California Occupational Guides

Guide for

Air Quality Engineers in California

May also be called: Air Quality Specialists; Air Resources Engineers; Senior Air Quality Engineers

Specialties within this occupation include: Air Pollution Specialists

What Would I Do?

Growing concern regarding the effects of pollutants on our health has resulted in a trend of increasingly stringent State and federal regulations over the past forty years. These regulations have focused on a broad range of sources and activities that involve virtually all aspects of modern society. In addition, the intersection of science, economics, law, and politics in the environmental area has resulted in increased attention to the costs and manner in which environmental pollution is regulated. All of these factors have opened the door for many professionals from all different backgrounds to become proficient or specialized in air quality issues. Working in government agencies, private industries, or consulting firms that provide advice to both, Air Quality Engineers inspect, analyze, and quantify levels of pollution and their environmental impact. They design and assess the effectiveness of environmental regulatory programs to manage these health risks to the environment.

Air Quality Engineers generally work indoors, with some amount of field work, depending on the job description or employer. They are involved in the quantification of emissions from different sources and sectors of the economy performing evaluations of alternative control techniques (both engineering and regulatory) to manage or reduce those emissions. In some job settings, they may investigate public complaints.

Air Pollution Specialists work for local, State, and federal governmental agencies. They prepare or evaluate permit applications and other environmental documents, as well as investigate, test, and sample pollutant sources in a given area. Common tasks include producing quantitative emissions estimates and using computer models to calculate the air quality and health risk impacts of those emissions. Documenting all of these activities in technical reports is an ongoing responsibility. They work on a variety of projects in some of the following areas:

- Air quality regulatory management
- Compliance and support
- Air permit applications
- Air quality impact assessments and licensing
- Control technology assessments
- Greenhouse gas emission statements/inventories
- Air toxins analysis

Tools and Technology

Depending on the project, Air Quality Engineers might use a combination of the following tools and technology.

- Air samplers or collectors
- Air velocity and temperature monitors
- Air velocity meters
- Ambient air measurement devices
- Database user interface and query software
- Desktop computers
- Flowmeters
- Greenhouse gas management software
- Hand-held digital thermometers
- Microsoft Project
- Microsoft Visual Basic
- Photometers
- Programming languages
- Project management software
- Scientific calculators
- Spectrophotometers
- Spreadsheet software

Important Tasks and Related Skills

Air Quality Engineers are a multifaceted group of specialists. Some perform similar tasks on a daily basis; others work on innovations in new technologies that cause their daily routine to be flexible. Depending on their specialty, the tasks Air Quality Engineers and Air Pollution Specialists perform may include the following:

Task	*Skill Used in this Task*
Meet with manufacturers, public contractors, federal, State, and local agencies to develop specifications for test equipment, engineering contract proposals, and overall program requirements in accordance with regulations.	Law and Government
Communicate scientific and technical information to the public, organizations, or internal audiences through oral briefings, written documents, workshops, conferences, training sessions, or public hearings.	Oral Expression
Research sources of emissions to determine their impact on the environment and develop theories or methods of pollution abatement or control.	Chemistry
Collect, quantify, and analyze air quality data to determine compliance with current regulations.	Inductive Reasoning
Prepare charts or graphs from data samples, providing summary information on the environmental relevance of the data.	Critical Thinking
Collaborate with environmental scientists, planners, hazardous waste technicians, engineers, and other specialists in law and business to address environmental problems.	Deductive Reasoning
Design, implement, and evaluate programs that monitor greenhouse gas producing firms.	Monitoring
Prepare written, oral, tabular, and graphic reports summarizing requirements and regulations, including enforcement documentation.	Written Expression
Develop trend data of air pollution from mobile and stationary sources in relation to various factors. Operate and interpret complex models to predict dispersion and environmental fate of air pollutants.	Mathematics
Prepare feasibility studies and compute cost effectiveness of proposed	Judgment and Decision

standards and control measures.	Making
Draft and develop control system instrumentations, tests, and methods for measurement of air pollution and emissions of air contaminants.	Engineering and Technology

Sources: U.S. Department of Labor **Occupational Information Network (O*NET)** at online.onetcenter.org and The Conference Board Help Wanted OnLine™(HWOL) data series.

