

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.

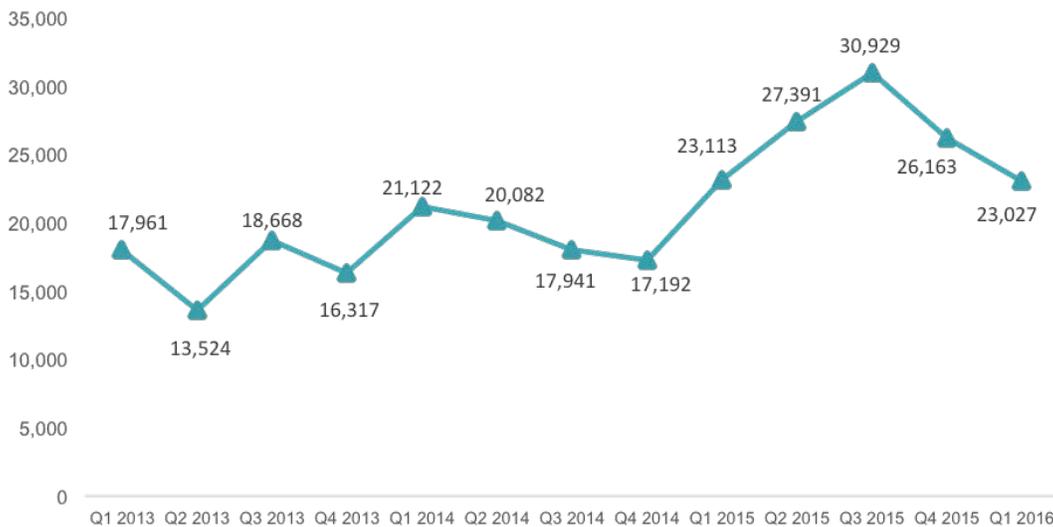
From welding to skilled metalwork, to logistics and mechanical and chemical engineering, to industrial design and manufacturing management, lightweighting-related jobs are found in nearly every manufacturing sector. This report provides an overview and examines the changing demand for workers in jobs 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

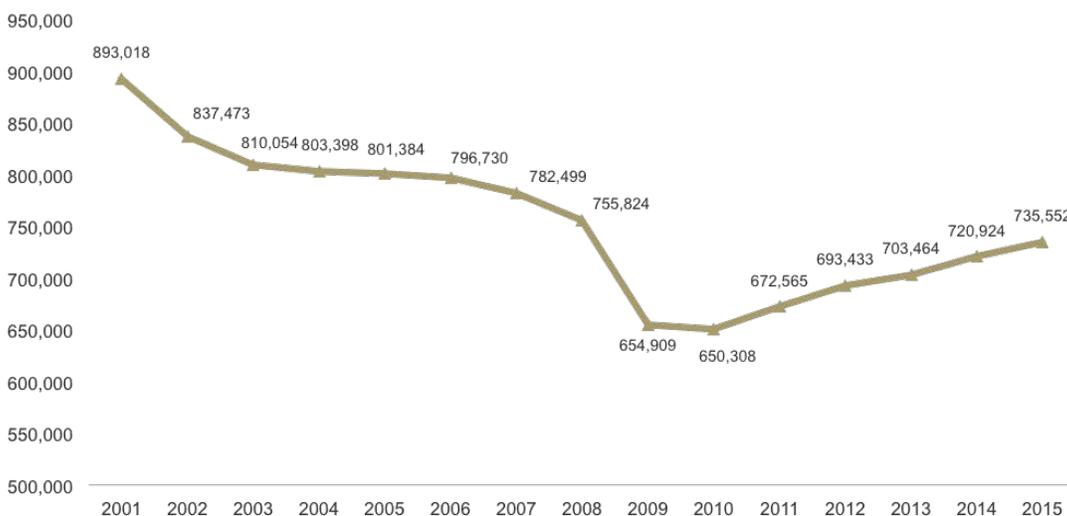
Advanced manufacturing employers in Ohio posted 23,027 online ads for jobs related to lightweighting in Q1 2016. This level of posting represents a decrease in employer demand for the second consecutive quarter since job postings peaked at 30,929 in Q3 2015. Despite the downturn in the past two quarters the general trend for employer demand in Ohio has been increasing. The same is true for employment. The 140 occupations used in this analysis employed over 735,500 in 2015, growing year over year since the end of the recession in 2010 when only 650,000 Ohio workers held the same lightweighting-related jobs.



