

Lightweight Technology Workforce

Supply-Demand Quarterly Update



ABOUT THIS REPORT

Lightweight Innovations for Tomorrow (LIFT) is a public-private partnership that develops and deploys advanced lightweight materials manufacturing technologies and implements education and training programs to prepare the workforce. An educated and skilled workforce is critical to the future of manufacturing. Under the direction of Emily Stover DeRocco, LIFT's Education & Workforce Director, LIFT's State Teams, engaging manufacturers, educators, workforce and economic developers, and state and local officials, are designing and implementing a cohesive strategy to deliver the talent necessary to the long-term health of the U.S. defense and commercial industrial bases.

Lightweight materials are increasingly important to the competitiveness of transportation manufacturing sectors, including suppliers in the automotive, aircraft, heavy truck, ship, rail, and defense manufacturing industries. Lighter vehicles for the military, industry, and consumer alike, have better performance and use less fuel.

From welding to skilled metalwork, to logistics and mechanical and chemical engineering, to industrial design and manufacturing management, lightweighting-related jobs are found in nearly every manufacturing sector. This report provides an overview and examines the changing demand for workers in jobs that are related to lightweighting in Ohio. This analysis is meant to further enhance the future development of lightweighting workforce education and training in the region.

Of particular note, throughout this analysis and report, we rely not just on national databases related to traditional occupations and job families. The pace of change in the manufacturing industry, largely resulting from technology infusion and forces of globalization, is reflected in rapid-fire change in the knowledge, skills and abilities the manufacturing workforce requires. To provide the best available analyses, this report integrates intelligence gathered from the real time, transactional labor market reflecting the realities of demand and supply, the changing nature of manufacturing employment, and the competencies that are needed in the 21st century manufacturing workforce.



EMPLOYER DEMAND AND EMPLOYMENT TRENDS

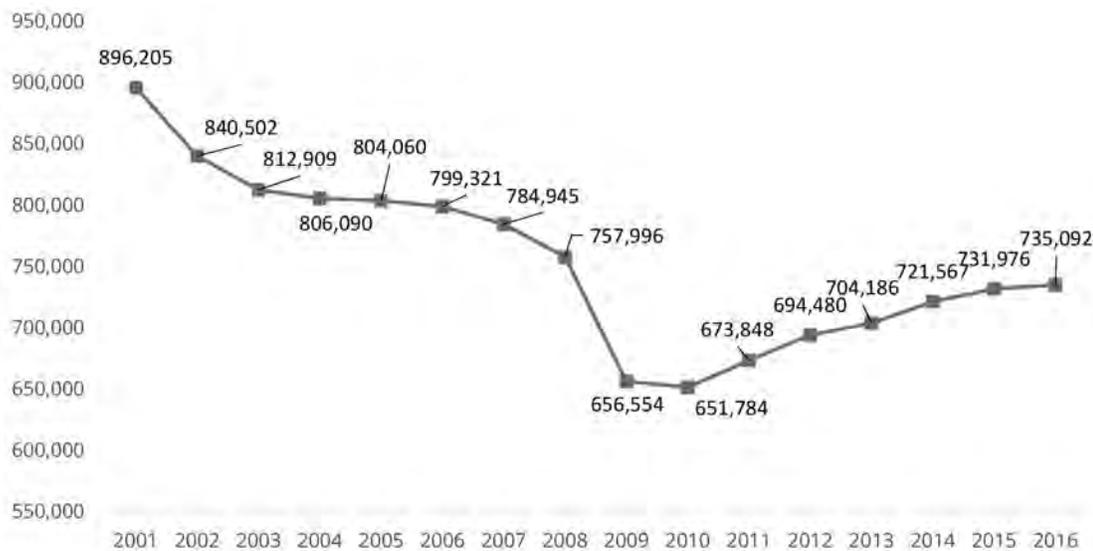
Following a drop in online job postings during Q1 2016, online postings for advanced manufacturing jobs related to lightweighting in Ohio have continued to fall in Q2 2016. The 19,224 ads posted this past quarter represented a 17% decrease over the 23,027 ads during Q1 2016. On the other hand, 2016 marked the sixth consecutive year of employment growth for lightweighting-related jobs in Ohio since the depths of the Great Recession in 2009. In 2009, only 656,554 Ohio workers were employed in lightweighting-related advanced manufacturing jobs, and in 2016, employment reached over 730,000.



