

Summary Report for: 49-9021.01 - Heating and Air Conditioning Mechanics and Installers

Install, service, and repair heating and air conditioning systems in residences and commercial establishments.

Sample of reported job titles: Service Technician, HVAC Specialist (Heating, Ventilation, and Air Conditioning Specialist), HVAC Technician (Heating, Ventilation, and Air Conditioning Technician), Air Conditioning Technician (AC Tech), HVAC Installer (Heating, Ventilation, and Air Conditioning Installer), Mechanic, Service Manager

Tasks

- Obtain and maintain required certifications.
- Comply with all applicable standards, policies, and procedures, including safety procedures and the maintenance of a clean work area.
- Repair or replace defective equipment, components, or wiring.
- Test electrical circuits and components for continuity, using electrical test equipment.
- Reassemble and test equipment following repairs.
- Inspect and test system to verify system compliance with plans and specifications and to detect and locate malfunctions.
- Discuss heating-cooling system malfunctions with users to isolate problems or to verify that malfunctions have been corrected.
- Record and report all faults, deficiencies, and other unusual occurrences, as well as the time and materials expended on work orders.
- Test pipe or tubing joints and connections for leaks, using pressure gauge or soap-and-water solution.
- Adjust system controls to setting recommended by manufacturer to balance system, using hand tools.

Tools & Technology

Tools used in this occupation:

Flow sensors — Turbine flow meters; Venturi meters; Water flow meters; Water pressure gauges

Shears — Duct knives; Shears

Thermocouples — Bead type thermocouples; Pipe clamp thermocouples; Thermocouples

Tongs — Tongs

Voltage or current meters — Alternating current AC line splitters; Current meters; Non-contact voltage detectors; Voltmeters

Technology used in this occupation:

Computer aided design CAD software — Computer aided design CAD software; HVAC tools software

Customer relationship management CRM software — Contact management systems

Internet browser software — Internet browser software

Spreadsheet software — Microsoft Excel; Spreadsheet software

Word processing software — Atlas Construction Business Forms; Microsoft Word

Knowledge

Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.

Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Sales and Marketing — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.

Skills

Troubleshooting — Determining causes of operating errors and deciding what to do about it.

Repairing — Repairing machines or systems using the needed tools.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Equipment Maintenance — Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Installation — Installing equipment, machines, wiring, or programs to meet specifications.

Social Perceptiveness — Being aware of others' reactions and understanding why they react as they do.

Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.

Coordination — Adjusting actions in relation to others' actions.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Abilities

Extent Flexibility — The ability to bend, stretch, twist, or reach with your body, arms, and/or legs.

Finger Dexterity — The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects.

Manual Dexterity — The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects.

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Arm-Hand Steadiness — The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Trunk Strength — The ability to use your abdominal and lower back muscles to support part of the body repeatedly or continuously over time without 'giving out' or fatiguing.

Control Precision — The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Work Activities

Performing General Physical Activities — Performing physical activities that require considerable use of your arms and legs and moving your whole body, such as climbing, lifting, balancing, walking, stooping, and handling of materials.

Repairing and Maintaining Mechanical Equipment — Servicing, repairing, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.

Handling and Moving Objects — Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Operating Vehicles, Mechanized Devices, or Equipment — Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or water craft.

Making Decisions and Solving Problems — Analyzing information and evaluating results to choose the best solution and solve problems.

Performing for or Working Directly with the Public — Performing for people or dealing directly with the public. This includes serving customers in restaurants and stores, and receiving clients or guests.

Communicating with Persons Outside Organization — Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.

Inspecting Equipment, Structures, or Material — Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Work Context

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Freedom to Make Decisions — How much decision making freedom, without supervision, does the job offer?

Telephone — How often do you have telephone conversations in this job?

Contact With Others — How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?

Exposed to Contaminants — How often does this job require working exposed to contaminants (such as pollutants, gases, dust or odors)?

Exposed to Hazardous Conditions — How often does this job require exposure to hazardous conditions?

Structured versus Unstructured Work — To what extent is this job structured for the worker, rather than allowing the worker to determine tasks, priorities, and goals?

In an Enclosed Vehicle or Equipment — How often does this job require working in a closed vehicle or equipment (e.g., car)?

Outdoors, Exposed to Weather — How often does this job require working outdoors, exposed to all weather conditions?

Spend Time Using Your Hands to Handle, Control, or Feel Objects, Tools, or Controls — How much does this job require using your hands to handle, control, or feel objects, tools or controls?

Job Zone

Title Job Zone Three: Medium Preparation Needed

Overall Experience Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.

Job Training Employees in these occupations usually need one or two years of training

involving both on-the-job experience and informal training with experienced workers.

Job Zone Examples These occupations usually involve using communication and organizational skills to coordinate, supervise, manage, or train others to accomplish goals. Examples include funeral directors, electricians, forest and conservation technicians, legal secretaries, interviewers, and insurance sales agents.

SVP Range (6.0 to < 7.0)

Education Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree.

There are 5 recognized apprenticeable specialties associated with this occupation:

Heating-and-Air-Conditioning Installer-Servicer; Furnace Installer-and-Repairer, Hot Air; Furnace Installer; Oil-Burner-Servicer-and-Installer; Air and Hydronic Balancing Technician

To learn about specific apprenticeship opportunities, please consult the U.S. Department of Labor [State Apprenticeship Information](#) website.

For general information about apprenticeships, training, and partnerships with business, visit the U.S. Department of Labor [Office of Apprenticeship Training, Employer and Labor Services \(OATELS\)](#) website.

Interests

Realistic — Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Work Styles

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Integrity — Job requires being honest and ethical.

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Self Control — Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations.

Independence — Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done.

Persistence — Job requires persistence in the face of obstacles.

Leadership — Job requires a willingness to lead, take charge, and offer opinions and direction.

Wages & Employment Trends

Median wages data collected from **Heating, Air Conditioning, and Refrigeration Mechanics and Installers**.

Employment data collected from **Heating, Air Conditioning, and Refrigeration Mechanics and Installers**.

Industry data collected from **Heating, Air Conditioning, and Refrigeration Mechanics and Installers**.

Median wages (2014) \$21.46 hourly, \$44,630 annual

State wages



Employment (2014) 292,000 employees

Projected growth (2014-2024) ■■■■Much faster than average (14% or higher)

Projected job openings (2014-2024) 84,200

State trends



Top industries (2014) [Construction](#)

Source: Bureau of Labor Statistics [2014 wage data](#) and [2014-2024 employment projections](#). "Projected growth" represents the estimated change in total employment over the projections period (2014-2024). "Projected job openings" represent openings due to growth and replacement.