

Chemical Engineers

SOC: 17-2041 • Career Profile Report

■ Key Facts

<div>\$121,860</div> <div>Median Salary</div>	<div>21,600</div> <div>Employment</div>	<div>+3.0%</div> <div>Growth Rate</div>
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■ Requirements & Salary Range

Education: Bachelor's degree

■ Automation Risk Assessment

Low Risk - 17.0% probability of being automated in the next 10-20 years.
This job is relatively safe from automation due to its creative, social, or complex problem-solving requirements.

■ Work-Life Balance

7.2/10 - Good work-life balance

■ Personality Fit (RIASEC)

Higher scores indicate better personality fit for this career type.

Realistic	8.2/10	Investigative	8.8/10
Artistic	6.4/10	Social	5.2/10
Enterprising	5.8/10	Conventional	6.6/10

■ Top Skills Required

Analytical skills, Communication skills, Creativity, Math skills, Problem-solving skills

✓ Strengths

- High Demand
- Flexible Work
- Continuous Learning

■ Challenges

- Burnout Risk
- Rapid Technological Change

■ What They Do

Chemical Engineers apply principles of chemistry, physics, and engineering to **design, develop, and optimize chemical processes and products**. They work to convert raw materials into valuable products, improve manufacturing efficiency, and ensure safety and environmental compliance. Their work is critical in pharmaceuticals, energy, food processing, and materials industries.

This career is well suited for individuals who enjoy problem-solving, experimentation, and process optimization.

What Do Chemical Engineers Do?

These professionals design processes, develop equipment, and oversee production to create chemicals, fuels, and other products efficiently and safely.

Common responsibilities include:

- Developing and improving chemical manufacturing processes
- Designing and testing equipment for chemical production
- Monitoring chemical reactions, process parameters, and quality control
- Ensuring compliance with safety, health, and environmental regulations
- Collaborating with chemists, engineers, and production teams
- Conducting research and simulations to optimize efficiency
- Preparing technical reports and documentation

Key Areas of Chemical Engineering

Chemical engineers may specialize in specific industries or processes:

- Process Design and Optimization: Improving chemical production efficiency and safety
- Materials and Product Development: Creating new chemicals, polymers, or pharmaceuticals
- Environmental and Safety Engineering: Reducing pollution and ensuring regulatory compliance
- Energy and Fuels: Designing processes for petroleum, biofuels, and energy production
- Research and Development: Innovating new processes and technologies

Skills and Abilities Needed

Chemical engineers combine technical, analytical, and problem-solving skills.

Core Professional Skills

Personal Qualities That Matter

Education and Career Pathway

This role typically requires formal education and technical training:

- Bachelor's Degree (minimum): Chemical engineering or related field
- Internships or Co-op Programs: Gaining hands-on experience in chemical processes and equipment
- Professional Engineer (PE) License (optional for advancement): Certification for higher responsibility roles
- Continuous Learning: Staying current with process technology, safety standards, and emerging materials
- Graduate Education (optional): Master's or PhD for research, development, or specialized fields

Where Do Chemical Engineers Work?

They are employed in industries that manufacture or process chemicals and materials:

- Chemical and Petrochemical Plants
- Pharmaceutical and Biotechnology Companies
- Food and Beverage Manufacturing
- Energy and Fuel Production

- Research Laboratories and Consulting Firms

Work environments include laboratories, manufacturing plants, industrial sites, and offices.

Is This Career Difficult?

This career requires strong analytical, technical, and problem-solving skills. Chemical engineers must manage complex processes, ensure safety, and innovate efficiently while maintaining compliance.

Who Should Consider This Career?

This career may be a strong fit if you:

- Enjoy applying chemistry and physics to solve problems
- Are analytical, detail-oriented, and innovative
- Can work with complex processes and equipment
- Have strong communication and teamwork skills
- Want a career in industrial, pharmaceutical, or materials engineering

How to Prepare Early

- Take courses in chemistry, physics, mathematics, and engineering
- Participate in laboratory work, research, or science projects
- Gain experience through internships or co-op programs in chemical industries
- Develop skills in process simulation, safety protocols, and technical reporting
- Explore advanced degrees or certifications for specialization

Chemical engineers design and optimize chemical processes, transforming raw materials into valuable products safely and efficiently across a wide range of industries.

*Generated by StartRight • Data from U.S. Bureau of Labor Statistics & O*NET*

Source: <https://www.bls.gov/ooh/architecture-and-engineering/chemical-engineers.htm>