**Job postings over time
Ohio**

Q1 2013 - Q2 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network



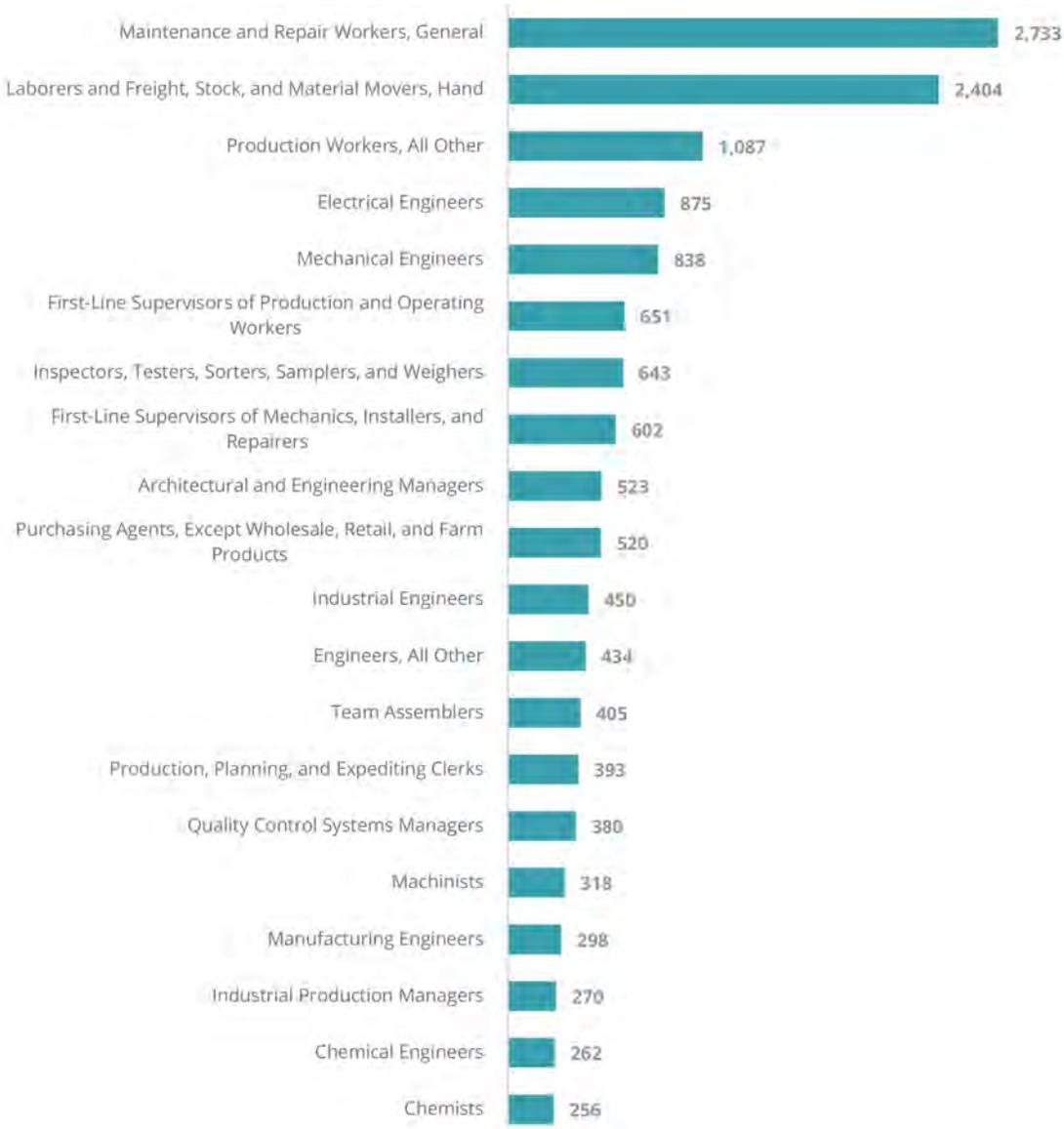
**Employment over time
Ohio**

Q1 2013 - Q2 2016

Data: EMSI, QWI
Analysis: Workforce Intelligence Network

TOP JOBS

Maintenance and repair workers represented the most in-demand occupation in Ohio with over 2,700 online job ads during Q2 2016. Laborers and freight workers (2,404 postings) and production workers (1,807 postings) were also highly demanded showing a large need for skilled tradesmen. Rounding out the top of the list, Engineers (electrical and mechanical with over 800 postings each) and tradesmen supervisory roles (with over 600 postings each) were also sought by employers during Q2 2016. Although there is a large need for workers within the lightweighting industries, there is also a need for those who can innovate the workplace and manage the business process.



Top posting jobs Ohio Q2 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

17%
*decline in demand
for advanced
manufacturing
workers*

19,224
*Total online job
ads in Q2 2016*

*Maintenance and
repair workers:
top in-demand job*



INTRODUCTION TO SKILLED TRADES

Skilled Trades workers are the builders and makers of America. They work directly with advanced materials, assemble complicated products, and are experts in welding and machinery. They ensure that designs and plans are carried out to every detail and specification. These workers do everything from welding, to setting and managing computer-numerically-controlled machines, to overseeing manufacturing floors. These skilled workers are essential to manufacturing of lightweight materials.

The 71 individual occupations within this cluster can be split into three distinct occupation sub-groups; Machinists, Assembly & Operations workers, and Skilled Materials Workers.

Machinists

Machinists set up and operate a variety of machine tools to produce parts and instruments. Some work on traditional industrial machinery while others operate or develop programs for computer-controlled machinery.

Assembly & Operations

Assembly & Operations workers assist other Skilled Trades workers during production. Some perform quality assurance inspections, assist with assembly, or perform supervisory duties on the factory floor.