Job postings over time
Ohio

Q1 2013 - Q1 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network



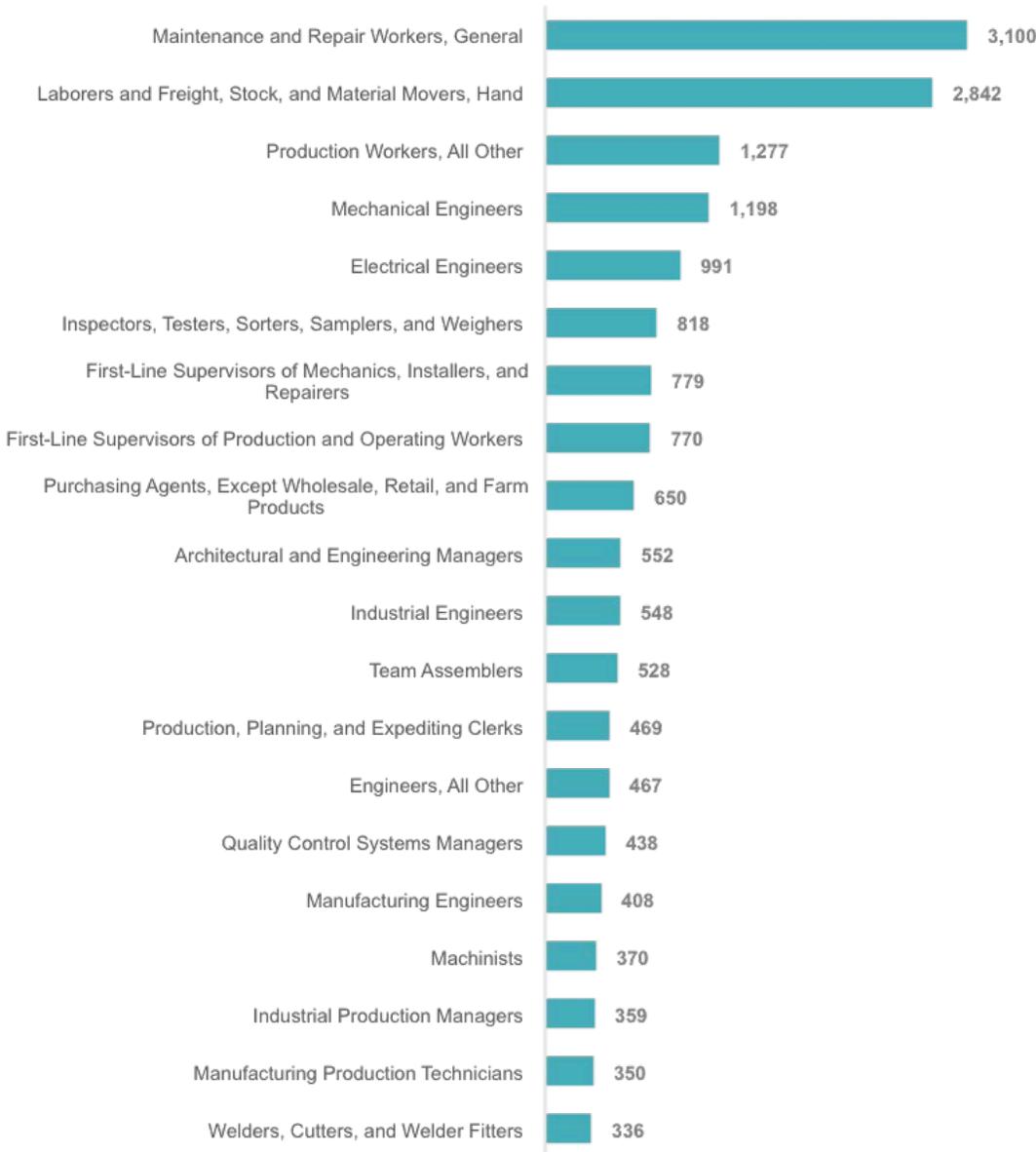
Employment over time
Ohio

Q1 2013 - Q1 2016

Data: EMSI, QWI
Analysis: Workforce Intelligence Network

TOP JOBS

Maintenance and repair workers represented the most in-demand lightweighting-related occupation in Ohio during Q1 2016, with 3,100 online job postings. Employers posted 2,842 online ads for the next most in-demand lightweighting job - laborers and freight, stock, and material movers. While postings for these types of assembly and operations and logistics workers are off the charts in Ohio, demand for engineers like mechanical (1,198 postings) and electrical engineers (991 postings) is also high.



