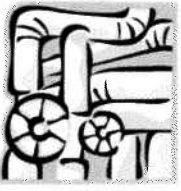


	Current Number of Workers 2006	Projected Number of Workers 2016	% Change to 2016	Average Annual Openings	 <b>Heating/Air Conditioning/Refrigeration Mechanics &amp; Installers</b> <b>SOC # 49-9021</b>	
<b>Regional</b>	300	400	33.30%	10		
<b>Texas</b>	24,350	30,100	23.601%	1000		
<b>Education/ Training Time</b>	<b>Is License Required?</b>	<b>Wage Rate \$/Hr. 2008 Regionally</b>	<b>Percent Female</b>	<b>Average Age</b>	<b>Job Turnover</b>	<b>Why Most Job Openings Occur</b>
<b>1+ years OR Apprentice</b>	<b>Industry Certificates</b>	\$15.79	1.2%	37.0	Average	<b>Equal Growth/ Replacement</b>

#### JOB DESCRIPTION

Install or repair heating, central air conditioning, or refrigeration systems, including oil burners, hot-air furnaces, and heating stoves. *Possible Green Job with enhanced skills.*

#### WHERE DO WORKERS FIND JOBS?

Building Equipment Contractors  
Hardware, and Plumbing and Heating Equipment and Supplies Merchant Wholesalers  
Elementary and Secondary Schools  
Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance

#### RELATED COLLEGE PROGRAMS

CIP 150501 Heating, Air Conditioning and Refrigeration Technology/Technician (ACH/ACR/ACHR/HRAC/HVAC/AC Technology)  
CIP 470201 Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician (HAC, HACR, HVAC, HVACR)

#### IMPORTANT KNOWLEDGE

##### ARTS AND HUMANITIES

\* English Language

##### BUSINESS AND MANAGEMENT

\* Customer and Personal Service

##### ENGINEERING AND TECHNOLOGY

\* Design

\* Engineering and Technology

\* Mechanical

##### MATHEMATICS AND SCIENCE

\* Mathematics

#### IMPORTANT SKILLS

##### CONTENT

\* Reading Comprehension

##### TECHNICAL SKILLS

\* Installation

\* Operation Monitoring

\* Repairing

\* Troubleshooting

#### IMPORTANT ABILITIES

##### FINE MANIPULATIVE ABILITIES

\* Arm-Hand Steadiness

\* Finger Dexterity

\* Manual Dexterity

##### FLEXIBILITY, BALANCE, AND

##### COORDINATION

\* Extent Flexibility

##### IDEA GENERATION AND REASONING

##### ABILITIES

\* Inductive Reasoning

\* Problem Sensitivity

##### PHYSICAL STRENGTH ABILITIES

\* Trunk Strength

##### VISUAL ABILITIES

\* Near Vision

## **NATURE OF THE WORK: Heating/Air Conditioning/Refrigeration Mechanics & Installers**

Heating and air-conditioning systems control the temperature, humidity, and the total air quality in residential, commercial, industrial, and other buildings. Refrigeration systems make it possible to store and transport food, medicine, and other perishable items. Heating, air-conditioning, and refrigeration mechanics and installers--also called technicians--install, maintain, and repair such systems.

Heating, air-conditioning, and refrigeration systems consist of many mechanical, electrical, and electronic components, such as motors, compressors, pumps, fans, ducts, pipes, thermostats, and switches. Technicians must be able to maintain, diagnose, and correct problems throughout the entire system. To do this, they adjust system controls to recommended settings and test the performance of the entire system using special tools and test equipment.

Technicians often specialize in either installation or maintenance and repair, although they are trained to do both. They also may specialize in doing heating work or air-conditioning or refrigeration work. Some specialize in one type of equipment--for example, hydronics (water-based heating systems), solar panels, or commercial refrigeration. Technicians also try to sell service contracts to their clients. Service contracts provide for regular maintenance of the heating and cooling systems and they help to reduce the seasonal fluctuations of this type of work.

Technicians follow blueprints or other specifications to install oil, gas, electric, solid-fuel, and multiple-fuel heating systems and air conditioning systems. After putting the equipment in place, they install fuel and water supply lines, air ducts and vents, pumps, and other components. They may connect electrical wiring and controls and check the unit for proper operation. To ensure the proper functioning of the system, furnace installers often use combustion test equipment, such as carbon dioxide testers, carbon monoxide testers, combustion analyzers and oxygen testers.

After a furnace or air-conditioning unit has been installed, technicians often perform routine maintenance and repair work to keep the systems operating efficiently. They may adjust burners and blowers and check for leaks. If the system is not operating properly, they check the thermostat, burner nozzles, controls or other parts to diagnose and then correct the problem.

During the summer, when the heating system is not being used, heating equipment technicians do maintenance work, such as replacing filters, ducts, and other parts of the system that may accumulate dust and impurities during the operating season. During the winter, air-conditioning mechanics inspect the systems and do required maintenance, such as overhauling compressors.

Refrigeration mechanics install, service, and repair industrial and commercial refrigerating systems and a variety of refrigeration equipment. They follow blueprints, design specifications, and manufacturers' instructions to install motors, compressors, condensing units, evaporators, piping, and other components. They connect this equipment to the ductwork, refrigerant lines, and electrical power source. After making the connections, they charge the system with refrigerant, check it for proper operation, and program control systems.

When air-conditioning and refrigeration technicians service equipment, they must use care to conserve, recover, and recycle chlorofluorocarbon (CFC), hydrochlorofluorocarbon (HCFC), hydrofluorocarbon (HFC), and other refrigerants used in air-conditioning and refrigeration systems. The release of these refrigerants can be harmful to the environment. Technicians conserve the refrigerant by making sure that there are no leaks in the system; they recover it by venting the refrigerant into proper cylinders; they recycle it for reuse with special filter-dryers; or they insure that the refrigerant is properly disposed.

Heating, air-conditioning, and refrigeration mechanics and installers are adept at using a variety of tools, including hammers, wrenches, metal snips, electric drills, pipe cutters and benders, measurement gauges, and acetylene torches, to work with refrigerant lines and air ducts. They use voltmeters, thermometers, pressure gauges, manometers, and other testing devices to check airflow, refrigerant pressure, electrical circuits, burners, and other components.