

Connecticut Technical High School System
Connecticut State Department of Education

HEATING and COOLING
and
SHEET METAL(SM-2)
APPRENTICESHIP
INFORMATION PACKET

2013-14

Covering the following licenses:

S-2 HEATING and COOLING
S-4 HEATING MECHANIC
S-6 LIMITED HEATING MECHANIC
S-8 LIMITED HEATING MECHANIC
S-10 LIMITED HEATING and COOLING
B-2/B-4 OIL BURNER SERVICER/INSTALLER
D-2 WARM AIR HEATING and COOLING
D-4 REFRIGERATION MECHANIC
SM-2 SHEET METAL

The following section, Apprentice Responsibilities, is taken from the **Apprentice Handbook & Progress Report**, which is given to each apprentice at the beginning of their training by the Office of Apprenticeship Training, Connecticut State Labor Department.

Apprentice Responsibilities:

- 1. Work safely.**
- 2. Avoid absenteeism and tardiness at work and at school.**
- 3. Attend and participate in related instruction and maintain the highest possible grades.**
- 4. Be involved and show dedication to your training (both on the job and in the classroom).**
- 5. Keep track of your training hours, (either in the form of work records or logbook) and advise your supervisor of any deficiencies in your apprenticeship training.**
- 6. Show dedication and interest in learning the trade.**
- 7. Show respect to the skilled journeypersons training and supervising you.**
- 8. Comply with the provisions of the Apprentice Agreement.**
- 9. Follow your sponsor's written work rules and policies.**
- 10. You must be accompanied by a journeyperson while on the job site.**

Concerning related classroom instruction, each apprentice student is expected:

- To purchase the textbooks required for each course
- To complete all instructor assigned quizzes and exams as well as any academic reinforcement activities.

NOTE: A minimum grade of 75% is necessary to pass each course.

Regional Apprenticeship Representatives
Regional Apprenticeship Representatives

Office of Apprenticeship Training

Department of Labor

860-263-6085

Region 1: Paul Femia, paul.femia@ct.gov (860) 263-6128

Towns Served:

Andover	Griswold	New London	Sterling
Ashford	Groton	North Stonington	Stonington
Bozrah	Hampton	Norwich	Thompson
Brooklyn	Hebron	Old Lyme	Tolland
Canterbury	Killingly	Plainfield	Union
Chaplin	Lebanon	Pomfret	Voluntown
Columbia	Ledyard	Preston	Waterford
Coventry	Lisbon	Putnam	Willington
East Lyme	Lyme	Scotland	Windham
Eastford	Mansfield	Sprague	Woodstock
Franklin	Montville	Stafford	

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Region 2: Larry Satchell, larry.satchell@ct.gov (860) 263-6084

Towns Served:

Bloomfield	Glastonbury	South Windsor
Bolton	Granby	Suffield
East Granby	Hartford	Vernon
East Hartford	Manchester	Wethersfield
East Windsor	Newington	Windsor
Ellington	Rocky Hill	Windsor Locks
Enfield	Somers	

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Region 3: Owen Golding, owen.golding@ct.gov (860) 263-6083

Towns Served:

Avon	Goshen	Oxford	West Hartford
Barkhamsted	Hartland	Plymouth	Winchester
Bethel	Harwinton	Roxbury	Woodbury
Bethlehem	Kent	Salisbury	
Bridgewater	Litchfield	Sharon	
Brookfield	Middlebury	Sherman	
Burlington	Morris	Simsbury	
Canaan	New Fairfield	Southbury	
Canton	New Hartford	Thomaston	
Colebrook	New Milford	Torrington	
Cornwall	Newtown	Warren	
Danbury	Norfolk	Washington	
Farmington	North Canaan	Watertown	

Regional Apprenticeship Representatives

Region 4: Gina Knox, gina.knox@ct.gov

(860) 263-6277

Towns Served:

Ansonia	Greenwich	Ridgefield	Westport
Bridgeport	Milford	Shelton	Wilton
Darien	Monroe	Stamford	
Derby	New Canaan	Stratford	
Easton	Norwalk	Trumbull	
Fairfield	Redding	Weston	