Top posting jobs Ohio Q1 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

735,500
*Ohio workers with
lightweighting-related skills*

23,000
*Q1 total online
job postings*

*Top in-demand job:
Industrial technology
maintenance*



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

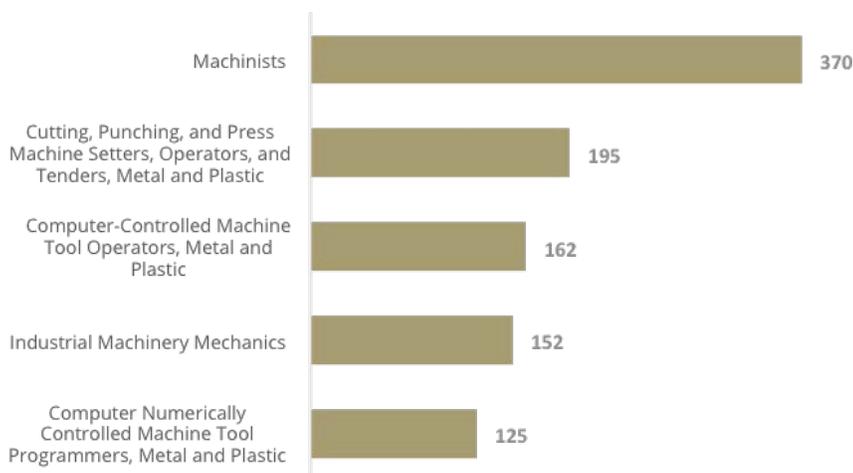
Machinists set up and operate a variety of machine tools to produce parts and instruments. Some work on traditional industrial machinery while others operate or develop programs for computer-controlled machinery.

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

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

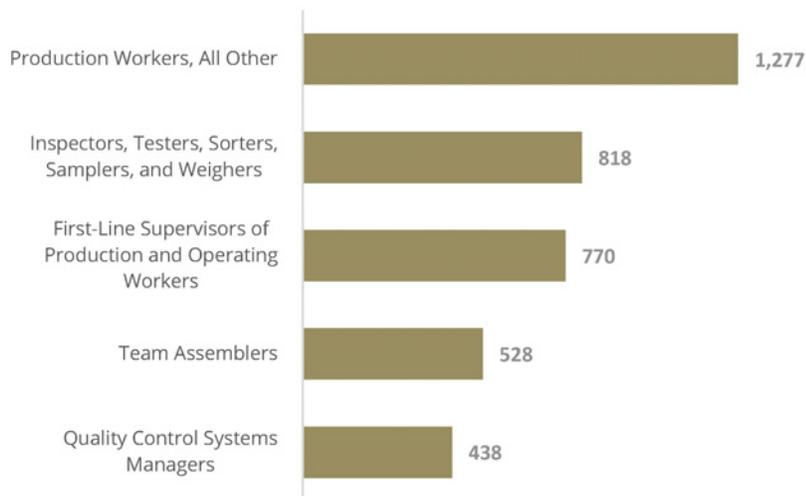
Machinists

Q1 2016

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

General machinists were the most in-demand occupation in the Machinists sub-group during Q1 2016. Ohio employers posted 370 online job ads for these workers between January and March 2016. The next most in-demand occupations included cutting, punching, and press machine operators (195 postings), computer-controlled machine tool operators (162 postings), and industrial machinery mechanics (152 postings).

