

**Heating, Air Conditioning, Ventilation and
Refrigeration Maintenance Technology/Technician
CIP 47.0201
Task Grid**

Proficiency Level
Achieved:
(X) Indicates
Competency
Achieved to Industry
Proficiency Level

Unit/Standard Number		
	Secondary Competency Task List	
100	INTRODUCTION TO HVAC	
101	Identify HVAC systems.	
102	Describe career opportunities in the HVAC profession.	
103	Demonstrate awareness of the occupational requirements.	
104	RESERVED	
105	Use soft skills when interacting with customers.	
200	BASIC SAFETY	
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	Set up and use stepladders, extension ladders, and scaffold.	
300	TOOLS FOR HVAC/R	
301	Use and maintain basic hand tools used in the trade.	
302	Use and maintain basic power tools used in the trade.	
400	BLUEPRINT READING	
401	Compare types of blueprint plans.	
402	Read and interpret blueprint plans.	
500	PIPING PRACTICES	
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 according to trade standards.	
506	Solder copper tubing.	
507	Braze ACR tubing.	
508	Identify and use fittings and tools for steel pipe.	
509	RESERVED	
510	Assemble corrugated stainless steel gas tubing (CSST) projects.	
511	RESERVED	
600	BASIC ELECTRICITY	

Unit/Standard Number	High School Graduation Years 2019, 2020 and 2021	
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601	Compare and analyze methods of producing electricity using appropriate terms.	
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 motor control protection and start devices.	
613	Apply electrical codes.	
614	Determine transformers and their applications.	
615	Size, apply, and ground electrical circuits and raceways.	
700	INTRODUCTION TO COOLING	
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	
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 & non-condensing), and electric heating equipment.	

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808	Perform annual preventive 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	
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 air distribution secondary accessories to increase air quality and comfort.	
1000	INTRODUCTION TO HYDRONIC SYSTEMS	
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	
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.	
1109	Identify pump down applications and perform system pump down operations.	
1200	TROUBLESHOOT HEATING	
1201	Perform gas burner flame proving tests according to trade standards.	
1202	Troubleshoot, and service gas heating equipment.	
1203	Troubleshoot oil fired equipment.	

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1300	TROUBLESHOOT COOLING	
1301	Identify control system components.	
1302	Install, troubleshoot, and service cooling equipment.	
1303	Install electrical components.	
1400	HEAT PUMPS	
1401	Explain heat pump modes of operation.	
1402	Identify and describe heat pump components.	
1403	Install comfort cooling systems.	
1500	COMPUTER FUNDAMENTALS	
1501	RESERVED	
1502	Utilize the Internet for research.	
1503	Use HVAC computer software.	