

DESIGN ENGINEER

Design engineers are responsible for developing and designing new products for their companies.

JOB TITLES COMMON TO THIS CAREER OCCUPATION INCLUDE:

Machine Design Engineer	Electrical Engineer	Tool Design Engineer
Control Systems Engineer	Electronic Engineer	Sales/Proposal Engineer
Quality Engineer	Software Engineer	Research and Development Engineer

SAGINAW VALLEY

Each ladder depicts a series of work experiences that leads to more challenging and higher paying opportunities. While every level of the ladder can provide a satisfying job, some employees will choose to gain even more skills and responsibilities that will advance them in their careers. To do so, they will need more education, training, and work experiences. Some jobs will require a certificate, a license, or an advanced degree.

CLIMBING THE CAREER LADDER

ADVANCED LEVEL

Bachelor's degree or proven technical skills that can be demonstrated through industry experience

Design Engineer \$20.00-\$30.50/hour	Manager \$19.00-\$32.00/hour
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MID LEVEL

Associate's degree or equivalent training and experience

Design Specialist \$15.00-\$23.50/hour	Skilled Trades \$17.85-\$24.00/hour	Manufacturing Support Specialist \$15.00-\$23.50/hour
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ENTRY LEVEL

High school diploma and completion of the Engineering/Manufacturing and Industrial Technology Career Pathway requirements and/or appropriate career and technical education classes

CAD and Design Trainee \$8.10-\$12.00/hour	Apprentice \$8.00-\$15.00/hour	Machinist Trainee \$8.10-\$12.00/hour
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Wages will vary within this occupation based on the employee's education, training, and years of experience. The ability to perform multiple design engineering functions will also increase the wage and the employee's value to the company.

JOB DESCRIPTION

Each occupation is described in terms of specific tasks and typical job duties.

A DESIGN ENGINEER MUST BE ABLE TO:

- Develop blueprints and other job specifications for a wide variety of design applications
- Apply a wide variety of design techniques and processes
- Perform complex mathematical calculations to do stress analyses of materials and determine their suitability for an application
- Understand manufacturing processes and costs
- Write design proposals that the customer will understand and find valuable
- Communicate with coworkers and supervisors to give and receive instructions and coordinate activities

WAGES

Wage information was obtained from the Michigan Department of Labor and Economic Growth and from local employers to give a general idea of the wages and salaries for this occupation.

WAGE RANGE

\$20.00-\$30.50/hour

WORKING CONDITIONS

Engineers typically work in an air-conditioned, state-of-the-art environment. They must interface with customers, as well as plant personnel. As part of the interfacing with customers, they could have the opportunity for global travel. They must be able to meet deadlines. Occasional overtime is required to ensure customer needs and expectations are met.

EDUCATION AND TRAINING

Courses, programs, and certificates that are needed for employment are offered by local education and training providers.



HIGH SCHOOL

- Completion of high school's Engineering/Manufacturing and Industrial Technology Career Pathway and/or appropriate career and technical education classes
- Algebra
- Geometry
- Trigonometry
- Physics
- Career studies, such as electricity, engineering/computer-aided drafting, pre-engineering, machine tool technology, and welding
- Co-op work experience
- Saginaw/Midland/Bay Michigan Works! automation certificate

COMMUNITY COLLEGE

- Machining certificate
- Computer-aided drafting/computer numeric control certificate
- On-the-job training
- Corporate training
- Transfer credits for associate's degree
- Delta College: associate's degree in applied science, manufacturing technology; bachelor's of science degree transfer program

UNIVERSITY

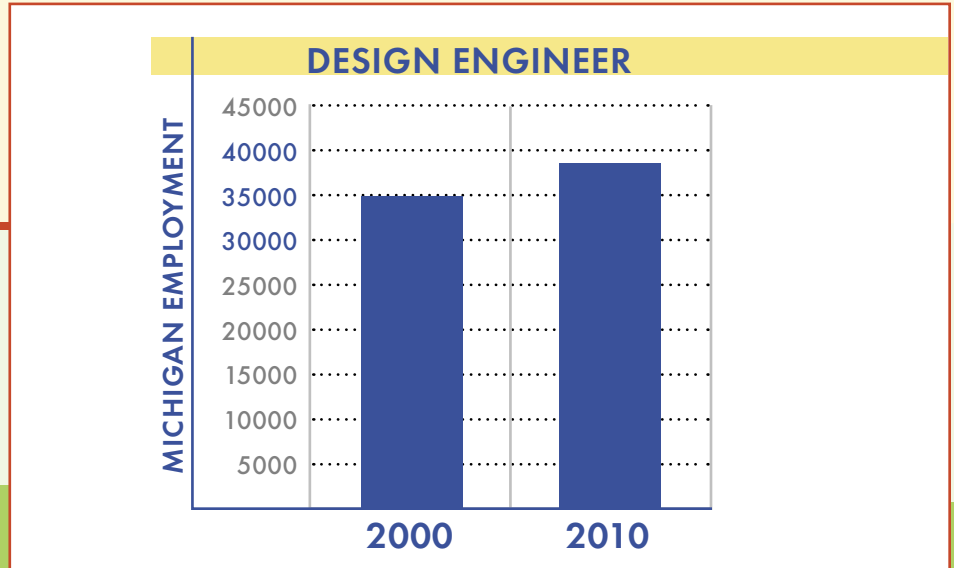
- Corporate training
- On-the-job training
- Selected classes
- Transfer credits for four-year degree
- Engineering degree
- Saginaw Valley State University: master of business administration; master of science, technological processes

LOCAL EDUCATION AND TRAINING PROVIDERS

- Local school districts
- Bay-Arenac ISD Career Center
- Saginaw Career Complex
- Saginaw/Midland/Bay Michigan Works!
- Delta College
- Delta Corporate Services
- Davenport Corporate Services
- Saginaw Valley State University
- Saginaw Valley State University Center for Manufacturing Improvement

JOB OUTLOOK

The rate of growth within this occupation is projected by data from local employers and the Michigan Department of Labor and Economic Growth.