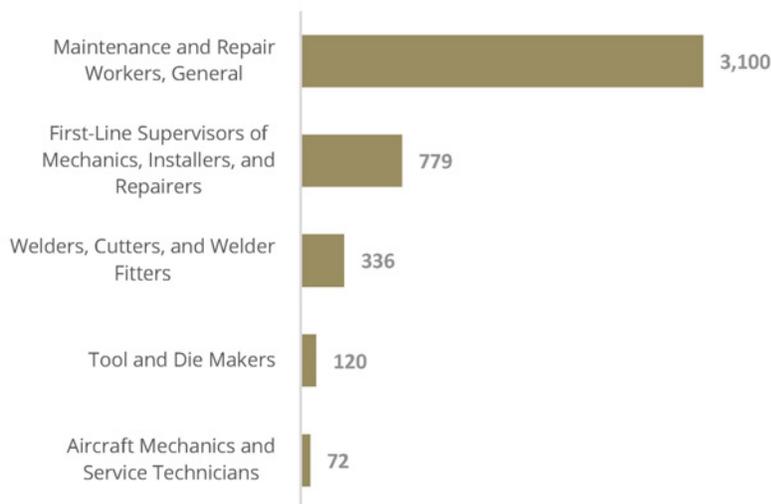
SKILLED TRADES



Top posting jobs Assembly & Operations Q1 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

Production workers were in high demand in Q1 2016 – Ohio advanced manufacturing employers posted over 1,200 online job ads for these workers. The next most in-demand workers in the Assembly & Operations sub-group were inspectors, testers, sorters, samplers, weighers with over 800 online ads. Supervisory roles like first-line supervisors of production and operating workers (770 postings) and quality control systems managers (438 postings) also appeared on the top jobs list for the Assembly & Operations sub-group.



Top posting jobs Skilled Materials Workers Q1 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

The most in-demand lightweighting-related occupation in Ohio during Q1 2016 was general maintenance and repair workers. The 3,100 online job ads for this occupation is approximately four times the demand for the next most in-demand Skilled Materials group occupation, first-line supervisors of mechanics, installers, and repairers (779 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, 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 skill sets 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. Advanced technical skills like mathematics and programming also appear on Q1 2016's skills list, further illustrating the shift in Skilled Trades employment.

- Repair, Inspection, & Cleaning
- Project Management & Supervisory Skills
- Machinery
- Welding
- Plumbing
- Mathematics
- Programming
- Packaging & Labeling
- Customer Service & Customer Contact
- Occupational Health and Safety

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, physical demand, and creativity/analytical ability in their advertisements. These types of skills are crucial for Skilled Trades so that they can collaborate effectively and especially in high-demand supervisor rolls.

- Communication Skills: Team Work, Collaboration, Building Effective Relationships
- Troubleshooting, Preventative Maintenance, & Problem Solving
- Physical Demand
- Writing & English Skills
- Supervisory & Organizational Skills: Planning, Leadership, Project Management, Meeting Deadlines, Time Management
- Quality Assurance and Control, Work Area Maintenance
- Microsoft Office
- Mathematics
- Multi-Tasking
- Creativity

IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Of the 5,277 Skilled Trades group job postings that specified desired experience level during Q1 2016, 90% were available to workers with less than 5 years of experience. Entry-level Skilled Trades positions are available to Ohio workers that are willing to undertake post-secondary training in applicable skills, like mathematics, welding, or programming, that will qualify them for one of the 3,881 jobs requiring less than two-years training. Job postings that require more than 5 years of experience (496 in Q1) are most likely for supervisor or management roles in the Skilled Trades.

Experience in-demand
Q1 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network



Education & training in-demand
Q1 2015

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network



Though the majority of advertised salaries in the Skilled Trades group in Q1 2016 were below \$35,000 per year, the average advertised salary for Ohio Skilled Trades workers was \$42,513. This is 22% higher than the state's median earnings for all workers, \$34,800. Higher wages in the Skilled Trades group are available with short-term, post-secondary training, as well as advancement to managerial and supervisory roles.

