**AC 150M 9503**

**BASIC REFRIGERATION SERVICING**

**Instructors:**

**Office phone:**

**Credits:** 1/2

**Required Text Books:**

**INFORMATION FOR AC 150 9601 AND 8001:**

**DESCRIPTION:**

This course is designed for persons interested in entering the refrigeration/air conditioning service, installation or building maintenance fields and is intended for the intermediate level student.The course is oriented toward development of basic skills required in troubleshooting, repair, and maintenance of refrigeration/air conditioning systems.Topics covered are soldering, silver soldering, service and troubleshooting tools and systems construction.

**OBJECTIVES:**

1. Build a refrigeration system according to industry and EPA standards. the tools and procedures used in the industry.
2. To provide the student with an opportunity to develop entry level competency in the basic skills

 and troubleshooting procedures needed in the industry.

1. To test and document the students level of competency, by performance.

**Outcomes:**

 Students will demonstrate the ability to systematically assemble a refrigeration system.Students will demonstrate the ability to apply a systematic approach to troubleshooting, repair, and maintenance of refrigeration systems

Students will demonstrate the ability to select and use appropriate tools and equipment for the assembly, troubleshooting, repair, and maintenance of refrigeration systems.

**ADA**

Students who feel they may need an accommodation based on the impact of a disability are encouraged to meet privately with their instructors to discuss their specific needs and must [contact the Disability Resource Center (Links to an external site.)Links to an external site.](http://www.tmcc.edu/drc/contact/) (DRC) in RDMT 114 (or call 775-673-7277) to establish documentation of a disability and to coordinate reasonable accommodations.

***NOTE:*** *Special attention is directed to appendices*

 *"L", "M" and "O"*

**COURSE OUTLINE**

This course is self paced in that performance testing is done as the individual student feels ready. However most classes will start with a short lecture that is specific to one of the skills or is informational in nature.

The course will proceed in the following order.

1. Copper tubing. (informational)
2. Cutting and bending copper tubing.
3. Flaring copper tube.
4. Swaging copper tube.
5. Soldering and brazing copper tube.
6. Use of gauge manifold.
7. Refrigerant recovery and recycling.
8. Leak testing refrigeration systems.
9. Evacuation of refrigeration systems.
10. Charging refrigeration systems.
11. Fundamental troubleshooting principals.
12. Electrical test meters.
13. Troubleshooting control circuits.
14. Troubleshooting motors and compressors.(electrical) and other electro/mechanical devices.

**Hands-on instruction, practice, performance testing and written quiz’s are included on all items listed above with the exception of those shown as (informational).**

**EPA 608 Certification. We can help with that. We have study guides. Plus on the text book page, they practice exams that you take for free.The cost of taking the exam is 15.00 Dollars. If you have questions or need help see one of the instructors**

**AC 150 BASIC REFRIGERATION SERVICING**

**TASK LIST**

**UNIT ONE: COMMON TOOLS, MATERIALS AND BASIC SKILLS.**

**1-1A COPPER TUBING AND PIPING PRACTICES:**

INFORMATIONAL;

**1-1C SOLDERING AND BRAZING:**

INFORMATIONAL AND PRACTICE;

**UNIT 1-1 TERMINAL PERFORMANCE OBJECTIVE:**

Given copper tube, flare nuts to fit, tubing tools, and a pressure source. Demonstrate an ability to form and install flared, swaged, soldered and brazed connections that are leak tight at 100 PSIG.

**Scores**

**Written test:Hands-on test:**

**Student: Instructor:**

INFORMATIONAL AND PRACTICE;

**1-2A GAGE MANIFOLD DESIGN AND COMPONENTS.**

**1-2B USE OF GAGE MANIFOLD FOR VARIOUS PROCEDURES.**

**UNIT 1-2 TERMINAL PERFORMANCE OBJECTIVE:**

 Given a standard gauge manifold and an operating refrigeration system correctly attach the manifold to the system and demonstrate an ability to read correct suction and discharge pressures, and convert the pressures to saturated refrigerant temperatures. Suction and discharge pressures, and convert the pressures to saturated refrigerant temperatures. Also demonstrate proper procedure for disconnecting the manifold from the system with a minimal loss of refrigerant, and minimal pressure left on the manifold.

**Scores**

**Written test:Hands-on test:**

**Student: Instructor:\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**1-3REFRIGERANT RECOVERY AND EPA REGULATIONS.**

**1-3A RECOVERY AND RECYCLING GENERAL INFORMATION**

**1-3B RECOVERY PROCEEDURES.**

**UNIT 1-3 TERMINAL PERFORMANCE OBJECTIVE:**

**Given a refrigerant system containing refrigerant, demonstrate an ability to recover the refrigerant with only deminimus venting of refrigerant.**

**Scores**

**Written test:Hands-on test:**

**Student: Instructor:**

**1-4LEAK TESTING SYSTEM:**

**INFORMATIONAL AND PRACTICE;**

**1-4A LEAK DETECTING GENERAL INFORMATION AND TOOLS.**

**1-4B LEAK TESTING PROCEDURES.**

**UNIT 1-4 TERMINAL PERFORMANCE OBJECTIVE:**

Given two refrigerant piping systems ( with known leak(s) ) one system at 100 PSIG and one at 20 PSIG, a halide torch leak detector, and an electronic leak detector. Demonstrate an ability to precisely locate all leaks with ether leak detector.

**Scores**

**Written test:Hands-on test:**

**Student: Instructor:**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**1-5** **EVACUATING REFRIGERANT SYSTEMS:**

**INFORMATIONAL AND PRACTICE;**

**1-5A EVACUATION GENERAL INFORMATION AND TOOLS.**

**1-5B EVACUATION PROCEDURES.**

**UNIT 1-4 TERMINAL PERFORMANCE OBJECTIVE:**

Given a leak tight refrigeration system, a gauge manifold, and a vacuum pump to demonstrate the ability to evacuate the system in such a manor that the system is free of gasses and moisture.

**Scores**

**Written test:Hands-on test:**

**Student: Instructor:**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**1-6 REFRIGERANT SYSTEM CHARGING:**

INFORMATIONAL AND PRACTICE;

**1-6A CHARGING GENERAL INFORMATION AND TOOLS.**

**1-6B CHARGING PROCEDURES.**

**UNIT 1-5 TERMINAL PERFORMANCE OBJECTIVES:**

1. Given a cap-tube type refrigeration system a gauge manifold, a vacuum pump, a charging scale, and refrigerant. Demonstrate ability to correctly charge the system using the SUPER HEAT method.
2. Given a partially charged refrigeration system, a gauge manifold, and refrigerant, demonstrates an ability to properly charge the system using theSUB-COOLING method.

**Scores**

**Written test:**

**Hands-on test 1:Hands-on test 2:**

**Student: Instructor:\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

INFORMATIONAL;

**Scores**

**Written test:**

**Hands-on test 1:Hands-on test 2:**

**Student: Instructor:**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

 **COURSE # AC 150 GRADING SYSTEM**

LESS THAN 70% ON ANY OF THE UNITS= A GRADE OF "W" ( NO CREDIT)

AN 70% TO 77% AVERAGE= A GRADE OF "D"

AN 78% TO 85% AVERAGE= A GRADE OF "C"

AN 86% TO 93% AVERAGE= A GRADE OF "B"

AN AVERAGE OVER 93% = A GRADE OF "A"

AVERAGES LISTED ARE OVERALL AVERAGE.

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