# 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

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| --- | --- | --- | --- |
| Item | Task  | (X) Indicates Proficiency 1 | 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

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| Item | Task  | (X) Indicates Proficiency 1 | 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

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| Item | Task  | (X) Indicates Proficiency 1 | 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

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

## 500 Piping Practices

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| Item | Task  | (X) Indicates Proficiency 1 | 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

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| Item | Task  | (X) Indicates Proficiency 1 | 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

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| Item | Task  | (X) Indicates Proficiency 1 | 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

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| Item | Task  | (X) Indicates Proficiency 1 | 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

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| Item | Task  | (X) Indicates Proficiency 1 | 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

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| --- | --- | --- | --- |
| Item | Task  | (X) Indicates Proficiency 1 | 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

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| Item | Task  | (X) Indicates Proficiency 1 | 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

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

## 1300 Troubleshooting Cooling

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

## 1400 Heat Pumps

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| --- | --- | --- | --- |
| Item | Task  | (X) Indicates Proficiency 1 | 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

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

1 Student Demonstrated Entry-Level Industry Proficiency as Indicated by (X)

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

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