WAGES

Advertised wages
Q1 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network



90%
Skilled Trades job postings open to workers with 5 or less years of experience

\$42,513
average advertised salary

2 Years
most jobs require less than 2 years of training



INTRODUCTION TO ADMINISTRATION GROUP

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

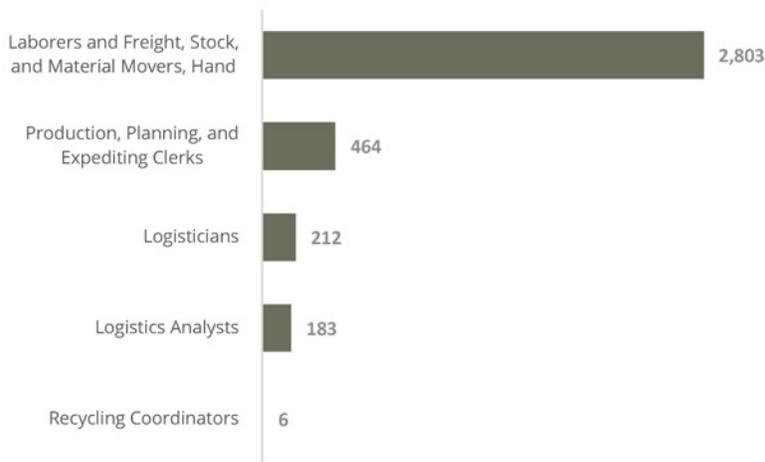
Logistics workers ensure transportation optimization of materials within organizations, from designing efficient supply chain processes to engaging in the actual transport of material and freight.

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.



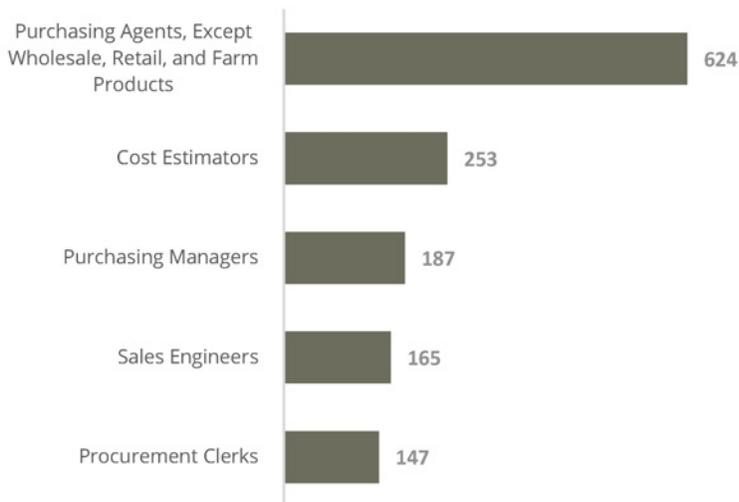
Top posting jobs

Logistics Q1 2016

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

The most in-demand Logistics occupation in Ohio during Q1 2016 was laborers and freight, stock, and material movers. With 2,803 online job ads posted, this occupation was also one of Ohio's most in-demand lightweighting-related jobs overall. Other top Logistics jobs include production, planning, and expediting clerks (464 postings), and logisticians (212 postings).

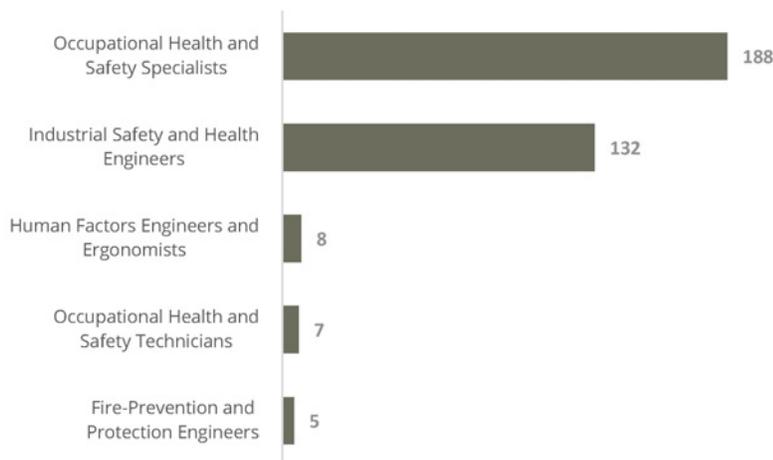
ADMINISTRATION



Top posting jobs *Procurement & Purchasing* Q1 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

Purchasing agents were the top in-demand Procurement & Purchasing workers in Ohio during Q1 2016. Ohio employers posted 624 online job ads for purchasing agents, 253 for cost estimators, and 187 for purchasing managers - all occupations with skills important to the manufacture of lightweight products.