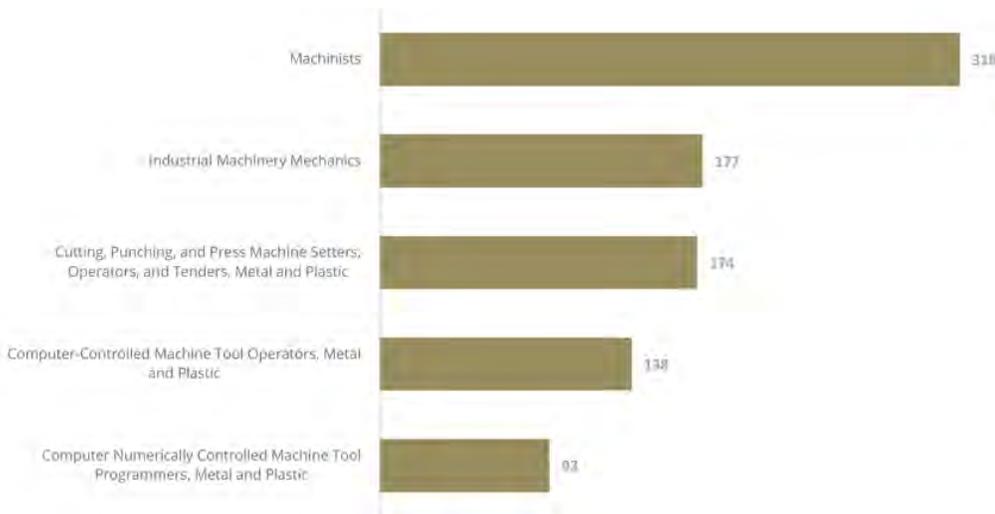
Skilled Materials Workers

Skilled Materials workers perform numerous roles from general maintenance to welding. All Skilled Materials workers must have intimate knowledge of lightweight metals and techniques in order to conduct proper repairs and/or assembly.

Top posting jobs

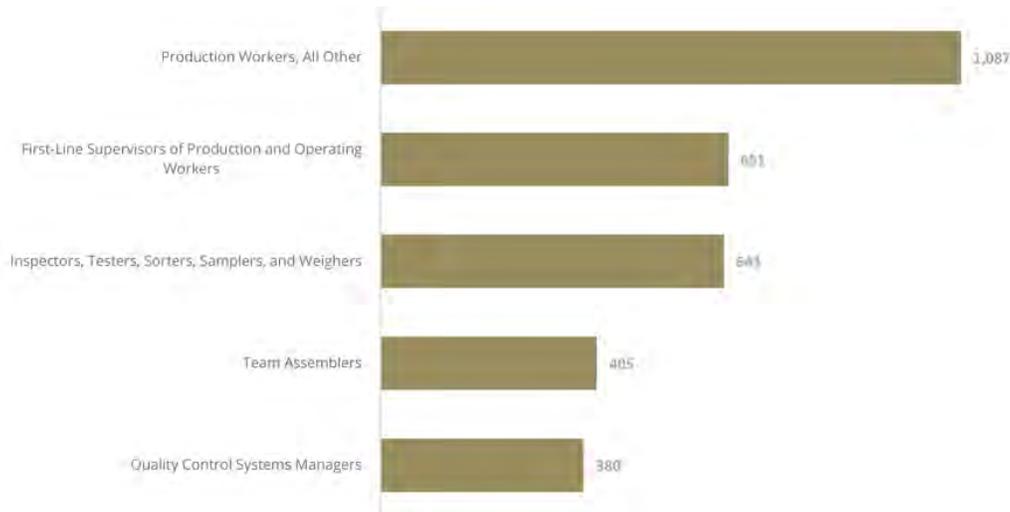
Machinists Q2 2016

*Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network*



General machinists were the most in-demand occupation in the Machinists sub-group during Q22016. Ohio employers posted 318 online job ads for these workers between April and June 2016. The next most in-demand occupations included industrial machinery mechanics (177 postings), cutting, punching, and press machine operators (174 postings), computer-controlled machine tool operators (138 postings), and computer-controlled machine tool programmers (93 postings).