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Region 5: Tammie Whiting, tammie.whiting@ct.gov

(860)263-6154

Towns Served

Bethany	East Haddam	Killingworth	North Haven	Westbrook
Branford	East Hampton	Madison	Old Saybrook	Woodbridge
Chester	East Haven	Marlborough	Orange	
Clinton	Essex	Middlefield	Portland	
Colchester	Guilford	Middletown	Salem	
Deep River	Haddam	New Haven	Seymour	
Durham	Hamden	North Branford	West Haven	

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Region 6: Keri Lamontagne, keri.lamontagne@ct.gov

(860) 263-6129

Towns Served:

Beacon Falls	Meriden	Southington
Berlin	Naugatuck	Wallingford
Bristol	New Britain	Waterbury
Cheshire	Plainville	Wolcott
Cromwell	Prospect	

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Department of Consumer Protection

Section 20-330 of the Connecticut General Statutes

"Heating, piping and cooling work" means (A) the installation, repair, replacement, maintenance or alteration of any apparatus for piping, appliances, devices or accessories for heating systems, including sheet metal work, and (B) the installation, repair, replacement, maintenance or alteration of air conditioning and refrigeration systems, boilers, including apparatus and piping for the generation or conveyance of steam and associated pumping equipment and process piping. Heating, piping and cooling work does not include solar work or medical gas and vacuum systems work. For the purposes of this subdivision, "process piping" means piping or tubing that conveys liquid or gas that is used directly in the production of a product for human consumption;

"Sheet metal work" means the installation, erection, replacement, repair or alteration of duct work systems, both ferrous and nonferrous

S-1 Unlimited Contractor

The holder of this license may do all heating, piping and cooling work as defined in Section 20-330 of the General Statutes.

S-2 Unlimited Journeyman

The holder of this license may do the same work as the S-1 licensee, but only while in the employ of a contractor licensed for such work.

S-3 Limited Contractor

The holder of this license may perform the installation, repair, replacement, maintenance or alteration of any apparatus for piping, appliances, devices or accessories for heating systems, boilers, including apparatus and piping for the generation or conveyance of steam associated pumping equipment and oil burner installation and servicing (excluding sheet metal work, air conditioning and refrigeration systems). This license also covers the installation of hot, chilled and condensed water as well as steam piping in air conditioning systems.

S-4 Limited Journeyman

The holder of this license may perform the same work as the S-3 licensee, but only while in the employ of a contractor licensed for such work

S-5 Limited Contractor

The holder of this license may perform only work limited to hot water or steam heating systems for buildings not over three stories high with total heating load not exceeding 500,000 BTU's and steam pressure not exceeding 15 pounds, but does not cover the installation or servicing of oil burners of any size.

S-6 Limited Journeyman

The holder of this license may perform the same work as the S-5 licensee, but only while in the employ of a contractor licensed for such work.

S-7 Limited Contractor

The holder of this license may perform only work limited to hot water or steam heating systems for buildings not over three stories high with a total heating load not exceeding 500,000 BTU's and steam pressure not exceeding 15 pounds. This license also covers the servicing and installation of oil burners handling up to five gallons per hour, as well as gas piping for the work covered by this license.

S-8 Limited Journeyman

The holder of this license may perform the same work as the S-7 licensee, but only while in the employ of a contractor licensed for such work.

S-9 Limited Contractor

The holder of this license may perform only work limited to hot water or steam heating systems for buildings not over three stories high with total heating load not exceeding 500,000 BTU's, steam pressure not exceeding fifteen pounds, and/or cooling installations up to 35 tons per systems. This license also covers the installation or servicing of oil burners handling up to five gallons per hour as well as LP gas supplied by gas containers and/or natural gas piping for work covered by this limited license.

S-10 Limited Journeyman

The holder of this license may perform work only while in the employ of a licensed contractor and only limited to hot water or steam heating systems for buildings not over three stories high with total heating load not exceeding 500,000 BTU's, steam pressure not exceeding fifteen pounds, and/or cooling installations up to 35 tons per systems. This license also covers the installation or servicing of oil burners handling up to five gallons per hour as well as LP gas supplied by gas containers and/or natural gas piping for work covered by this limited license.