Working Conditions

Air Quality Engineers work both indoors and outdoors investigating complaints, sampling air quality, preparing environmental documents, and working with businesses, government agencies, and the general population. Their offices tend to be modern, quiet, and climate-controlled; however, when working outdoors Air Quality Engineers are sometimes exposed to extreme weather conditions. Field work for Air Quality Engineers usually takes them to industrial facilities, where conditions may require familiarity with and use of safety gear including hard hats, safety goggles, ear plugs, respirators, or protective clothing. They frequently need to travel, driving to and from client sites or air monitoring stations. Some Air Quality Engineers drive modified trucks equipped with air monitoring equipment.

The average schedule for Air Quality Engineers is a standard 40-hour workweek, but they can expect to work an occasional evening, weekend, or holiday in order to meet project deadlines. Physical requirements for some Air Quality Engineers include flexibility, arm-hand steadiness to lift and maneuver equipment, and the ability to climb ladders.

Engineers and Specialists who work in government agencies may be represented by the Professional Engineers in California Government (PECG) union.

Will This Job Fit Me?

People who are concerned about public health, air quality, and the detrimental effect pollutants have on the environment may enjoy this type of work. This occupation could be a good fit for individuals who want to protect public health using their skills in math and science. Those who enjoy designing and constructing products that aid in the reduction of air pollution may like this job.

Those who have the goal of working in a leadership role, as well as a desire to advance within their specialty, may like the work of an Air Quality Engineer. In addition, individuals who pay close attention to detail and work well under pressure might do well in the air quality field. Those who are comfortable interpreting and explaining regulations or compliance rules to clients or public entities may like this type of work.

What Wages and Benefits Can I Expect?

Wages

For Air Quality Engineers who work in private industries, a formal salary survey is not available. However, references to annual salaries range from $60,000 to upwards of $100,000. All salaries depend on the pay structure established by each employer for work performed, the nature of the project, and the skill of the specialists.

For those who work in State agencies such as the California Air Resources Board, monthly earnings range from of $2,900 to upwards of $7,100.

Benefits

In addition to salary, medical and retirement benefits are usually included in the compensation for Engineers employed by private firms or government agencies. Self-employed Air Quality Engineers are responsible for covering their own medical, dental, and life insurance.

What is the Job Outlook?

With growing concerns about greenhouse gases and air pollution, industries, environmental organizations, and government agencies are turning to Air Quality Engineers for solutions to their pollution problems.

How Do I Qualify?

Education, Training, and Other Requirements

A Bachelor of Science (B.S.) degree in engineering is the minimum educational requirement for Air Quality Engineers. In private firms, Air Quality Engineers are generally required to have a bachelor's degree in chemical, mechanical, or environmental engineering, although most employers prefer completion of a Master of Science (M.S.) degree in fields related to air quality or any of the previously listed fields.

Other educational fields considered relevant for Air Quality Engineers are land use planning, environmental science, chemistry, toxicology, physical sciences, biological engineering, and civil engineering. Engineers who have obtained their Professional Engineers (PE) licensure, or are at least in the process of obtaining an Engineer in Training status (EIT), are generally considered the most desirable candidates.

In both government and private agencies, Air Quality Engineers learn additional skills needed with every project, working under the supervision of a senior Engineer. In some cases, having an advanced degree or previous work experience in air quality testing and control can substitute for a particular employer's requirements.

Specific requirements cited from published job listings for Air Quality Engineers include knowledge and experience in the following areas:

- Air quality permitting and air permit application preparation
- Calculations of emissions and preparation of emission inventories
- Development of air regulatory compliance plans and reports
- Dispersion modeling
- Control technology assessment and costing
- U.S. Environmental Protection Agency Title V permitting requirements
- Technical writing

Air Pollution Specialists employed by the State of California can qualify with a four-year degree in science or a related field.

Experience

Experience needs posted by employers in California show a wide range of experience, anywhere from 1 to 15 years. This is due to the varying nature and complexity of projects throughout the field.

Early Career Planning

High school students planning to become an Air Quality Engineer should take classes in English, chemistry, mathematics, biological and life sciences, computer science or computer-aided design programs, and mechanical drawing. Students would also benefit from participating in extracurricular

science or engineering programs geared toward middle and high school students such as Odyssey of the Mind, Junior Engineering Technical Society (JETS), and Science Olympiad.

Continuing Education

While continuing education is not necessarily a requirement, most Air Quality Engineers need to update their knowledge through workshops, seminars, and ongoing training. They also need to keep up with changes to environmental codes and regulations.

Licensing and Certification

Air Quality Engineers who provide professional oversight to less-experienced Engineers or manage public projects will likely have a Professional Engineers (PE) license in civil, mechanical, or chemical engineering. To obtain a PE license generally requires a B.S. degree from an accredited college recognized by the Accreditation Board for Engineering and Technology (ABET), some experience in the field, and prior completion of the Engineer-in-Training (EIT) or Fundamentals of Engineering (FE) examination. Once PE licensure is obtained, it must be renewed every two years.