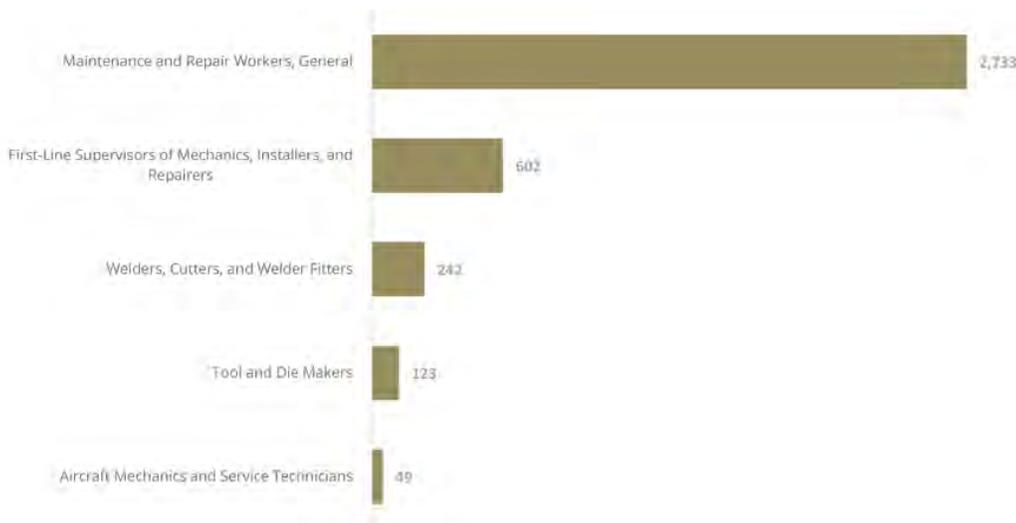
SKILLED TRADES



Top posting jobs Assembly & Operations Q2 2016

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Production workers were in high demand in Q2 2016. Ohio advanced manufacturing employers posted over 1,000 online job ads for these workers. The next most in-demand workers in the Assembly and Operations sub-group were first-line supervisors of production and operating workers (651 postings). Team assemblers (405 postings), quality control systems managers (438 postings), and quality control systems managers (380 postings) also appeared on the top jobs list for the Assembly and Operations sub-group.



Top posting jobs Skilled Materials Workers Q2 2016

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

The most in-demand lightweighting-related occupation in Ohio during Q2 2016 was general maintenance and repair workers. The 2,733 online job ads for this occupation is approximately four and a half times the demand for the next most in-demand Skilled Materials group occupation, first-line supervisors of mechanics, installers, and repairers (602 postings).

SKILLED TRADES

IN-DEMAND TECHNICAL SKILLS

Occupations in the Skilled Trades group require a wide array of high-level technical skills. Traditional skills like machinery, welding, plumbing, and repair, inspection, and cleaning are still present in Skilled Trades job postings. The increased demand for managers in Skilled Trades occupation in Ohio, though, is demonstrated in the posting for skillsets like project management, customer service, and occupational health and safety. As employers seek more managers, the job postings have reflected the need for an evolving list of skills. Traditional skills like repair, inspection, and machinery skills are highly sought in Skilled Trade occupations. Advanced technical skills such as, mathematics and programming also appear within a variety of postings in Q2 2016 and show a shift in Skilled Trades to a demand for more educated and critically thinking workers.

- Repair/Inspection
- Machinery/Machining/Machine Operation
- Welding
- Scheduling
- Supervisory Skills/Budgeting
- Computer Numerical Control (CNC)
- Mathematics
- Plumbing/HVAC
- Customer Service
- Cleaning
- Lathes
- Micrometers/Calipers
- Programmable Logic Controller (PLC) Programming
- Forklift Operation

IN-DEMAND EMPLOYABILITY SKILLS

While Skilled Trades workers now need advanced technical skills, they also need to maintain more traditional foundational skills critical to succeeding in a workplace. Employers hiring Skilled Trades workers often post employability skills like communication, problem solving, ability to perform physical labor , and creativity/ analytical ability in their advertisements. These types of skills are crucial for Skilled Trades so that they can collaborate effectively and especially needed in high-demand supervisor roles.

- Communication Skills, Team Work/Collaboration
- Troubleshooting, Preventative Maintenance, Problem Solving, Work Area Maintenance
- Ability to Perform Physical Labor
- Supervisory Skills, Organizational Skills, Leadership
- Writing
- Computer Skills, Microsoft Office
- Detail-Oriented, Planning, Editing
- Mathematics
- Quality Assurance and Control
- Planning

IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Advertised experience in online job postings for Skilled Trades workers in Ohio reveals that a majority of openings require less than five years of experience. The high number of job postings indicating little to no experience required indicates that entry-level jobs are available for qualified workers. Despite the low levels of experience required for many Skilled Trades job postings, more employers now expect candidates to have relevant education or training, as evidenced by the over 2,700 postings in Q1 2016 requiring short-term post-secondary training. If potential candidates can learn valuable in-demand technical skills like welding, programming, or mathematics through a short-term training program, they can begin to fill the low-level experience openings that have such high demand amongst Ohio employers. Job postings requiring five or more years of experience most likely indicate supervisor or management positions..

Experience in-demand Q2 2016

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network



Education & training in-demand Q2 2016

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network



The average advertised salary in online job postings during Q2 2016 for Skilled Trades workers in Ohio was \$42,640, or 26% higher than median earnings of all workers in the state (\$33,800). While the majority of postings advertising salary offered less than \$35,000, the three higher wage brackets saw an increase in the number of online ads. The \$35,000 to \$50,000 wage bracket had postings increase from 378 in Q1 2016 to 519 in Q2 2016 (+37.3%). The ability to gain training and education in less than two years paired with the higher wage levels make Skilled Trades occupations an exciting option for Ohio workers.

WAGES

Advertised wages Q2 2016

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network



0-5 years Experience most in-demand by Ohio employers

\$42,640 average advertised salary

3,610 postings requiring an associate's degree or less



INTRODUCTION TO ADMINISTRATION

Purchasing materials, ensuring worker safety around machines and with materials, and coordinating and analyzing material and goods movement are essential administration jobs related to lightweighting. Without workers focused on worker safety, production would slow down, and more workers would be injured. Procurement professionals require an extensive understanding of the materials that they purchase. Logistics workers range from materials movers to logistics analysts. While these jobs are focused on administration, all of the workers in this occupation category must have detailed knowledge of materials, goods movement, and worker safety to help ensure smooth and seamless production.

There are 17 individual occupations within this cluster, which can be split into three distinct occupation sub-groups: Procurement & Purchasing, Human Safety, and Logistics Workers.