B-1 Limited Contractor

The holder of this license may perform only work of installing, servicing or repairing gas or oil burners for domestic and light commercial installations. A domestic or light commercial burner shall be considered as one consuming five gallons or less per hour.

B-2 Limited Journeyman

The holder of this license may perform the same work as the B-1 licensee, but only while in the employ of a contractor licensed for such work.

B-3 Limited Contractor

The holder of this license may perform the installing, servicing or repairing of any gas or oil fire burners.

B-4 Limited Journeyman

The holder of this license may perform the same work as the B-3 licensee, but only while in the employ of a contractor licensed for such work.

D-1 Limited Contractor

The holder of this license may perform only work limited to installation, replacement, repair, maintenance or alteration of any warm air, air conditioning and refrigeration system, including necessary piping for the conveyance of heating or cooling media and associated pumping equipment. This license does not include the installation or servicing of oil burners of any size.

D-2 Limited Journeyman

The holder of this license may perform the same work as the D-1 licensee, but only while in the employ of a contractor licensed for such work.

D-3 Limited Contractor

The holder of this license may perform only work limited to the installation, repair, replacement, maintenance or alteration of all refrigeration systems included in food storage, air conditioning or special process systems.

D-4 Limited Journeyman

The holder of this license may perform the same work as the D-3 licensee, but only while in the employ of a contractor licensed for such work.

SM-1 Limited Sheet Metal Contractor

The holder of this license may perform only work limited to the installation, erection, replacement, repair or alteration of any duct work system, both ferrous and nonferrous for ductwork systems of any size and type, excluding pneumatic conveyance systems which are covered under sections 20-3325(a), (b), (c), and (d) of these regulations.

SM-2 Limited Sheet Metal Journeyman

The holder of this license may perform only work limited to the installation, erection, replacement, repair or alteration of any duct work system, both ferrous and nonferrous for ductwork systems of any size and type, excluding pneumatic conveyance systems which are covered under sections 20-3325(a), (b), (c), and (d) of these regulations. The holder of this license may perform such work only while in the employ of a contractor license for such work.

S-2 HEATING and COOLING APPRENTICESHIP
COURSE SEQUENCE AND PREREQUISITES

Related Instruction- 720 Hours

OJT - 8000 Hours

The following courses are 36 hours each.	Course number	Semester	Prerequisites
FIRST YEAR COURSES:			
Basic Math Computations	A0001	1	
Blueprint Reading	A0031	1	
OSHA 30	A0099	1	
Oil Burner Fundamentals	A0783	2	
Refrigeration Fundamentals	A0781	2	
SECOND YEAR COURSES:			
Heating Fundamentals	A0784	1	
HVAC Math	A0006	1	A0001
Electrical Fundamentals	A0782	1	
HVAC Sheet Metal Theory I	A2901	2	
Brazing, Cutting and Metallurgy	A2113	2	
THIRD YEAR COURSES:			
Heating- Hydronic and Steam	A0789	1	A0784
Refrigeration, Domestic Commercial and Special Systems	A0721	1	A0781
Air Conditioning	A0785	1	
Oil Burner Controls & Servicing	A0791	2	
SMACNA	A2906	2	
FOURTH YEAR COURSES:			
EPA Refrigerant Standards	A0787	1	
HVAC Sheet Metal Theory II*	A2902	1	A2901
Forced Air Heating and Cooling	A0790	1	A0784
International Mechanical Code	A0729	2	
Related Codes and Standards	A0730	2	

*** May substitute Welding II A2102**

S-4 HEATING MECHANIC APPRENTICESHIP
S-6 LIMITED HEATING MECHANIC APPRENTICESHIP
S-8 LIMITED HEATING MECHANIC APPRENTICESHIP
COURSE SEQUENCE AND PREREQUISITES