ADVANCEMENT

Design engineers have worked their way to the advanced level of their career ladder. They may advance further by increasing their skills, supervision or training of other employees, managing a department, or through other increased responsibilities.

WHAT THE EMPLOYER SAID



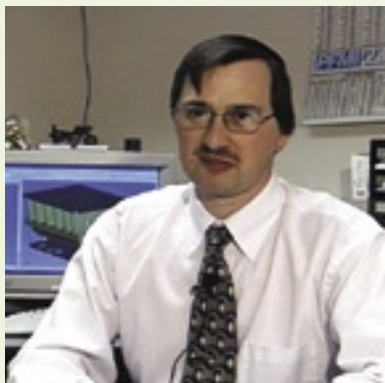
WHAT DO YOU LOOK FOR IN A POTENTIAL EMPLOYEE FOR THIS POSITION?

“The only competitive advantage that a company has is in the people they employ. A potential employee must have the technical skills required for this position, have earned a bachelor’s degree in engineering, or have proven technical skill and know-how that can be demonstrated through industry experience. This person must also have a willingness to learn and teach others what he or she knows, work well with people, have good verbal communication skills, be a team player, and a problem solver.”

Charles Lange, president and CEO
CIGNYS

STAR PROFILE

This interview is intended to show you what is needed to be a star employee.



EMPLOYEE:
RUSSELL WHELTON

OCCUPATION:
DESIGN ENGINEER

COMPANY:
CIGNYS

TELL US HOW YOU ATTAINED YOUR CURRENT POSITION.

I worked my way up through the corporation, starting out as a production floor worker. By taking night classes at Delta, I was able to obtain an associate's degree in engineering and an associate's degree in science. With this background, I was able to work as a detailer using AutoCAD. With work experience and continuing education, my level of responsibility has increased.

DESCRIBE YOUR TYPICAL DAY.

I interact with customers establishing design requirements, work with shop floor machinists to determine the best design, and call vendors for material and component requirements. The majority of my day is spent working on designs and detailing drawings using AutoCAD and SolidWorks software.

WHAT TRAINING AND EDUCATION DID YOU NEED TO ENTER THIS POSITION?

The classes required for my position would include computer classes like Word, Excel, and PowerPoint. Information from math classes, such as geometry and trigonometry, is also used daily. Static and dynamic motion classes are also required. Drafting and communication skills are needed. The most valuable classes would be geometry and trigonometry, which I use daily.

WHAT QUALITIES MAKE SOMEONE A "STAR" IN THIS OCCUPATION?

Star employees need to have an open mind, good communication skills, be willing to continuously learn, have the ability to be flexible with workloads, and be accountable for their actions. A very important quality is the ability to take the responsibility for independent learning.

WHAT DO YOU LIKE MOST/LEAST ABOUT YOUR JOB?

The thing I like most about my job is the freedom to design and the responsibility I have for important projects. The job is continually changing. I must always learn new concepts, programs, and methods of manufacturing. I enjoy keeping up with the latest design software. Just like every couple of months there are new video games for the computer, in manufacturing there is constantly new software to learn and use. The thing I like least about my job is how much time I spend working at the computer.

WHAT ADVICE CAN YOU GIVE SOMEONE SEEKING A JOB IN YOUR FIELD?

If possible, obtain your bachelor's degree before starting a job. Many companies won't look at you if you don't have a degree. If you don't have a degree, then you need to participate in your company's ongoing education and training programs. They will likely pay for the employee's education at a local college or university so that the employee can obtain the knowledge and skills that are needed.

ARE THERE ANY LICENSES OR CERTIFICATIONS NEEDED FOR YOUR POSITION?

Yes. A bachelor's degree is now the requirement for this position. In the past, if you did not have a bachelor's degree, you needed to have proven technical skills and work experience, an associate's degree in engineering, or certificates showing skills with drafting software (such as AutoCAD, SolidWorks, etc.) But today, without the bachelor's degree, it is hard to get the work experience needed for this position.

ACKNOWLEDGMENTS

The Career Ladders project began as a Saginaw County Vision 2020 initiative. To date, more than 300 individuals have been involved in the project. It is impossible to list them all, but the Comprehensive Education and Workforce Development Committee appreciates each one and the incredible participation by our major employers and educational institutions, as well as the support from the Arnold and Gertrude Boutell Memorial Fund, The Dow Chemical Company, The Dow Corning Foundation, the Fordney Club, the Hospital Council of East Central Michigan, the Michigan Department of Labor and Economic Growth, the National Tooling and Machining Association – Saginaw Valley Chapter, the Saginaw Community Foundation, the Saginaw County Business and Education Partnership, the Saginaw County Chamber of Commerce Foundation, Saginaw County's local school districts, Saginaw County's Promise, the Saginaw County Vision 2020, the Saginaw Future Inc., the Saginaw/Midland/Bay Michigan Works!, the Saginaw Township Business Association, the Saginaw Valley Manufacturers' Association, and the Saginaw Valley Tech Prep Partnership. We also want to thank NOVA for their guidance.

EQUAL OPPORTUNITY EMPLOYER/PROGRAM. AUXILIARY AIDS AND SERVICES ARE AVAILABLE UPON REQUEST TO INDIVIDUALS WITH DISABILITIES.