Top posting jobs *Human Safety* Q1 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

Employer demand in the Human Safety occupation sub-group was split between occupational health and safety specialists (188 postings) and industrial safety and health engineers (132 postings) during Q1 2016. Other in-demand Human Safety workers included human factors engineers and ergonomists and occupational health and safety technicians.

ADMINISTRATION

IN-DEMAND TECHNICAL SKILLS

Job postings in the Administration occupation group seek skills and experience in purchasing and procurement, logistics and supply chain management, inventory management, and budgeting. Other technical skills that employers may seek in Administration workers include forklift operation, labeling and packaging, customer service, and enterprise resource planning (ERP).

- Forklift Operation
- Purchasing, Procurement, Budgeting, & Cost Control
- Inspection, Repair, & Cleaning
- Customer Service & Customer Contact
- Labeling & Packaging
- Logistics, Supply Chain Management, & Inventory Management
- Project Management, Contract Management, & Supervisory Skills
- Enterprise Resource Planning (ERP)
- SAP
- Occupational Health and Safety

IN-DEMAND FOUNDATIONAL SKILLS

Basic skills desired by employers hiring Administration workers are focused on customer service, communication and organization, problem solving, and quality assurance. Q1 2016 job postings in the Administration group also indicates that these workers should have strong writing skills, be creative, and be able to multi-task in their roles as purchasing agents, occupational health and safety specialists, and logisticians.

- Communication & Organizational Skills
- Physical Demand
- Microsoft Office
- Project Management & Supervisory Skills: Planning, Time Management, Meeting Deadlines
- Writing & English Skills
- Problem Solving & Troubleshooting
- Customer Service & Negotiation Skills, Quality Assurance
- Mathematics
- Multi-Tasking
- Creativity

IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Advertised experience required in the Q1 2016 Administration job postings indicates that many of these positions are available to Ohio workers with little to no experience. Over 1,200 of the Administration occupation job postings between January and March 2016 required 0 to 2 years of experience. Entry-level workers in Ohio would be able to secure an Administration job in lightweight manufacturing with some short-term, post-secondary training. Of the job postings that advertised a required level of education or training, most required just some post-secondary training (1,622 job postings) that would allow Ohio workers to enter the lightweight manufacturing workforce following a short program on supply chain, logistics, or occupational safety.

Experience in-demand

Q1 2015

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



Education & training in-demand

Q1 2015

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



Only 25% of Administration group job postings in Ohio during Q1 2016 advertised an annual salary. Of those that did, a majority advertised salaries less than \$35,000 a year; the mean advertised salary for the occupation group was \$38,260. While most of the advertised wages were low, the mean advertised salary is 9% higher than the median salary for all Ohio workers in 2014, \$34,800. The proportion of job postings with salaries falling within the \$35,000 to \$49,999 and the \$50,000 to \$74,999 brackets both grew from Q4 2015 to Q1 2016. The share of postings advertising wages between \$35,000 and \$49,999 grew 14% from 152 to 174 postings, and the share advertising wages between \$50,000 and \$74,999 grew 6% from 135 to 143 postings.