Related Instruction- 576Hours

OJT - 8000 Hours

The following courses are 36 hours each.	Course number	Semester	Prerequisites
FIRST YEAR COURSES:			
Basic Math Computations	A0001	1	
Blueprint Reading	A0031	1	
OSHA 30	A0099	2	
HVAC Math	A0006	2	A0001
SECOND YEAR COURSES:			
Heating Fundamentals	A0784	1	
Electrical Fundamentals	A0782	1	
Oil Burner Fundamentals	A0783	2	
Brazing, Cutting and Metallurgy	A2113	2	
THIRD YEAR COURSES:			
Heating- Hydronic and Steam	A0789	1	A0784
Welding II	A2102	1	A2113
Oil Burner Controls and Servicing	A0791	2	A0783
SMACNA	A2906	2	
FOURTH YEAR COURSES:			
HVAC Sheet Metal Theory I	A2901	1	
Related Codes and Standards	A0730	1	
HVAC Sheet Metal Theory II	A2902	2	A2901
International Mechanical Code	A0729	2	

S-10 LIMITED HEATING and COOLING APPRENTICESHIP
COURSE SEQUENCE AND PREREQUISITES

Related Instruction- 576 Hours

OJT - 6000 Hours

The following courses are 36 hours each.	Course number	Semester	Prerequisites
FIRST YEAR COURSES:			
Basic Math Computations	A0001	1	
Blueprint Reading	A0031	1	
OSHA 30	A0099	1	
HVAC Math	A0006	2	
Oil Burner Fundamentals	A0783	2	
Refrigeration Fundamentals	A0781	2	
SECOND YEAR COURSES:			
Heating Fundamentals	A0784	1	
Electrical Fundamentals	A0782	1	
Oil Burner Controls and Servicing	A0791	1	A0783
Air Conditioning	A0785	2	
Heating- Hydronic and Steam	A0789	2	A0784
THIRD YEAR COURSES:			
Brazing, Cutting and Metallurgy	A2113	1	
Refrigeration, Domestic Commercial and Special Systems	A0721	1	A0781
Forced Air Heating and Cooling	A0790	1	A0784
International Mechanical Code	A0729	2	
Related Codes and Standards	A0730	2	

B-2 OIL BURNER SERVICER/INSTALLER APPRENTICESHIP
(Residential/Light commercial)
COURSE SEQUENCE AND PREREQUISITES

Related Instruction- 252 Hours

OJT - 2000 Hours

The following courses are 36 hours each.	Course number	Semester	Prerequisites
FIRST YEAR COURSES:			
Basic Math Computations	A0001	1	
OSHA 30	A0099	1	
Oil Burner Fundamentals	A0783	2	
Electrical Fundamentals	A0782	2	
SECOND YEAR COURSES:			
Heating Fundamentals	A0784	1	
Related Codes and Standards	A0730	2	
Oil Burner Controls and Servicing	A0791	2	A0783

B-4 OIL BURNER SERVICER/INSTALLER APPRENTICESHIP(unlimited)
COURSE SEQUENCE AND PREREQUISITES

Related Instruction- 324 Hours

OJT - 4000 Hours

The following courses are 36 hours each.	Course number	Semester	Prerequisites
FIRST YEAR COURSES:			
Basic Math Computations	A0001	1	
Blueprint Reading	A0031	1	
OSHA 30	A0099	1	
Oil Burner Fundamentals	A0783	2	
Electrical Fundamentals	A0782	2	
SECOND YEAR COURSES:			
Heating Fundamentals	A0784	1	
Related Codes and Standards	A0730	2	
International Mechanical Code	A0729	2	
Oil Burner Controls and Servicing	A0791	2	A0783

D-2 WARM AIR HEATING and COOLING APPRENTICESHIP
COURSE SEQUENCE AND PREREQUISITES

Related Instruction- 432Hours

OJT - 4000 Hours

The following courses are 36 hours each.	Course number	Semester	Prerequisites
FIRST YEAR COURSES:			
Basic Math Computations	A0001	1	
Blueprint Reading	A0031	1	
OSHA 30	A0099	1	
HVAC Math	A0006	2	A0001
Electrical Fundamentals	A0782	2	
Refrigeration Fundamentals	A0781	2	
SECOND YEAR COURSES:			
HVAC Sheet Metal Theory I	A2901	1	
Air Conditioning	A0785	1	
Heating Fundamentals	A0784	1	
Forced Air Heating and Cooling	A0790	2	A0784 A2901
International Mechanical Code	A0729	2	
Related Codes and Standards	A0730	2	

