes

- 165 Hours
- Revised: 2008, Third Edition
- NATE-Recognized Training Provider
- Instructor's Guide includes access code to download TestGen software, module exams, PowerPoints®, and performance profile sheets from www.nccerirc.com.

PAPERBACK	ISBN
Trainee Guide: $97	978-0-13-604484-0
Instructor's Guide: $97	978-0-13-604485-7

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.

Trade Math Two *(20 Hours)*
Trainee $20 ISBN 978-0-13-609931-4
Instructor $20 ISBN 978-0-13-609906-2
(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)*
Trainee $20 ISBN 978-0-13-609932-1
Instructor $20 ISBN 978-0-13-609907-9
(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 *(55 Hours)*
Trainee $20 ISBN 978-0-13-609933-8
Instructor $20 ISBN 978-0-13-609908-6
(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.

Sheet Metal Duct Fabrication Standards *(7.5 Hours)*
Trainee $20 ISBN 978-0-13-609935-2
Instructor $20 ISBN 978-0-13-609909-3
(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.

Air Properties and Distribution *(15 Hours)*
Trainee $20 ISBN 978-0-13-609936-9
Instructor $20 ISBN 978-0-13-609910-9
(Module ID 04205-08) Explains the properties of air and how these properties relate to one another. Teaches how to use the gas laws, psychrometric charts, and measuring instruments to evaluate air properties in an air distribution system.

Bend Allowances *(5 Hours)*
Trainee $20 ISBN 978-0-13-609937-6
Instructor $20 ISBN 978-0-13-609911-6
(Module ID 04206-08) Provides instruction and practice in determining proper bend allowances in sheet metal. Also reviews the interplay of different factors that affect the amount of bend allowance needed and the methods for calculating allowance.

Soldering *(15 Hours)*
Trainee $20 ISBN 978-0-13-609938-3
Instructor $20 ISBN 978-0-13-609912-3
(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)*

Trainee $20 ISBN 978-0-13-609939-0
Instructor $20 ISBN 978-0-13-609913-0

(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)*

Trainee $20 ISBN 978-0-13-609905-5
Instructor $20 ISBN 978-0-13-609949-9

(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
- Instructor's Guide includes access code to download TestGen software, module exams, PowerPoints®, and performance profile sheets from www.nccerirc.com.

PAPERBACK	ISBN
Trainee Guide: $97	978-0-13-609962-8
Instructor's Guide: $97	978-0-13-609963-5

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.

Trade Math Three – Field Measuring and Fitting *(15 Hours)*

Trainee $20 ISBN 978-0-13-610511-4
Instructor $20 ISBN 978-0-13-610518-3

(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)*

Trainee $20 ISBN 978-0-13-610512-1
Instructor $20 ISBN 978-0-13-610520-6

(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)*

Trainee $20 ISBN 978-0-13-610513-8
Instructor $20 ISBN 978-0-13-610521-3

(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)*

Trainee $20 ISBN 978-0-13-610514-5
Instructor $20 ISBN 978-0-13-610522-0

(Module ID 04304-09) Discusses the different types of louvers, dampers, and access doors used in air distribution systems and reviews the standards that apply to them.

Comprehensive Plan and Specification Reading *(30 Hours)*

Trainee $20 ISBN 978-0-13-610515-2
Instructor $20 ISBN 978-0-13-610523-7

(Module ID 04305-09) Provides a case-study approach to learning how to use building plans and specifications to lay out, fabricate, and install HVAC systems. Allows trainees to proceed through the module as if they were working on an actual building project. Includes construction drawings.

Fabrication Three – Triangulation *(47.5 Hours)*

Trainee $20 ISBN 978-0-13-610516-9
Instructor $20 ISBN 978-0-13-610524-4

(Module ID 04306-09) Describes the principles of triangulation and how it can be used to measure ductrun fittings. Provides a variety of tasks to practice developing, laying out, and fabricating selected ductrun fittings.

Advanced Architectural Sheet Metal *(12.5 Hours)*

Trainee $20 ISBN 978-0-13-610517-6
Instructor $20 ISBN 978-0-13-610525-1

(Module ID 04307-09) Provides trainees with the opportunity to practice layout, fabrication, and installation of various architectural pieces.

L4 SHEET METAL

LEVEL 4

Curriculum Notes

- 150 Hours
- Revised: 2009, Third Edition
- NATE-Recognized Training Provider
- Instructor's Guide includes access code to download TestGen software, module exams, PowerPoints®, and performance profile sheets from www.nccerirc.com.

PAPERBACK	ISBN
Trainee Guide: $97	978-0-13-609964-2
Instructor's Guide: $97	978-0-13-609965-9

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.

Shop Production and Organization *(15 Hours)*

Trainee $20 ISBN 978-0-13-214227-4
Instructor $20 ISBN 978-0-13-214233-5

(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 relationships of shop personnel.

Air Testing and Balancing *(25 Hours)*

Trainee $20 ISBN 978-0-13-214228-1
Instructor $20 ISBN 978-0-13-214234-2

(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)*

Trainee $20 ISBN 978-0-13-214229-8
Instructor $20 ISBN 978-0-13-214235-9

(Module ID 04403-09) Introduces the techniques and proper operation of equipment used for welding, brazing, and cutting. Emphasizes safety and awareness of hazards involved. Trainees practice welds in a variety of positions and perform a basic braze.

Fume and Exhaust System Design *(25 Hours)*

Trainee $20 ISBN 978-0-13-214230-4
Instructor $20 ISBN 978-0-13-214236-6

(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)*

Trainee $20 ISBN 978-0-13-214231-1
Instructor $20 ISBN 978-0-13-214237-3

(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)*

Trainee $20 ISBN 978-0-13-214232-8
Instructor $20 ISBN 978-0-13-214238-0

(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.