

**Competency Task List – Secondary Component**

**Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician**

**CIP 47.0201**

High School Graduation Years 2022, 2023, 2024

**100 Introduction to HVAC/R**

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
101	Identify HVAC/R systems.		
102	Describe career opportunities in the HVAC/R profession.		
103	Demonstrate awareness of the occupational requirements.		
104	RESERVED		
105	Use soft skills when interacting with customers.		

**200 Basic Safety**

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
201	RESERVED		
202	RESERVED		
203	Identify and demonstrate the use of personal protection equipment.		
204	Apply OSHA regulations to identify hazards and measures to prevent job site accidents from occurring.		
205	Demonstrate the proper use of stepladders, extension ladders, and scaffolding.		

**300 Tools for HVAC/R**

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
301	Identify, use, and maintain basic hand tools used in the trade.		
302	Identify, use, and maintain basic power tools used in the trade.		

**400 Blueprint Reading**

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
401	Compare types of blueprint plans.		
402	Read and interpret blueprint plans.		

**500 Piping Practices**

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
501	Identify piping materials.		
502	Select, measure, cut, ream, swage, and flare piping and tubing projects.		
503	Cut, ream, thread, and assemble steel piping projects and pressure test.		
504	Assemble non-metallic pipe and fittings and pressure test.		
505	Assemble copper tubing projects and pressure test.		
506	Solder copper tubing.		
507	Braze ACR tubing.		
508	RESERVED		
509	RESERVED		
510	Assemble corrugated stainless steel gas tubing (CSST) projects.		
511	RESERVED		

**600 Basic Electricity**

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
601	Describe and explain the basic concepts of electricity.		
602	Calculate basic electrical quantities using Ohm's law.		
603	Explain how magnetism is used in different HVAC components.		
604	Implement safe electrical practices.		
605	Interpret and draw various types of electrical schematics and symbols.		
606	Apply proper wiring techniques.		
607	Perform electrical testing to include mechanical/electronic relays on energized and de-energized circuits.		
608	Wire series circuit, parallel circuit, and series/parallel circuit.		
609	Install and size electric disconnects, circuit breakers, and fuses.		
610	Classify and test various types of capacitors.		
611	Identify electrical motors and their applications.		
612	Differentiate between motor control protection and start devices.		
613	Apply relevant electrical codes.		
614	Determine transformers ratings and their applications.		
615	RESERVED		

**700 Introduction to Cooling**

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
701	Measure temperature and pressure of a cooling system.		
702	Calculate superheat and subcooling.		
703	Locate and describe components of the basic refrigeration cycle.		
704	Evaluate refrigerants using temperature and pressure charts for various refrigerants.		
705	Analyze and test the operations of various compressors.		

706	Analyze and test the operations of various condensers.		
707	Analyze and test the operations of various evaporators.		
708	Analyze, test, and adjust the operations of various metering devices.		
709	Identify secondary components used in the air conditioning and refrigeration industry.		
710	Evaluate effects of airflow on cooling system performance.		
711	Categorize and manipulate service valves.		

**800 Introduction to Heating**

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
801	Describe the principles of combustion.		
802	Evaluate temperatures and pressures of various heating systems.		
803	Identify components and fuel properties of various heating systems.		
804	Perform maintenance on a gas furnace.		
805	RESERVED		
806	Identify oil heating equipment.		
807	Install and adjust oil, gas (condensing and non-condensing), and electric heating equipment.		
808	Perform maintenance on oil fired equipment.		
809	RESERVED		
810	Identify and size electric heating equipment.		
811	Install heating/air conditioning thermostats.		
812	RESERVED		
813	Perform combustion analysis on oil and gas fired equipment.		
814	Identify the sequence of operations of various warm air furnaces.		

**900 Air Distribution Systems**

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
901	Identify and design different types of duct systems.		
902	Identify and describe the different types of duct system components.		
903	Test velocity, static pressures, temperature, humidity, and volume in a duct system.		
904	RESERVED		
905	RESERVED		
906	Compare, identify, and fabricate using various duct materials.		
907	Perform basic installation practices, including duct sealing and leak testing.		
908	Identify and compare the application of air distribution secondary accessories to increase air quality and comfort.		

**1000 Introduction to Hydronic Systems**

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
1001	Identify and compare various hot water heating system components, piping schemes, and their applications.		
1002	Service and maintain hydronic systems.		

**1100 Leak Detection, Evacuation, Recovery, and Charging**

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
1101	Locate refrigerant leaks using common types of leak detectors.		
1102	Perform refrigerant recovery.		
1103	Perform system evacuation and dehydration.		
1104	Determine when to charge with liquid versus vapor.		
1105	Weigh in correct system charge when appropriate.		

1106	Charge systems using superheat method when appropriate, e.g., fixed restriction.		
1107	Charge systems using subcooling method when appropriate, e.g., TXV, AXV.		
1108	Apply knowledge of EPA Section 608 regulations.		
1109	Identify pump down applications and perform system pump down operations.		

### 1200 Troubleshooting Heating

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
1201	Perform gas burner flame proving tests.		
1202	Troubleshoot gas heating equipment.		
1203	Troubleshoot oil fired equipment.		

### 1300 Troubleshooting Cooling

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
1301	Identify control system components.		
1302	Troubleshoot and service cooling equipment.		
1303	Troubleshoot electrical components.		

### 1400 Heat Pumps

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
1401	Explain heat pump modes of operation.		
1402	Identify and describe heat pump components.		
1403	Install heat pump systems.		

**1500 Computer Fundamentals**

Item	Task	(X) Indicates Proficiency <sup>1</sup>	Secondary Course Crosswalk
1501	RESERVED		
1502	Utilize the Internet for research.		
1503	Use HVAC computer software.		

<sup>1</sup> Student Demonstrated Entry-Level Industry Proficiency as Indicated by (X)

Secondary CTE Instructor Signature \_\_\_\_\_ Date \_\_\_\_\_

Student Signature \_\_\_\_\_ Date \_\_\_\_\_