



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

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 Explain the class rules and the rationale behind them.

200 BASIC SAFETY

201 Identify causes of job site accidents and measures to prevent them.

202 Identify job site hazards and describe measures to prevent them from occurring.

203 Identify and demonstrate the use of personal protection equipment.

204 Demonstrate the knowledge of OSHA regulations.

300 TOOLS FOR HVAC/R

301 Identify and Safely Use Basic Hand Tools Used in the Trade.

302 Identify and Safely Use Basic Power Tools Used in the Trade.

400 BLUEPRINT READING


401 Identify types of blueprint plans.

402 Read and Interpret blueprint plans.

500 PIPING PRACTICES

501 Identify Piping Materials.


502 Select, Measure, Cut, and Ream Piping and Tubing.

Unit/Standard Number	 pennsylvania DEPARTMENT OF EDUCATION	<u>High School Graduation years 2013, 2014, 2015</u>
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503	Assemble Piping Projects and Pressure Test According to Trade Standards.	
504	Identify and assemble PVC pipe and fittings.	
505	Assemble copper tubing projects and pressure test according to trade standards.	
506	Solder copper tubing.	
507	Braze and silver solder ACR Tubing.	
508	Identify and demonstrate proper use of fittings and tools for steel (black) pipe.	
509	Cut, ream, thread and assemble steel (black) pipe.	
510	Assemble Corrugated Stainless Steel Gas Tubing (CSST) Projects.	
511	Identify piping material such as PVC, ABS, copper, black iron	
600	BASIC ELECTRICITY	
601	Describe 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	Identify Safe Electrical Practices.	
605	Recognize and draw various types of electrical schematics and symbols.	
606	Demonstrate proper wiring techniques.	
607	Demonstrate electrical testing to include mechanical/electronic relays.	
608	Wire series circuit, parallel circuit, and series / parallel circuit.	
609	Install electric disconnects, circuit breakers and fuses.	
610	Identify and test capacitors.	
611	Identify electrical motors and their applications.	
612	Recognize motor control protection and start devices.	
613	Recognize Electrical Codes.	
614	Demonstrate knowledge of transformers and their applications.	



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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	Apply Pressure Temperature Charts for various refrigerants.
705	Describe the functions of compressors.
706	Describe the functions of condensers.
707	Describe the functions of evaporators.
708	Describe the functions of metering devices.
709	Identify secondary components used in the air conditioning and refrigeration industry.
710	Evaluate effects of airflow on system performance.
800	INTRODUCTION TO HEATING
801	Describe the principles of combustion.
802	Identify temperatures and pressures of a heating system.
803	Identify components of various heating systems.
804	Perform maintenance on a gas furnace.
805	Troubleshoot conventional / condensing gas heating equipment.
806	Identify oil heating equipment.
807	Install and adjust oil fired equipment.
808	Perform annual preventive maintenance on oil fired equipment.
809	Troubleshoot oil fired equipment.
810	Identify electric heating equipment.
811	Install heating/air conditioning thermostats according to manufacturer's standards.

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812	Identify components and controls of steam heating systems.	
813	Perform Combustion Analysis on oil and gas fired equipment.	
900	AIR DISTRIBUTION SYSTEMS	
901	Identify and sketch different types of duct systems.	
902	Identify and describe the different types of duct system components.	
903	Measure temperature, humidity and air velocities.	
904	Determine velocity, static, and total air pressures in a system.	
905	Determine airflow volume using velocity pressure method.	
906	Perform basic duct fabrication functions.	
1000	INTRODUCTION TO HYDRONIC SYSTEMS	
1001	Describe hot water heating system components.	
1002	Install and service 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	Demonstrate knowledge of EPA Section 608.	



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1200	TROUBLESHOOTING GAS HEATING
1201	Perform gas burner flame proving tests according to trade standards.
1202	Demonstrate how to install, trouble shoot, and service gas heating equipment.
1300	TROUBLESHOOTING COOLING
1301	Identify control system components.
1302	Demonstrate, install, trouble shoot, and service cooling equipment .
1303	Demonstrate how to install electrical components.
1400	HEAT PUMPS
1401	Explain heat pump modes of operation.
1402	Identify and describe heat pump components.
1403	Demonstrate how to install heat pumps.
1500	COMPUTER FUNDAMENTALS
1501	Identify components of a desktop computer.
1502	Utilize the Internet for research.
1503	Identify and demonstrate skills with computer software relating to HVAC.