D-4 REFRIGERATION MECHANIC APPRENTICESHIP
COURSE SEQUENCE AND PREREQUISITES

Related Instruction-360Hours

OJT - 4000 Hours

The following courses are 36 hours each.	Course number	Semester	Prerequisites
FIRST YEAR COURSES:			
Basic Math Computations	A0001	1	
Blueprint Reading	A0031	1	
OSHA 30	A0099	1	
Refrigeration Fundamentals	A0781	2	
Electrical Fundamentals	A0782	2	
SECOND YEAR COURSES:			
Brazing, Cutting and Metallurgy	A2113	1	
EPA Refrigerant Standards	A0787	1	
Refrigeration, Domestic, Commercial and Special Systems	A0721	2	A0781
International Mechanical Code	A0729	2	
Welding II	A2102	2	A2113

SM-2 SHEET METAL APPRENTICESHIP
COURSE SEQUENCE AND PREREQUISITES

Related Instruction- 540 Hours

OJT - 8000 Hours

The following courses are 36 hours each	Course number	Semester	Prerequisites
FIRST YEAR COURSES:			
Basic Math Computations	A0001	1	
OSHA 30	A0099	1	
HVAC Math	A0006	2	A0001
Brazing, Cutting and Metallurgy	A2113	2	
SECOND YEAR COURSES:			
Blueprint Reading	A0031	1	
HVAC Sheet Metal Theory I	A2901	1	
Welding I	A2101	2	A2113
HVAC Sheet Metal Theory II	A2902	2	A2901
THIRD YEAR COURSES:			
HVAC Sheet Metal Layout I	A2904	1	
Welding II	A2102	1	A2113
SMACNA	A2906	2	
HVAC Sheet Metal Layout II	A2905	2	A2904
FOURTH YEAR COURSES:			
Forced Air Heating & Cooling	A0790	1	A2901
International Mechanical Code	A0729	1	
Related Codes and Standards	A0730	2	

HEATING & COOLING

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Course: Basic Math Computations **A0001** **36 Hours**

- A. Computations Using Real Numbers**
- B. Computations Using Fractions**
- C. Computations Using Decimal Fractions**
- D. Base, Rate, and Portion**
- E. Computation of Area and Volume**
- F. Units of Measurements**

Course: Blueprint Reading **A0031** **36 Hours**

- A: Application of Building Codes and Standards**
- B: Introduction to Blueprint Reading**
- C: Alphabet of Lines and Symbols**
- D: Orthographic Projection Drawings**
- E: Construction Dimensions and Construction Materials**
- F: Reading Plot Plans and Contour Maps**
- G: Footings, Foundations and Floor Blueprint,
Structural Steel, Framing Blueprints**
- H: Plumbing System Blueprints**
- I: H.V.A.C. System Blueprints**
- J: Electrical Systems Blueprints**

Course: OSHA-30 **A0099** **36 Hours**

- A. Introduction to OSHA – 2 hours**
- B. Managing Safety and Health – 2 hours**
- C. OSHA Focus Four Hazards – 6 hours**
 - a. (1) Falls (minimum one hour and 15 minutes)**
 - b. (2) Electrocution**
 - c. (3) Struck-By (e.g., falling objects, trucks, cranes)**
 - d. (4) Caught-In or Between (e.g., trench hazards, equipment)**
- D. Personal Protective and Lifesaving Equipment – 2 hours**
- E. Health Hazards in Construction – 2 hours**
- F. Stairways and Ladders – 1 hour.**
- G. Electives - 12 hours**
 - a. Concrete and Masonry Construction**
 - b. Confined Space Entry**
 - c. Cranes, Derricks, Hoists, Elevators, & Conveyors**
 - d. Ergonomics**
 - e. Excavations**
 - f. Fire Protection and Prevention**
 - g. Materials Handling, Storage, Use and Disposal**
 - h. Motor Vehicles, Mechanized Equipment and Marine Operations; Rollover Protective Structures and Overhead Protection; and Signs, Signals and Barricades**
 - i. Powered Industrial Vehicles**
 - j. Safety and Health Programs**
 - k. Scaffolds**
 - l. Steel Erection**
 - m. Tools - Hand and Power**
 - n. Welding and Cutting**