Licensing is not required for Air Pollution Specialists who work for the State of California; however, Specialists who obtain their PE licensure qualify for higher earnings and may experience greater leadership opportunities.

Where Can I Find Training?

There are two ways to search for training information at www.labormarketinfo.edd.ca.gov/?Pageid=1013:

- Search by Field of Study to find what programs related to Air Quality Engineers are available and what schools offer those programs. You may use keywords such as: Air Quality Engineer and air pollution.
- Search by Training Provider to find schools by name, type of school, or location.

Contact schools you are interested in to learn about classes available, tuition and fees, and any prerequisite course work.

Where Would I Work?

Air Quality Engineers work in government agencies, such as the California Air Resources Board, U.S. Environmental Protection Agency, and local air districts. Others work in private engineering firms, conducting research and development activities or serving as consultants to public and private clients. They also work for manufacturing firms, refineries, chemical plants, pipelines, or upstream oil and gas operations.

Finding a Job

Direct application to employers remains one of the most effective job search methods. Air Quality Engineers can also register with their school placement center for job leads. Professional associations and organizations provide job leads as well. **Online job opening systems** include JobCentral at www.jobcentral.com and CalJOBS^{SM} at www.caljobs.ca.gov.

To find your nearest One-Stop Career Center, go to Service Locator at www.servicelocator.org. View the helpful job search tips at www.labormarketinfo.edd.ca.gov/occguides/JobSearchTips.pdf for more resources (requires Adobe Reader).

Yellow Page Headings

You can focus your local job search by checking employers listed online or in your local telephone directory. Below are some suggested headings where you might find employers of Air Quality Engineers.

- Air Pollution Measuring Service
- Air Pollution Control
- Air Quality Engineering
- Environmental Compliance

Find Possible Employers

To locate a list of employers in your area, use "Find Employers" on the LaborMarketInfo Web site at www.labormarketinfo.edd.ca.gov/aspdotnet/databrowsing/empMain.aspx?menuChoice=emp

- Select the search for employers by occupation.
- Select a geographic area.
- Search for an occupation by keyword, occupation, or category.
- Select one of the top industries that employ the occupation.
- This will give you a list of employers in that industry in your area.
- Click on "View Filter Selections" to limit your list to specific cities or employer size.
- Click on an employer for the street address, telephone number, size of business, Web site, etc.
- Contact the employer for possible employment.

Where Could This Job Lead?

After years of experience working for private firms or government agencies, Air Quality Engineers sometimes join consulting firms or start their own business. In government, the next step in the career ladder for Air Resources Engineers, Air Quality Engineers, and Air Pollution Specialists is the “Senior” position, which involves managing a team and leading projects.

Related Occupations

Below is a list of occupations related to Air Quality Engineers.

- Chemical Engineers (SOC 17-2041)
- Civil Engineers (SOC 17-2051)
- Compliance Officers, Except Agriculture (SOC 13-1041)
- Environmental Engineering Technicians (SOC 17-3025)
- Environmental Engineers (SOC 17-2081)
- Environmental Science and Protection Technicians, Including Health (SOC 19-4091)
- Environmental Scientists and Specialists, Including Health (SOC 19-2041)
- Mechanical Engineers (SOC 17-2141)

Other Sources

- California Air Resources Board
  www.arb.ca.gov/homepage.htm
- California Department of Consumer Affairs
  www.dca.ca.gov
- California Environmental Protection Agency
  www.calepa.ca.gov
- Professional Engineers and Land Surveyors
  www.pels.ca.gov

- Accreditation Board for Engineering and Technology
  www.abet.org
- Air and Waste Management Association
  www.awma.org
- American Society for Engineering Education
  www.asee.org
- Institute of Electrical and Electronics Engineers
  www.ieee.org/index.html
- Junior Engineering Technical Society
  www.jets.org
- National Society of Professional Engineers
  www.nspe.org/index.html
- U.S. Environmental Protection Agency
  www.epa.gov

These links are provided for your convenience and do not constitute an endorsement by EDD.

For the Career Professional

The following codes are provided to assist counselors, job placement workers, or other career professionals.

System	Code
SOC – Standard Occupational Classification at www.bls.gov/soc	N/A
O*NET – Occupational Information Network at online.onetcenter.org	N/A

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