



HILLYARD

TECHNICAL CENTER

Heating, Ventilation, Air Conditioning, & Refrigeration

Job Skill Competencies

HVACR Level One and HVACR Level Two

Safety

Identify types, purposes and operation of fire extinguishers.

Inspect shop for hazards.

Work cautiously and safely, using appropriate tools.

Demonstrate victim removal procedures from an electrical conductor.

Demonstrate safe handling of refrigerants.

Demonstrate safe handling of pressurized gases.

Demonstrate safe handling of combustibles.

Apply MSDS (Material Safety Data Sheet) information to material use.

Demonstrate first aid for occupational hazards.

Refrigeration Principles and Practices

Explain principles of refrigeration.

Explain heat transfer theory.

Identify refrigerant and oil types, characteristics and uses.

Use a gauge manifold set.

Leak-test a system.

Evacuate and measure vacuum Level to 500 microns.

Recover refrigerants.

Charge system to manufacturer's specifications.

Describe the operation of refrigeration system accessories (e.g., receiver, accumulators, filter/driers, sight glasses, valves, etc.).

Piping Principles and Practices

Identify different types of tubing and fittings.

Perform copper tubing operations, including cutting, flaring, soldering, brazing, bending swaging, etc.

Install repair and replace aluminum tubing.

Perform gas pipe operations (cutting, reaming, threading and connecting).

Basic Electricity

Differentiate between common single and three phase voltage systems, including 240 V, 60Hz, single phase, 208 V, 60Hz, three phase, 240V, 60Hz, three phase, and 480V, 60 Hz, three phase.

Read and interpret voltage, ampere, and Ohm and watt meters.

Apply the principles and relationship of Ohm's law as it applies to series, parallel, and series-parallel circuits.

Electric Motors

Apply the operating principles of electric motors.

Recognize the application of various types of electric motors.

Recognize the application of various types of capacitors.

Test capacitors.

Explain the principles and operation of electric motor protection devices.

Interpret electric motor specifications (e.g., horsepower, voltage, etc.).

Install and connect electric motors.

Controls

Apply the principles of safety and operating control devices (e.g., pressure switches, thermostats, etc.).

Apply the principles of electromechanical control devices (e.g., relays, contactors, magnetic starters, timers, sequencers, etc.).

Apply principles of electronic control devices (e.g., ignition modules, electronic timers, etc.).

Apply the principles of safety and control circuits.

Install/service mechanical control devices (e.g., pneumatic and water controls).

Install/service electromechanical control devices.

Install/replace transformers.

Residential/Light Commercial Cooling/Heating

Install or replace compressor.

Install or replace condensing unit.

Repair or replace condenser.

Repair or replace evaporator.

Replace, repair and adjust metering devices.

Perform clean-up of a contaminated system.

Describe operation of a heat pump.

Start and check residential heating and cooling systems.

Measure and adjust airflow.

Pump down unit.

Installation and Preventative Maintenance

Perform preventative maintenance on air-conditioning systems.

Perform maintenance on heating system.

Design air-distribution systems.

Troubleshooting

Troubleshoot mechanical control devices.

Troubleshoot electromechanical devices.

Troubleshoot electronic control devices.

Troubleshoot electric motors.

Troubleshoot natural gas fired heating systems.

Troubleshoot electric heating systems.

Troubleshoot heat pumps.

Troubleshoot air-conditioning systems.

Customer Relations

Explain operation of the system's thermostat.

Communicate system operation in lay terms.

Leadership Competencies

Demonstrate an understanding of SkillsUSA, its structure and activities.

Demonstrate an understanding of one's personal values.

Perform tasks related to effective personal management skills.

Demonstrate interpersonal skills.

Demonstrate etiquette, and courtesy.

Demonstrate effectiveness in oral and written communication.

Develop and maintain a code of professional ethics.

Maintain a good professional appearance.

Perform basic tasks related securing and terminating employment.

Perform basic parliamentary procedure in a group meeting.

NOTE: These competencies are addressed in the Missouri **SkillsUSA Curriculum Guide** Lessons

Updated 5/9/16