Logistics

Logistics workers ensure transportation optimization of materials within organizations, from designing efficient supply chain processes to engaging in the actual transport of material and freight.

Procurement & Purchasing

Procurement & Purchasing workers ensure that all of the machinery, equipment, tools, and supplies necessary for metal manufacturers are ready and available for production.

Human Safety

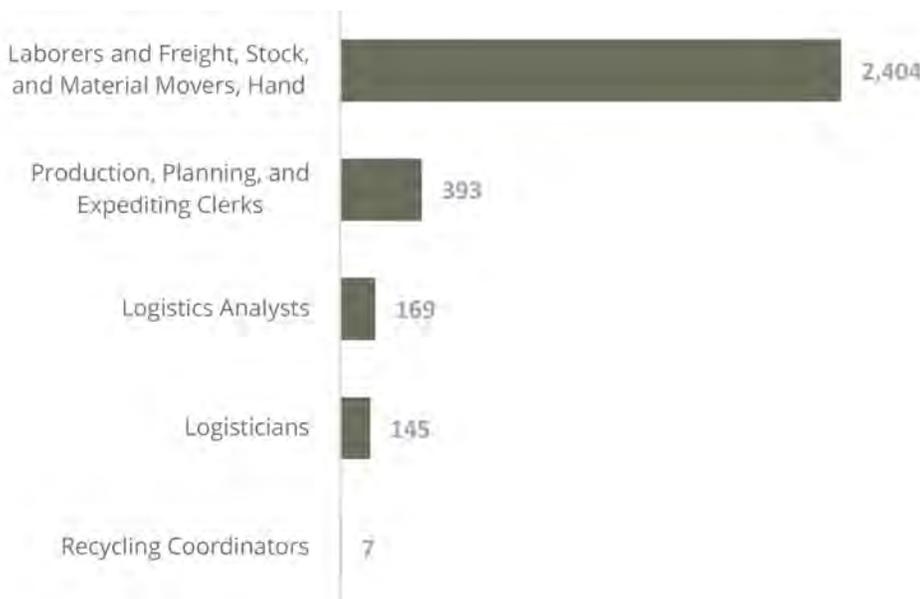
Human Safety workers plan, implement, coordinate, review, and inspect safety programs and protocols to ensure a safe workforce environment.

Top posting jobs

Logistics Q2 2016

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Laborers and freight, stock, and material movers were the most in-demand occupation in the Logistics sub-group during Q2 2016. Ohio employers posted 2,404 online job ads for these workers between April and June 2016. The next most in-demand occupations included production, planning, and expedition clerks (177 postings). Supervisory and higher skilled positions in the Logistics sub-group were also highly sought with logistics analysts (169 postings), logisticians (145 postings) and recycling coordinators (7 postings) rounding out the top five in-demand Logistics occupations.



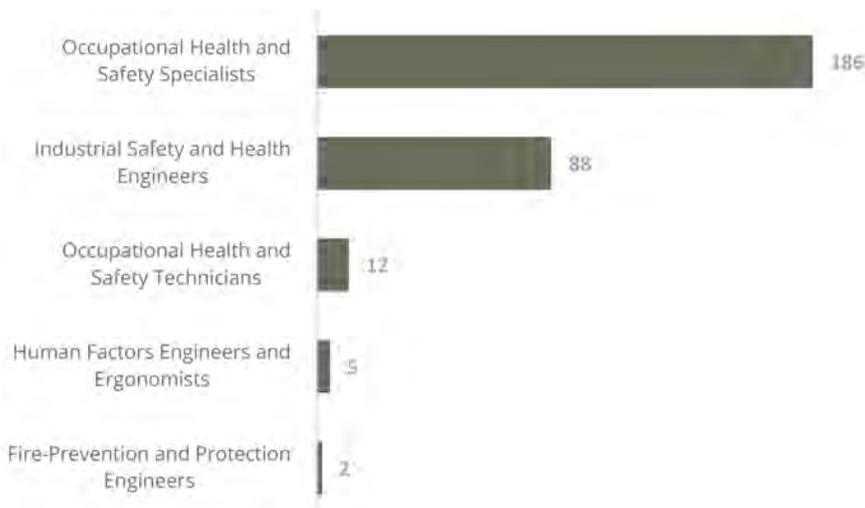
ADMINISTRATION



Top posting jobs Procurement & Purchasing Q2 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

Purchasing agent were the most in-demand occupation in the Procurement and Purchasing sub-group during Q2 2016. Ohio employers posted 520 online job advertisements for these workers between April and June 2016. Other front-end supply chain workers like procurement clerks (149 postings) and sales engineers (132 postings) were also in high demand in Ohio. Supervisory and analytical occupations appeared on the top in-demand procurement and purchasing with cost estimators (219 postings) and purchasing managers (148 postings) appearing within the top five.



Top posting jobs Human Safety Q2 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

Occupational health and safety specialists were the highest in-demand occupation in the Human Safety sub-group during Q2 2016. Ohio employers posted 186 job ads between April and June of 2016 for these workers. Designing a safe work environment appears to be a top priority within this field as the other top jobs focus on designers and engineers focused in safety. They include industrial safety and health engineers (88 postings), occupational health and safety technicians (12 postings), human factors engineers and ergonomists (5 postings) and fire-prevention and protection engineers (2 postings).