WAGES

Advertised wages

Q1 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



1,200
job postings
requiring less than 2
years experience

\$38,260
average
advertised salary

1,200
job postings requiring
a bachelor's degree



INTRODUCTION TO ENGINEERING & DESIGN GROUP

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

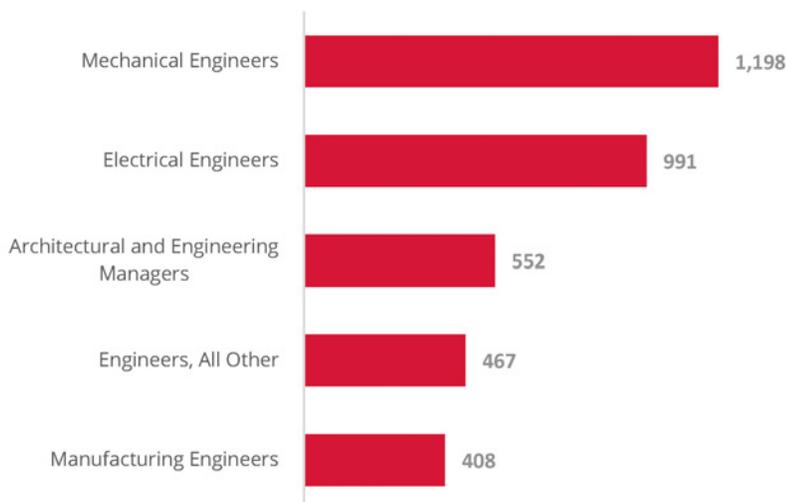
Chemical Engineers & Metallurgy workers perform duties related to the research, design, development, and testing of chemicals and metal materials. These workers often lead the charge in finding cutting-edge uses of lightweight metal materials.

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.



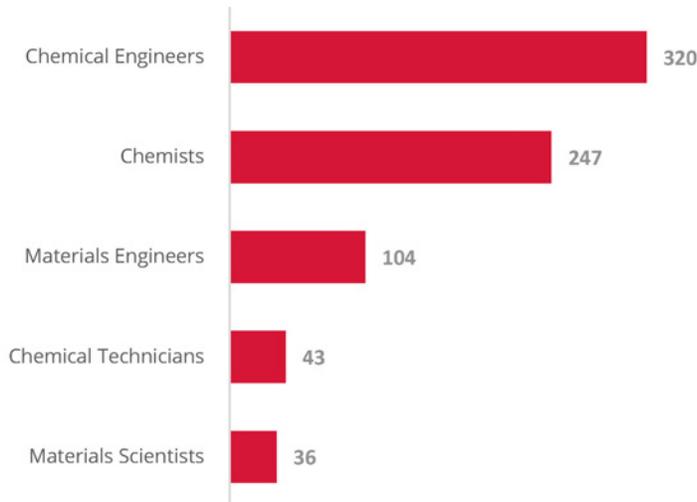
Top posting jobs

Electrical & Mechanical Q1 2016

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

Electrical & Mechanical engineers are in high demand in Ohio during Q1 2016. Ohio employers posted 1,198 online job ads for mechanical engineers between January and March 2016 and 991 ads for electrical engineers. Other in-demand occupations in the Electrical & Mechanical engineering sub-group include architectural and engineering managers (552 postings), all other engineers (467 postings), and manufacturing engineers (408 postings) with skills related to lightweight metals manufacturing.

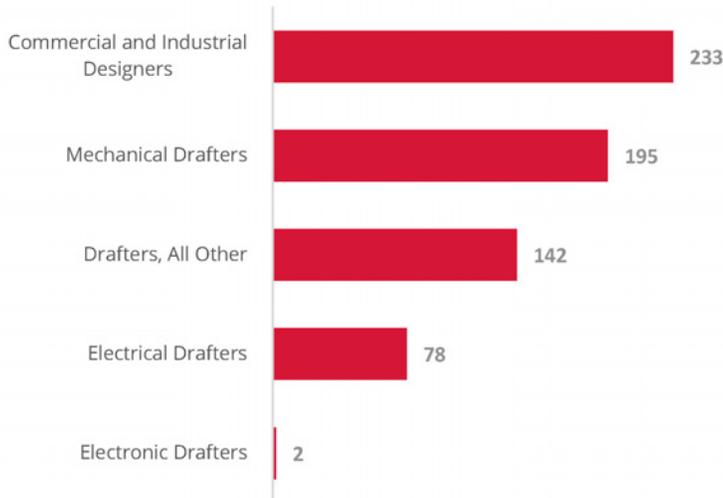
ENGINEERING & DESIGN



Top posting jobs Chemical & Metallurgy Q1 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