Course: Oil Burner Fundamentals **A0783** **36 Hours**

- A. Combustion Process
- B. Oil Burners
- C. Air Delivery System
- D. Oil Tank Installation
- E. Pumps and Nozzles
- F. Ignition System
- G. Electrical Equipment

Course: Refrigeration Fundamentals **A0781** **36 Hours**

- A. Fundamentals of Refrigeration
- B. Refrigeration Tools and Materials
- C. Basic Refrigeration Systems
- D. Compressions Systems and Compressors
- E. Refrigeration Controls

Course: Heating Fundamentals **A0784** **36 Hours**

- A. Gas Heating Systems
- B. Hydronic Radiant Heating Systems
- C. Oil Heating Systems
- D. Electric Heating Systems
- E. Alternate Heating Methods
- F. Humidification
- G. Solar Energy

Course: HVAC Math **A0006** **36 Hours**

- A. Direct Measure
- B. Computed Measure-Area
- C. Computed Measure-Volume
- D. Formulas
- E. Duct Calculations
- F. Trigonometry
- G. Graphs

Course: Electrical Fundamentals **A0782** **36 Hours**

- A. Electrical-Magnetic Fundamentals
- B. Electric Motors
- C. Electric Circuits and Controls

Course: HVAC Sheet Metal Theory I **A2901** **36 Hours**

- A. Air Distribution
- B. Air Measurement and Cleaning

Course: Brazing, Cutting and Metallurgy **A2113** **36 Hours**

- A. Brazing, Braze Welding & Soldering
- B. Cutting Operations
- C. Pipe Welding
- D. Welding Metallurgy
- E. Metal Identification
- F. Weldability of Carbon & Alloy Steels
- G. Weldability of Tool Steels and Cast Iron
- H. Weldability of Stainless Steel
- I. Weldability of Nonferrous Metals
- J. Distortion Control
- K. Materials & Fabrication Standards & Codes

Course: Heating-Hydronic and Steam A0789 36 Hours

- A. Steam Heating Systems
- B. Hot Water Heating Systems
- C. Domestic Hot Water

Course: Refrigeration: Commercial, Domestic and Special Systems A0721 36 Hours

- A. Domestic Refrigerators and Freezers
- B. Servicing & Installing Small Hermetic Systems
- C. Commercial Systems
- D. Commercial Systems- Applications
- E. Servicing and Installing Commercial Systems
- F. Commercial Systems- Heating Loads and Piping
- G. Absorption Systems
- H. Special Refrigeration Systems and Applications

Course: Air Conditioning A0785 36 Hours

- A. Fundamentals of Air Conditioning
- B. Cooling and Dehumidification Systems
- C. Central Air Conditioning and Heat Pumps

Course: Oil Burner Controls and Servicing A0791 36 Hours

- A. Oil Burner Controls
- B. Control Circuit Wiring
- C. Service Procedures-Burner Not Operating (BNO)
- D. Service Procedures-Improper Operation
- E. Annual Tune-up
- F. Combustion Efficiency Testing
- G. Improving Combustion Efficiency

Course: SMACNA A2906 36 Hours

- Basic Duct Construction standards, including symbols, duct design and performance requirements
- Pressure classes including water gage, sealant classes, transverse joints and longitudinal seams
- Fitting construction including elbows, vane requirements & supports, offsets & transitions, and branch connections
- Flexible duct including grill and register connections, canvas connectors, and flexible duct supports
- Round and Oval duct including construction standards, pressure gages for round duct and tee's and laterals
- Hangers and support systems including hanger selection, minimum requirements, trapeze loads, riser supports and unit supports
- Functional Standards including stability, leakage, vibration and noise generation and transmission
- Fibrous glass duct construction including requirements & restrictions, fitting and pipe construction, reinforcement, hangers and supports, accessory connections and health and safety
- Fire and Smoke Dampers including terminology and applications, codes and regulations, fire damper installation, breakaway connections, fibrous glass duct installation, fire damper styles and access doors
- Radiation dampers including ceiling assemblies, heat stop and installation