ADMINISTRATION

IN-DEMAND TECHNICAL SKILLS

Occupations in the Administration group require a wide array of high-level technical skills and managerial skills. Traditional skills like forklift operation, inspection, and other machine base skills are present within some of these postings. With the idea of administrators typically overseeing business processes skillsets like purchasing, supply chain management, and inventory management were highly sought after within these postings. As employers seek more managers, the job postings have reflected the need for an evolving list of skills. More technical skills like logistics and mathematics were also in-demand, showing an interest in creative and critical thinkers to fill these administration positions.

- Purchasing, Procurement, Budgeting, Cost Control, Inventory Management and Control
- Customer Service, Listening
- Scheduling
- Forklift Operation
- Logistics, Supply Chain Management and Knowledge
- SAP
- Project Management, Contract Management
- Inspection, Repair, Labeling, Packaging
- Mathematics
- Enterprise Resource Planning (ERP)

IN-DEMAND FOUNDATIONAL SKILLS

While Administration workers now need advanced technical and managerial skills, they also need to maintain more traditional foundational skills critical to succeeding in a workplace. Employers hiring Administration workers often post employability skills like communication, problem solving, physical demand, and creativity/analytical ability in their advertisements. With a variety of platforms to work with and maintain the business process computer skills and knowledge of Microsoft Office are also imperative within this occupation group. These types of skills are crucial for Administration so that they can collaborate effectively, especially in high-demand supervisor roles.

- Communication Skills, Team Work/Collaboration
- Microsoft Office, Computer Skills
- Writing
- Ability to Perform Physical Labor
- Problem Solving, Planning, Project Management
- Organizational Skills, Detail-Oriented
- Customer Service, Building Effective Relationship, Listening
- Multi-tasking
- Cost Control, Cost Estimation
- Mathematics

IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Advertised experience in online job postings for Administration workers in Ohio reveals that a majority of openings require less than five years of experience. A majority of these postings desired those with 3 to 5 years of experience indicating want for some skills be developed, but another large group of postings (901 postings) reflected entry level experience (0-2 years) needed showing that a great opportunity to enter the Administration field. With the demanding workload, critical thinking, and decisive atmosphere, more employers now expect candidates to have relevant education or training, as evidenced by the over 1,600 postings in Q1 2016 requiring bachelor's degrees. With high postings for customer contact and front end positions, some can begin to fill the low-level experience openings with high school or vocational training completed. Job postings requiring five or more years of experience most likely indicate supervisor or analyst positions.

Experience in-demand

Q2 2016

Data: Burning Glass Technologies



Education & training in-demand

Q2 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



The average advertised salary in online job postings during Q2 2016 for Administration workers in Ohio was \$37,407, or 11% higher than median earnings of all workers in the state (\$33,800). The majority of postings advertising salary offered less than \$35,000 and saw an increase of 42 postings from Q1 2016. Postings with \$35,000 to \$75,000 advertised salaries decreased, but those over \$75,000 remained the same from last quarter.

WAGES

Advertised wages

Q2 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



252
job postings
advertising salaries
over \$50,000

\$37,407
average
advertised salary

1,612
job postings requiring
a bachelor's degree



INTRODUCTION TO ENGINEERING & DESIGN

Engineers and industrial designers create the blueprints for all things manufacturing. These workers not only envision the products of the future but they also ensure that the products are functional, safe, reliable, and durable.

There are 52 individual occupations within this groups which can be split into four distinct occupation sub-groups; Electrical & Mechanical Engineering, Chemical Engineering & Metallurgy, Industrial Designers & Drafters, and Process Engineering & Testing.

Electrical & Mechanical Engineers

Electrical & Mechanical Engineers perform duties related to the research, design, development, and testing of mechanical functioning, electrical, and manufacturing equipment, components, or systems for commercial, industrial, military, or scientific use.

Chemical Engineers & Metallurgy

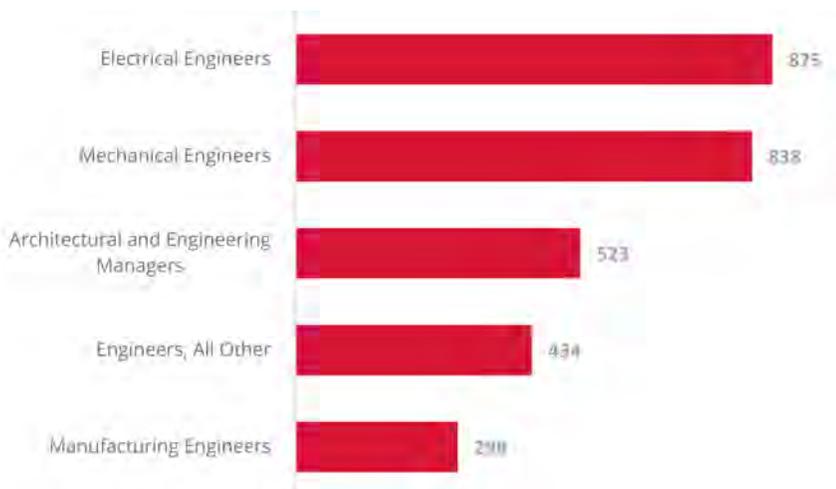
Chemical Engineers & Metallurgy workers perform duties related to the research, design, development, and testing of chemicals and metal materials. These workers often lead the charge in finding cutting-edge uses of lightweight metal materials.