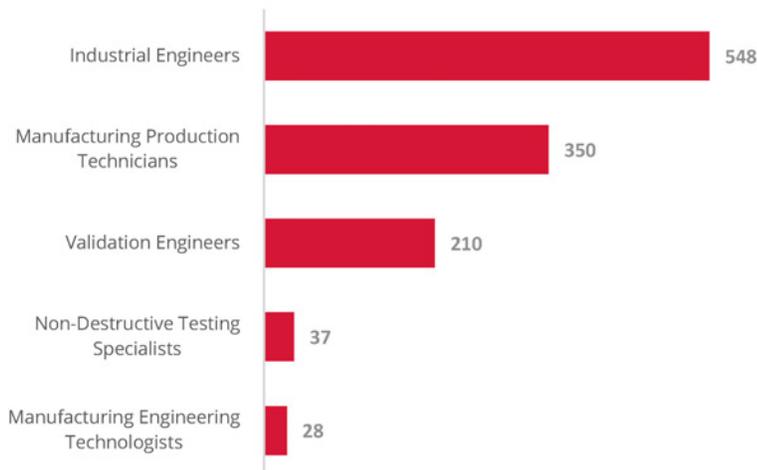
The most in-demand Chemical Engineering & Metallurgy occupation in Ohio in Q1 2016 was chemical engineers. Ohio employers posted 320 online job ads for chemical engineers and 247 for chemists. Materials engineers (104 postings) were also in high-demand.



Top posting jobs Designers & Drafters Q1 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

Ohio employers are seeking commercial designers and drafters that have skills transferrable to lightweighting advanced manufacturing. Commercial and industrial designers garnered 233 online job postings during Q1 2016, followed by 195 for mechanical drafters. Electrical drafters also saw 78 online job ads during Q1.



Top posting jobs Process & Testing Q1 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

The most in-demand Process Engineering & Testing occupation during Q1 2016 in Ohio was industrial engineers (548 postings). Ohio employers are also seeking manufacturing production technicians (350 postings) and validation engineers (210 postings) that can work in advanced manufacturing settings.

ENGINEERING & DESIGN

IN-DEMAND TECHNICAL SKILLS

Engineering occupations demand a broad range of technical skills. Many engineers will be expected to know AutoCAD, programming, and other software skills. Knowledge in chemistry, mechanical engineering, and electrical engineering apply to the specific engineering role. Higher-up, managerial engineering roles require strong project management, process improvement, and budgeting skills.

- Project Management & Scheduling
- Mechanical, Electrical, & Process Engineering
- AutoCAD, CAD
- Budgeting & Cost Control
- Repair, Inspection, Technical Support, Schematic Diagrams
- Programming
- Chemistry
- Process Improvement, Six Sigma, Lean Manufacturing
- Welding
- Customer Service/Customer Contact

IN-DEMAND FOUNDATIONAL SKILLS

Beyond the science, mathematics, and engineering technical skills required for lightweighting-related Engineering & Design employment, engineers are expected to have basic, foundational skills as well. Ohio employers seeking to hire engineers during Q1 2016 valued candidates with strong writing skills, strong communication & team work skills, and demonstrated problem solving experience. Other basic, employability skills for engineers include experience with quality assurance and cost estimation.

- Communication Skills: Team Work, Collaboration, Building Effective Relationships
- Writing & English Skills
- Project Management: Project Planning and Development Skills, Supervisory Skills, Decision Making
- Problem Solving, Trouble Shooting, & Preventative Maintenance
- Microsoft Office
- Quality Assurance and Control, Customer Service
- Cost Control & Cost Estimation
- Creativity
- Multi-Tasking
- Physical Demand

IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Of the Q1 2016 online job postings for Engineering & Design occupations that posted a require experience level, the majority (2,284 postings) were for engineers with 3 to 5 years of experience. Another large proportion of postings was for engineers and designers with 0 to 2 years of experience. Most engineering occupations require a bachelor's degree, and this was reflected in Ohio's Q1 postings: 4,057 online job ads advertised that the position require a bachelor's degree, an additional 208 preferred a graduate or professional degree.

Experience in-demand

Q1 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



Education & training in-demand

Q1 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



Only 24% of Q1 2016 postings in the Engineering & Design occupation group advertised salaries. Of those, the majority (1,296 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 Q1 2016 among Ohio's Engineering & Design occupations was \$70,439. This salary is over twice as much as Ohio's median annual earnings for all workers, \$34,800, but 6% lower than the median salary for Engineering & Design occupations in Ohio.

WAGES

Advertised wages

Q1 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



4,000
job postings
requiring a
bachelor's degree

\$70,439
average
advertised salary

1,300
job postings with
salaries greater than
\$50,000



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