









Unit/Standard Number	 pennsylvania DEPARTMENT OF EDUCATION High School Graduation years 2016, 2017, 2018 Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician CIP 47.0201 Task Grid 	Level 1				Level 2				Level 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Secondary Competency Task List												
100	INTRODUCTION TO HVAC												
101	Identify HVAC systems.	15											
102	Describe career opportunities in the HVAC profession.	15											
103	Demonstrate awareness of the occupational requirements.	15											
104	Explain the class rules and the rational behind them.	15											
200	BASIC SAFETY												
201	Identify causes of job site accidents and measures to prevent them.	15											
202	Identify job site hazards and describe measures to prevent them from occurring.	15											
203	Identify and demonstrate the use of personal protection equipment.		15										
204	Demonstrate the knowledge of OSHA regulations.		15										
300	TOOLS FOR HVAC/R												
301	Identify and Safely Use Basic Hand Tools Used in the Trade.		15										
302	Identify and Safely Use Basic Power Tools Used in the Trade.		15										
400	BLUEPRINT READING												
401	Identify types of blueprint plans.		15										
402	Read and Interpret blueprint plans.		15										
500	PIPING PRACTICES												
501	Identify Piping Materials.			15									
502	Select, Measure, Cut, and Ream Piping and Tubing.			15									
503	Assemble Piping Projects and Pressure Test According to Trade Standards.			15									
504	Identify and assemble PVC pipe and fittings.			15									
505	Assemble copper tubing projects and pressure test according to trade standards.			15									
506	Solder copper tubing.			15									
507	Braze ACR Tubing.				18								

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	Secondary Competency Task List												
508	Identify and demonstrate proper use of fittings and tools for steel (black) pipe.				18								
509	Cut, ream, thread and assemble steel (black) pipe.				18								
510	Assemble Corrugated Stainless Steel Gas Tubing (CSST) Projects.				18								
511	Identify piping material such as PVC, ABS, copper, black iron				18								
600	BASIC ELECTRICITY												
601	Describe methods of producing electricity using appropriate terms.				10								
602	Calculate basic electrical quantities using Ohm's law.				10								
603	Explain how magnetism is used in different HVAC components.				10								
604	Identify Safe Electrical Practices.				10								
605	Identify and draw various types of electrical schematics and symbols.				10								
606	Demonstrate proper wiring techniques.				10								
607	Demonstrate electrical testing to include mechanical/electronic relays.				10								
608	Wire series circuit, parallel circuit, and series / parallel circuit.				10								
609	Install electric disconnects, circuit breakers and fuses.				10								
610	Identify and test capacitors.					10							
611	Identify electrical motors and their applications.					10							
612	Identify motor control protection and start devices.					10							
613	Identify Electrical Codes.					10							
614	Demonstrate knowledge of transformers and their applications.					10							
700	INTRODUCTION TO COOLING												
701	Measure temperature and pressure of a cooling system.					10							
702	Calculate Superheat and Subcooling.					10							
703	Locate and describe components of the basic refrigeration cycle.					10							
704	Apply Pressure Temperature Charts for various refrigerants.					10							

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	Secondary Competency Task List												
1000	INTRODUCTION TO HYDRONIC SYSTEMS												
1001	Describe hot water heating system components.									18			
1002	Install and service hydronic systems.										11		
1100	LEAK DETECTION, EVACUATION, RECOVERY AND CHARGING												
1101	Locate refrigerant leaks using common types of leak detectors.										11		
1102	Perform refrigerant recovery.										11		
1103	Perform system evacuation and dehydration.										11		
1104	Determine when to charge with liquid versus vapor.										11		
1105	Weigh in correct system charge (when appropriate).										11		
1106	Charge systems using superheat method when appropriate (e.g., fixed restriction).										11		
1107	Charge systems using subcooling method when appropriate (e.g., TXV, AXV).										13		
1108	Demonstrate knowledge of EPA Section 608.											11	
1200	TROUBLESHOOTING GAS HEATING												
1201	Perform gas burner flame proving tests according to trade standards.											11	
1202	Demonstrate how to install, trouble shoot, and service gas heating equipment.											11	
1300	TROUBLESHOOTING COOLING												
1301	Identify control system components.											11	
1302	Demonstrate, install, trouble shoot, and service cooling equipment .											11	
1303	Demonstrate how to install electrical components.											11	

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	Secondary Competency Task List												
1400	HEAT PUMPS												
1401	Explain heat pump modes of operation.											11	
1402	Identify and describe heat pump components.											13	
1403	Demonstrate how to install heat pumps.												11
1500	COMPUTER FUNDAMENTALS												
1502	Utilize the Internet for research.												11
1503	Identify and demonstrate skills with computer software relating to HVAC.												11
L1600	CONSTRUCTION MATH												
L1601	Demonstrate Proficiency in Math as it relates to HVAC/R.												11
L1800	BASIC COMMUNICATION												
L1801	Demonstrate Reading, Writing, Listening, and Speaking Skills.												11
L1802	Complete a Resume and Mock Interview.												11
L1900	BASIC EMPLOYABILITY												
L1901	Demonstrate Employability Skills.												11
L1902	Demonstrate Interpersonal Skills.												13
	Total (Hours)	90	90	90	90	90	90	90	90	90	90	90	90