Designers & Drafters

Designers & Drafters collaborate with other workers within the Engineer group to prepare detailed diagrams and designs of machinery, devices, and manufactured products. They combine their artistic talents and knowledge of lightweight metal capabilities to create both functional and appealing product designs.

Process Engineers & Testing

Process Engineering & Testing workers design processes and test manufacturing machinery to ensure that production of lightweight metal materials meet both internal and external safety and quality requirements.



Top posting jobs

Electrical & Mechanical Q2 2016

*Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network*

Electrical engineers took the top in-demand job spot in Ohio within the Electrical and Mechanical sub-group. A total of 875 job ads were looking for individuals to work within this particular occupation. The remaining top five Electrical and Mechanical sub-group occupations were dominated by engineers such as mechanical engineers (838 postings), architectural and engineering managers (523 postings), all other engineers (434 postings), and manufacturing engineers (298 postings).

ENGINEERING & DESIGN

Top posting jobs

Chemical & Metallurgy

Q2 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network

Chemical Engineers were the most sought after workers within the Chemical and Metallurgy sub-group. With 262 online postings, chemical engineers took the number one spot within the sub-group. Other high in-demand positions included chemists (256 postings), materials engineers (109 postings), chemical technicians (46 postings), and materials scientists (25 postings).

Top posting jobs

Designers & Drafters

Q2 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network

Commercial and industrial designers were the most sought out job advertisements within the Designers and Drafters sub-group. A total of 174 job postings were looking for workers to fill these positions. The remainder of the top five jobs in-demand for this sub-group include mechanical drafters (142 postings), all other drafts (94 postings), electrical drafters (39 postings), and electronic drafters (3 postings).

Top posting jobs

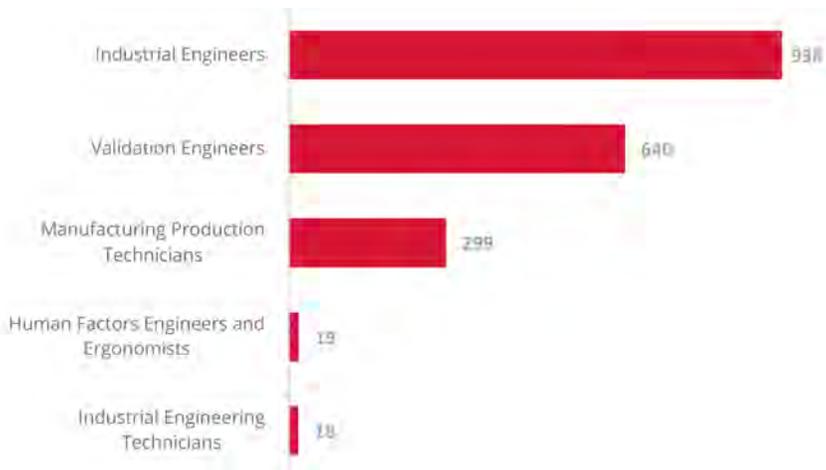
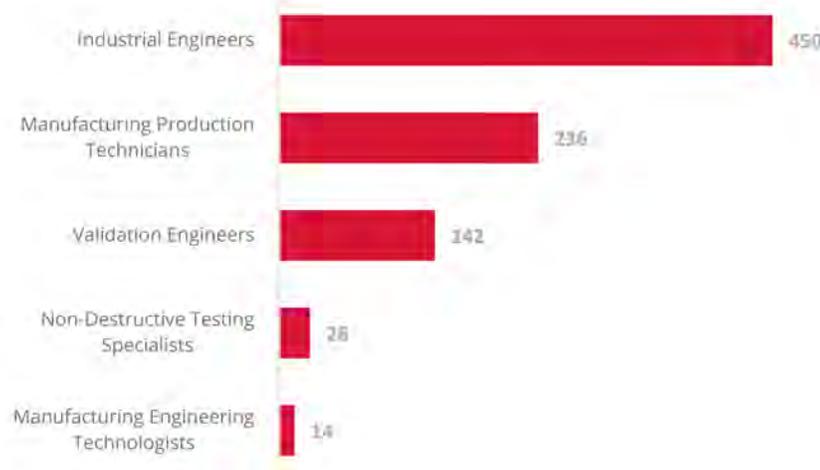
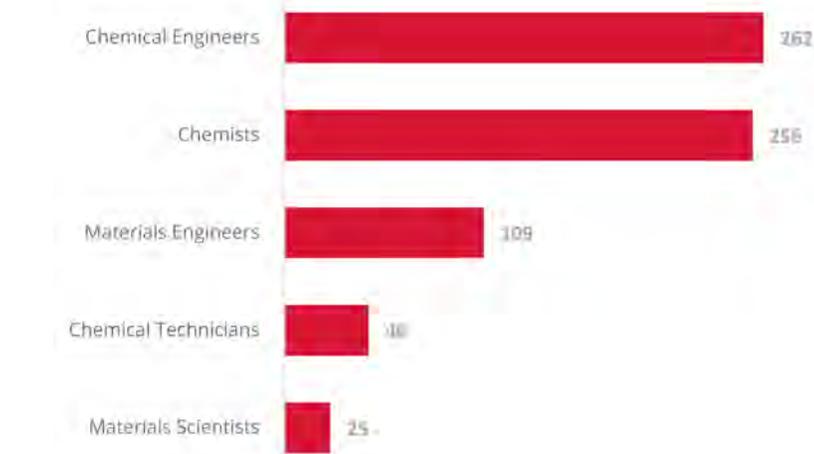
Process & Testing

