

OCCUPATIONAL OUTLOOK HANDBOOK

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Chemical Engineers

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Summary

Quick Facts: Chemical Engineers	
2018 Median Pay <input data-bbox="397 478 414 499" type="button" value="?"/>	\$104,910 per year \$50.44 per hour
Typical Entry-Level Education <input data-bbox="483 514 500 535" type="button" value="?"/>	Bachelor's degree
Work Experience in a Related Occupation <input data-bbox="565 541 581 562" type="button" value="?"/>	None
On-the-job Training <input data-bbox="430 571 446 592" type="button" value="?"/>	None
Number of Jobs, 2018 <input data-bbox="430 598 446 619" type="button" value="?"/>	33,900
Job Outlook, 2018-28 <input data-bbox="430 625 446 646" type="button" value="?"/>	6% (As fast as average)
Employment Change, 2018-28 <input data-bbox="483 655 500 676" type="button" value="?"/>	2,100



[What Chemical Engineers Do](#)

Chemical engineers apply the principles of chemistry, biology, physics, and math to solve problems that involve the use of fuel, drugs, food, and many other products.

[Work Environment](#)

Chemical engineers work mostly in offices or laboratories. They may spend time at industrial plants, refineries, and other locations, where they monitor or direct operations or solve onsite problems. Nearly all chemical engineers work full time.

[How to Become a Chemical Engineer](#)

Chemical engineers must have a bachelor's degree in chemical engineering or a related field. Employers also value practical experience. Therefore, internships and cooperative engineering programs can be helpful.

[Pay](#)

The median annual wage for chemical engineers was \$104,910 in May 2018.

[Job Outlook](#)

Employment of chemical engineers is projected to grow 6 percent from 2018 to 2028, about as fast as the average for all occupations. Demand for chemical engineers' services depends largely on demand for the products of various manufacturing industries.

[State & Area Data](#)

Explore resources for employment and wages by state and area for chemical engineers.

[Similar Occupations](#)

Compare the job duties, education, job growth, and pay of chemical engineers with similar occupations.

[More Information, Including Links to O*NET](#)

Learn more about chemical engineers by visiting additional resources, including O*NET, a source on key characteristics of workers and occupations.

[What They Do ->](#)

SUGGESTED CITATION:

Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook*, Chemical Engineers, on the Internet at <https://www.bls.gov/oooh/architecture-and-engineering/chemical-engineers.htm> (visited December 05, 2019).

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What Chemical Engineers Do

About this section [?](#)

Chemical engineers apply the principles of chemistry, biology, physics, and math to solve problems that involve the production or use of chemicals, fuel, drugs, food, and many other products. They design processes and equipment for large-scale manufacturing, plan and test production methods and byproducts treatment, and direct facility operations.



Chemical engineers develop and design chemical manufacturing processes.

Duties

Chemical engineers typically do the following:

- Conduct research to develop new and improved manufacturing processes
- Establish safety procedures for those working with dangerous chemicals
- Develop processes for separating components of liquids and gases, or for generating electrical currents, by using controlled chemical processes
- Design and plan the layout of equipment
- Conduct tests and monitor the performance of processes throughout production
- Troubleshoot problems with manufacturing processes
- Evaluate equipment and processes to ensure compliance with safety and environmental regulations
- Estimate production costs for management

Some chemical engineers, known as **process engineers**, specialize in a particular process, such as oxidation (a reaction of oxygen with chemicals to make other chemicals) or polymerization (making plastics and resins).

Others specialize in a particular field, such as nanomaterials (extremely small substances) or biological engineering. Still others specialize in developing specific products.

In addition, chemical engineers work in the production of energy, electronics, food, clothing, and paper. They must understand how the manufacturing process affects the environment and the safety of workers and consumers.

Chemical engineers also conduct research in the life sciences, biotechnology, and business services.

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Work Environment

[About this section](#) 

Chemical engineers held about 33,900 jobs in 2018. The largest employers of chemical engineers were as follows:

Research and development in the physical, engineering, and life sciences	10%
Engineering services	9
Petroleum and coal products manufacturing	6
Wholesale trade	4
Pharmaceutical and medicine manufacturing	4



Chemical engineers generally work in offices or laboratory settings, although sometimes they must work in an industrial setting to oversee production.

Chemical engineers work mostly in offices or laboratories. They may spend time at industrial plants, refineries, and other locations, where they monitor or direct operations or solve onsite problems. Chemical engineers must be able to work with those who design other systems and with the technicians and mechanics who put the designs into practice.

Some engineers travel extensively to plants or worksites, both domestically and abroad.

Injuries and Illnesses

Chemical engineers can be exposed to health or safety hazards when handling certain chemicals and plant equipment, but such exposure can be avoided if proper procedures are followed.

Work Schedules

Nearly all chemical engineers work full time. Occasionally, they may have to work additional hours to meet production targets and design standards or to troubleshoot problems with manufacturing processes. Some chemical engineers work more than 40 hours per week.

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