

ATPF-1125: SYSTEM EVACUATION

Cuyahoga Community College

Viewing: ATPF-1125 : System Evacuation

Board of Trustees:

2015-12-03

Academic Term:

Spring 2019

Subject Code

ATPF - Applied Ind Tech - Pipefitters

Course Number:

1125

Title:

System Evacuation

Catalog Description:

Basic course covering the evacuation procedures followed in initiating refrigeration equipment and systems. Also included are tool and equipment identification and use, proper selection and application of each.

Credit Hour(s):

2

Lecture Hour(s):

2

Requisites

Prerequisite and Corequisite

Departmental approval: admission to Pipefitter's apprenticeship program.

Outcomes

Course Outcome(s):

Describe the tools and equipment used by the heating, air conditioning and refrigeration technician.

Objective(s):

1. Define the terms used in evacuation procedures of refrigeration systems.
2. List the tools, hand and power, used in the service industry.
3. Demonstrate the proper use of service tools.
4. Identify the materials used for installing supply lines in the service industry.
5. List the different types of service equipment and explain the operation of each.

Course Outcome(s):

Identify the different types of tubing and piping used in the refrigeration industry and discuss the methods of joining them.

Objective(s):

1. State methods used to make swaged and flared joints.
2. Describe procedures for preparing steel pipe for threading pipe ends.
3. List the different types of tubing used in heating, air-conditioning and refrigeration applications.
4. Identify two common methods of cutting copper tubing.
5. Discuss procedures used to bend tubing.
6. Describe methods used to solder and braze tubing.

Course Outcome(s):

Describe procedures used to perform refrigeration system evacuations including pressure testing and identify the tools and equipment that are used.

Objective(s):

1. Describe the methods used to perform a standing pressure test.
 2. Select proper leak detectors used for determining faulty systems.
 3. Identify two different types of vacuum measuring instruments used in conjunction with gas correction procedures.
 4. List different types of evacuation practices and discuss various types.
 5. List the purpose of high vacuum evacuations.
 6. Demonstrate the ability to properly use the tools and equipment to perform pressure tests and evacuations.
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Methods of Evaluation:

1. Quizzes
2. Tests
3. Final exam

Course Content Outline:

1. Tools and equipment
 - a. Tools
 - i. Tubing cutters
 - ii. Service wrenches
 - iii. Gage manifold
 - iv. Benders
 - b. Equipment
 - i. Leak detectors
 1. Halide
 2. Electronic
 3. Ultra sound
 - ii. Vacuum sensors
 - c. Application techniques
 - i. Square cutting
 - ii. Rotational adjustments
 - iii. Pressure readings
 - iv. Testing
 - v. Bending radius
 - d. Materials
 - i. Tubing
 1. Soft Copper
 2. Hard drawn copper
 3. Weights
 - ii. Pipe
 1. Steel
 2. Plastic
 - e. Torches
 - i. Air acetylene
 - ii. Oxygen acetylene
 - iii. Nitrogen Cylinders
 - f. Equipment
 - i. Vacuum pumps
 - ii. Pipe threader
 - iii. Pressure reducing regulator
2. Cutting and connecting
 - a. Joints
 - i. Swaged
 - ii. Soldered
 - iii. Flared
 - iv. Brazed
 - v. Threaded
 - b. Cutting
 - i. Tubing
 1. Tube cutters
 2. Saws

- ii. Pipe
 - 1. Preparation
 - 2. Cutting
 - 3. Threading
- c. Pipe threading
 - i. Square cut technique
 - ii. De-burring
 - iii. Reamed ends
- d. Swaged joints
 - i. Critical joint length
 - ii. Anvil blocks
 - iii. Expanded tubing
- e. Flared joints
 - i. Mechanical
 - ii. Fittings
 - iii. Sealants
- 3. Tests and evacuation
 - a. Pressure test
 - i. Purpose
 - 1. Closed systems
 - 2. Tight connections
 - ii. Procedure
 - 1. Visual inspection
 - 2. Regular installation
 - 3. Pressure test
 - 4. Final readings
 - 5. Time requirements
 - b. Leak detectors
 - i. Types
 - 1. Halide torch
 - 2. Electronic
 - 3. Ultra sound
 - ii. Operation
 - iii. Sensitivities
 - c. Vacuum instruments
 - i. Types
 - 1. Single stage
 - 2. Double stage
 - ii. Non condensable material
 - iii. Operation
 - 1. Refrigerant oil
 - 2. Maintenance
 - d. Evacuation procedure
 - i. Energizing the systems
 - ii. Equipment attachment
 - iii. Vacuum pump oil
 - iv. Instrument readings
 - 1. Inches of mercury
 - 2. Microns
 - v. Evacuation analysis
 - 1. Time
 - 2. Readings
 - vi. Commission of system

Resources

United Association Training Department. *HVAC/R Training*. current edition. International Pipe Trades Training Committee, Inc., Washington, D.C., 2006.

Thomas W. Frankland. *Pipe Trades*. current edition. Glencoe/McGraw-Hill, New York, New York, 2015.

Althouse, Turnquist and Bracciano. *Modern Refrigeration and Air Conditioning*. 4th edition. Goodheart-Willcox Co., South Holland, Illinois, 1979.

Resources Other

<http://www.free-ed.net/sweethaven/MechTech/Refrigeration/coursemain.asp?lesNum=4&modNum=1>

<http://physics.about.com/od/glossary/g/heat.htm>

<http://www.refrigerationbasics.com/1024x768/definitions1.htm>

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