Q2 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network

Industrial engineers were the highest in-demand occupation within the Process and Testing sub-group in Ohio. A total of 450 online job postings sought these particular engineers within the Ohio. Validation engineers (142 postings) and manufacturing engineering technologists (14 postings) were also highly sought engineers within the sub-group. Manufacturing production technicians (236 postings) and non-destructive testing specialists (28 postings) also held spots within the top five in-demand jobs within the Process and Testing sub-group.



ENGINEERING & DESIGN

IN-DEMAND TECHNICAL SKILLS

Occupations in the Engineers and Design group require a wide array of high-level technical skills and managerial skills. Advanced technical skills such as mechanical and electrical engineering, AutoCAD, and programmable logic controller programming were all highly demanded. These technical skills are a must, bringing about the innovation and bettering of the industry from within. Employers though have been pushing for these engineers and designers to have management skills as well, such as project management, budgeting, and scheduling to name a few. In addition to creative and innovative personalities a push for leaders within this field is evident. Those who can bring these kind of skills to the field could potentially lead the change and improvements of the lightweighting industry, making these skills invaluable for Ohio employers.

- Mechanical Engineering
- Validation, Product Development, Manufacturing Processes, Product Design
- Project Management, Budgeting
- Electrical Engineering
- Computer Aided Drafting/Design (CAD), AutoCAD
- Scheduling
- Automotive Industry Experience
- Inspection
- Packaging
- Purchasing, Cost Control

IN-DEMAND FOUNDATIONAL SKILLS

While Engineer and Design workers need advanced technical and managerial skills, they also need to maintain more traditional foundational skills critical to succeeding in a workplace. Employers hiring these workers often post employability skills like communication, problem solving, and creative thinking abilities in their advertisements. With a desire to innovate through technology computer skills and knowledge of Microsoft Office are also important within this occupation group. These types of skills are crucial for Engineers and Designers so that they can collaborate effectively and better processes and procedures within firms.

- Communication Skills
- Problem Solving, Troubleshooting
- Writing
- Microsoft Office, Computer Skills
- Project Management, Planning, Organizational Skills, Detail-Oriented
- Research
- Team Work/Collaboration
- Quality Assurance and Control, Cost Control
- Mathematics
- Creativity

IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Advertised experience in online job postings for Engineer and Design workers in Ohio reveals that a majority of openings require less than five years of experience. A majority of these postings desired those with 3 to 5 years of experience indicating want for some skills be developed, but another large group of postings (860 postings) reflected entry level experience (0-2 years) needed showing that opportunity to enter the field exists. With the demanding workload, critical thinking, and decisive atmosphere, more employers now expect candidates to have relevant education or training, as evidenced by the over 1,600 postings in Q2 2016 requiring bachelor's degrees. For those willing to learn within companies, many postings (1,248 postings) do look for those with high school or vocational training which shows that more firms are trying to gain employees they can develop and teach.

Experience in-demand

Q2 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network

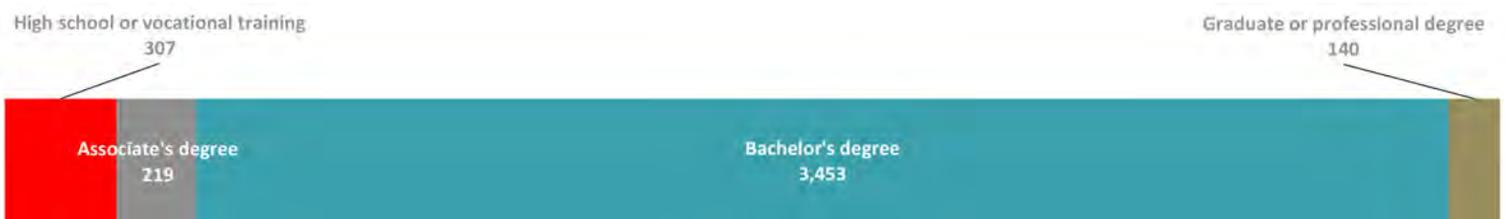


Education & training in-demand

Q2 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



Only 20% of Q2 2016 postings in the Engineering & Design occupation group advertised salaries. Of those, the majority (867 postings) advertised annual salaries above \$50,000 per year. The high educational attainment required to secure most engineering positions translates into high earnings. The mean advertised salary for Q2 2016 among Ohio's Engineering and Design occupations was \$70,160. This salary is over twice as much as the Ohio's median annual earnings for all workers, \$34,800.

WAGES

Advertised wages

Q2 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



3,453
job postings
requiring a
bachelor's degree

\$70,160
average
advertised salary

867
job postings with
salaries greater
than \$50,000



For more information about LIFT and additional workforce data visit www.lift.technology