Course: EPA Refrigerant Standards A0787 36 Hours

- A. Refrigerants
- B. Refrigerant Recovery/Recycling/Reclaiming
- C. EPA Certification Exams

Course: HVAC Sheet Metal Theory II A2902 36 Hours

- A. Sheet Metal Tools and Machinery
- B. Safety in a Sheet Metal Shop
- C. Types of Sheet Metal
- D. Sheet Metal Materials
- E. Fasteners
- F. Patterns and Cutting Metal
- G. Punching, Drilling and Riveting

Course: Forced Air Heating and Cooling A0790 36 Hours

- A. Basic heating and Air Conditioning Systems
- B. Air Conditioning & Heating Control Systems
- C. Air Conditioning Systems- Heating & Cooling Loads

Course: International Mechanical Code A0729 36 Hours

- A. Administration of the International Mechanical Code

Course: Related Codes and Standards A0730 36 Hours

- A. International Residential Code
- B. National Fire Protection Association Standards

Course: Welding II A2102 36 Hour

- A. Gas Tungsten Arc Welding (GTAW)
- B. Flux Cored Arc Welding (FCAW)
- C. Brazing, Braze Welding & Soldering
- D. Cutting Operations

ADDITIONAL SHEET METAL COURSES

Course: Welding I A2101 36 Hour

- A. Oxyacetylene Welding (OAW)
- B. Shielded Metal Arc Welding (SMAW)
- C. Gas Metal Arc Welding (GMAW)

Course: HVAC Sheet Metal Layout I A2904 36 Hours

- A. Folding edges and making seams
- B. Turning, Burring and Raising
- C. Forming, Crimping, Beading and Grooving
- D. Soldering
- E. Drawing for pattern drafting
- F. Making and notching simple patterns

Course: HVAC Sheet Metal Layout II A2905 36 Hours

- A. Parallel line development
- B. Triangulation
- C. Radial line development
- D. Sheet metal in the building trades
- E. Short method pattern development
- F. Projects

Booklist for Heating and Cooling/ Sheet Metal Apprentice Students:

For Basic Math Computations (A0001):

- Applied Mathematics, R. Jesse Phagan, Goodheart-Willcox Company, Inc. ISBN 1-56637-995-4
- Workbook: Applied Mathematics, R. Jesse Phagan, Goodheart-Willcox Company, Inc., ISBN 1-56637-996-2

For HVAC Math (A0006):

- Practical Problems in Mathematics for Heating and Cooling Technicians, Third Edition, Russell B. DeVore, Thomson Delmar Learning), ISBN# 0-8273-7948-X

For Blueprint Reading (A0031):

- Print Reading for Construction, Residential and Commercial by Walter C. Brown and Daniel P. Dorfmueller, Goodheart-Willcox Company, Inc., ISBN 1-59070-347-2.

For OSHA 30 (A0099):

- OSHA 1926 CFR 29

For All S-2, S-4, and S-8 Apprentices:

- Modern Refrigeration and Air Conditioning by Althouse, Turnquist and Bracciano, Goodheart-Wilcox Company, Inc., ISBN 1-59070-280-8
- Residential Oil Burners, 2nd Edition, by Herb Weinberger Delmar Publishing, ISBN 0-7668-1828-4
- Sheet Metal Second Edition by Leo Meyer, American Technical Publishers ISBN 0-8269-1910-3

For All S-10, B-2, and B-4 Apprentices:

- Modern Refrigeration and Air Conditioning by Althouse, Turnquist and Bracciano, Goodheart-Wilcox Company, Inc. ISBN 1-59070-280-8
- Residential Oil Burners, 2nd Edition, by Herb Weinberger Delmar Publishing, ISBN 0-7668-1828-4
- International Mechanical Code Book 2006, International Code Council

For All SM-2 Apprentices:

- Modern Refrigeration and Air Conditioning by Althouse, Turnquist and Bracciano, Goodheart-Wilcox Company, Inc. ISBN 1-59070-280-8
- Sheet Metal Second Edition by Leo Meyer, American Technical Publishers ISBN 0-8269-1910-3

For Brazing, Cutting and Metallurgy and Welding I & II

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