

ATSM-2310: REFRIGERATION I

Cuyahoga Community College

Viewing: ATSM-2310 : Refrigeration I

Board of Trustees:

2012-05-24

Academic Term:

2012-06-01

Subject Code

ATSM - Applied Ind Tech- Sheetmetal

Course Number:

2310

Title:

Refrigeration I

Catalog Description:

Introduces refrigeration theory, heat transfer, and the refrigeration cycle, including the piping of residential split systems using refrigeration tubing, with concentration on installation techniques including brazing and soldering. Also included are various layout procedures using mechanical and shop drawings.

Credit Hour(s):

1

Lecture Hour(s):

1

Requisites

Prerequisite and Corequisite

Departmental approval: admission to Sheet Metal Worker's apprenticeship program.

Outcomes

Course Outcome(s):

Discuss the properties of refrigeration theory.

Objective(s):

1. Apply math concepts to estimate material requirements
2. Calculate sizes and measurements of flat metal to provide a cut list for the ductwork to be made.
3. Employ layout and cutting procedures that are required for ductwork fabrication.
4. Use hand and power tools to fabricate air transfer components.

Course Outcome(s):

Discuss the physical properties of heat transfer.

Objective(s):

1. Develop patterns using triangles where two points are known.
2. Produce patterns by removing excess metal.
3. Create ductwork fittings that could have different size and shape openings.

Course Outcome(s):

Explain the principles of a residential split system.

Objective(s):

1. Use hand and power tools, including machinery, to construct ductwork and connections.
 2. Connect sheet metal components using locking and seaming methods.
 3. Employ soldering techniques to connect various assemblies.
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Course Outcome(s):

Employ accurate layout and fabrication techniques for proper installations.

Objective(s):

1. Use hand and power tools, including machinery, to construct ductwork and connections.
 2. Connect sheet metal components using locking and seaming methods.
 3. Employ soldering techniques to connect various assemblies.
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Methods of Evaluation:

1. Tests
2. Quizzes
3. Class participation

Course Content Outline:

1. Refrigeration theory
 - a. History
 - i. Invention
 - ii. Primitive cooling techniques
 - iii. Direct expansion refrigeration
 - b. Types of refrigerants
 - i. Gas
 - ii. Liquids
 - iii. Mixtures
 - c. Refrigeration Cycle
 - i. Latent heat
 - ii. Specific heat
 - iii. Change of state
2. Heat transfer
 - a. Effects
 - i. Conduction
 - ii. Convection
 - iii. Radiation
 - b. Heat gain and loss
 - i. Structures
 - ii. Equipment
 - iii. Insulation values
 - c. Sizing
 - i. Tubing
 - ii. Ductwork
 - iii. Equipment
3. Split Systems
 - a. Principles
 - i. Air flow
 - ii. Refrigerant flow
 - iii. Heat transfer
 - b. Functions
 - i. Evaporator
 - ii. Condenser
 - iii. Compressor and metering devices
4. Installation

- a. Construction Drawings
 - i. Mechanical
 - ii. Shop
 - iii. Electrical
- b. Layout
 - i. Applied math
 - ii. Piping and tubing
 - iii. Equipment
- c. Installation tools
 - i. Hand tools
 - ii. Power tools
 - iii. Brazing equipment
- d. Brazing and soldering
 - i. Alloys
 - ii. Torches
 - iii. Application

Resources

International Training Institute. *Core Curriculum*. 2nd. International Training Institute Alexandria, Va., 2007.

International Training Institute. *Sheet Metal Math*. 2nd. International Training Institute Alexandria, Va., 2007.

International Training Institute. *1. Refrigeration and Air Conditioning Technology* –. 6th. International Training Institute Alexandria, Va., 2007.

Resources Other

www.envirosure.com/rtrain.htm -

en.wikipedia.org/wiki/File:Refrigeration.jpg

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