

ATSM-2510: COMMERCIAL ROOF TOP UNITS

Cuyahoga Community College

Viewing: ATSM-2510 : Commercial Roof Top Units

Board of Trustees:

2012-05-24

Academic Term:

Fall 2018

Subject Code

ATSM - Applied Ind Tech- Sheetmetal

Course Number:

2510

Title:

Commercial Roof Top Units

Catalog Description:

Describes the different types of heating/air conditioning systems used on commercial buildings, including the use of specialty roof mounting systems. Also covered are electrical circuitry, air circulation, gas piping and optional accessories.

Credit Hour(s):

2

Lecture Hour(s):

2

Requisites

Prerequisite and Corequisite

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

Outcomes

Course Outcome(s):

Examine the different package equipment systems and discuss the operation of each.

Objective(s):

1. Compare the operation of gas/electric versus electric/electric package systems.
2. Discuss the advantages/ disadvantages of using rooftop units
3. Identify specialized accessories used on package systems and describe their functions.

Course Outcome(s):

Identify the different rooftop mounting options.

Objective(s):

1. Demonstrate the ability to properly level and secure a unit roof curb.
2. Illustrate the use of unit rails with a duct curb.
3. Explain the structural requirements needed for weight distribution.
4. List the materials used for roof curb installations.

Course Outcome(s):

Identify the electrical requirements for all package unit types and discuss its supply and distribution for operation and control.

Objective(s):

1. Differentiate between voltage requirements for gas/electric and electric/electric units.
2. Determine the respective wire sizes needed for different amperage draws based on voltage requirements.

3. Identify the different wire colors used for different voltages.
4. Explain the difference between single-phase and three-phase power units.

Course Outcome(s):

Describe the different duct connections used for package systems and the use of accessories to the system.

Objective(s):

1. Explain the operation of an economizer used on a package system.
2. Discuss the difference between an economizer and a fresh air intake.
3. List the various accessories and controls used.

Course Outcome(s):

Demonstrate ability to interpret wiring diagrams and manufacturer instructions to properly install a package unit system.

Objective(s):

1. Layout roof curb, unit wiring and gas piping.
2. Use power and hand tools to install system.
3. Interpret manufacturer instructions for unit start up.

Methods of Evaluation:

1. Tests
2. Quizzes
3. Class participation

Course Content Outline:

1. Packaged equipment systems
 - a. Gas
 - i. Rooftop units
 - ii. Natural gas
 - b. Electric units
 - i. Strip heating
 - ii. Heat pumps
 - c. Advantages
 - i. Pre-piped units
 - ii. Self contained
 - iii. Easy maintenance
 - iv. Incorporated flu systems
 - d. Disadvantages
 - i. Location of units
 1. Extensive wiring requirements
 2. Length of supply piping
 - ii. Maintenance in inclement weather
2. Rooftop mounting
 - a. Roof curbs
 - i. Leveling operations
 - ii. Securing and waterproofing
 - b. Unit rails
3. Structural reinforcements
 - a. Decking
 - b. Bar joists and load transfer
 - c. Curb materials
 - i. Treated wood
 - ii. Sheet metal/channel
 - iii. Waterproofing fabric and applications
 - iv. Hardware
4. Electrical requirements

- a. Voltage
 - i. Gas/electric
 - ii. Electric/electric
- 5. Wire sizes
 - a. Amperage draws
 - b. Voltage requirements
 - c. Wire color coding
 - d. Single phase
 - e. Three phase
 - i. Lower amperage requirement
 - ii. Energy saving
- 6. Duct connections
 - a. Economizers
 - i. Air changes
 - ii. Energy efficient
 - b. Fresh air intake
 - c. Accessories
 - i. Sensors
 - ii. Dampers
- 7. Wiring diagrams and manufacturer's specifications
 - a. Layout
 - i. Curb units
 - ii. Applied math
 - iii. Power sources
 - b. Hand and power tools
 - c. Manufacturer's specifications
 - i. .Wiring
 - ii. Gas piping
 - iii. Maintenance
 - d. Instrumentation
 - i. Electric meters
 - ii. Monometers
 - iii. Refrigerant gages

Resources

International Training Institute. *Core Curriculum*. 2nd. International Training Institute Alexandria, Va., 2004.

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

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

International Training Institute. *Servicing Environmental Systems Student Workbook Book 1*. 1st. International Training Institute Alexandria, Va., 1997.

International Training Institute. *Modern Refrigeration and Air Conditioning*. current. International Training Institute Alexandria, Va., 2000.

Resources Other

www.njmechanical.com/rooftop_replacement.aspx -

en.wikipedia.org/wiki/Air_handler

serverspecs.blogs.techtarget.com/.../data-center-rooftop-hvac-install-video/

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