

# 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 Indiana. 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.



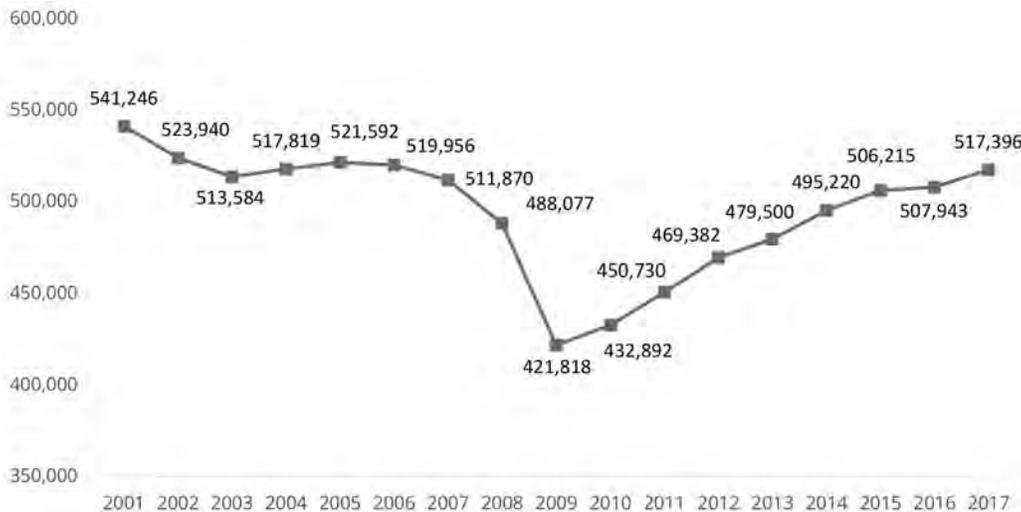
## EMPLOYER DEMAND AND EMPLOYMENT TRENDS

Postings for occupations related lightweight advanced manufacturing in Indiana increased in Q1 2017, rising six percent from 11,441 postings in Q4 to 12,143. Demand for lightweighting-related workers in Indiana reached a high in Q2 2016 when employers posting nearly 18,000 online job ads for LIFT occupations. Meanwhile, employment in the 140 occupations used in this analysis continues to grow since a recession low of 424,000 workers in 2009. There are 517,396 Indiana workers employed in advanced manufacturing jobs related to lightweighting in 2017, marking the eighth consecutive year of employment growth.



**Job postings over time**  
Indiana  
Q1 2013 - Q1 2017

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network



**Employment over time**  
Indiana  
2001 - 2017

Data: EMSI, QWI  
Analysis: Workforce Intelligence Network

# TOP JOBS

Maintenance and Repair Workers remain the most in-demand lightweighting-related occupation in Indiana with over 1,800 online job ads during Q1 2017. Laborers and freight workers also kept their second place during Q1 with 1,640 postings. Many engineering and supervisor occupations are also in high demand in Indiana during Q1, including mechanical, electrical, and industrial engineers.



## Top posting jobs Indiana Q1 2017

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network

**6%**  
increase in  
demand between  
quarters

**12,143**  
Total online job  
ads in Q1 2017

**8**  
years of  
consecutive  
employment growth



## 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.*

### 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.*

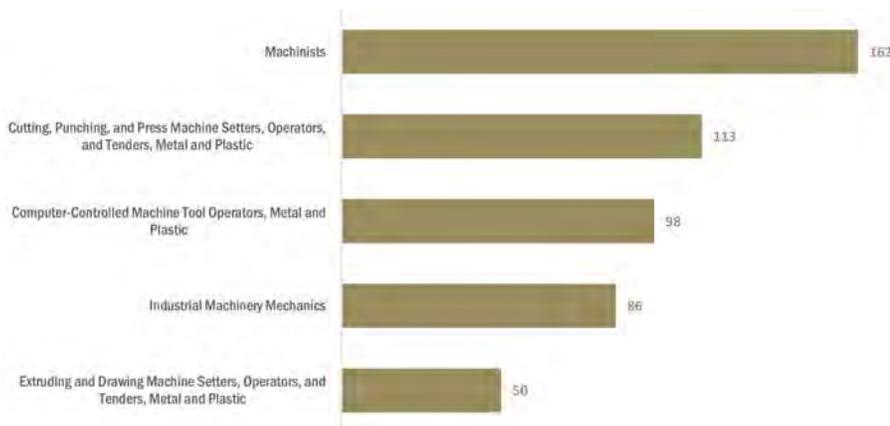
### Assembly & Operation

*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.*

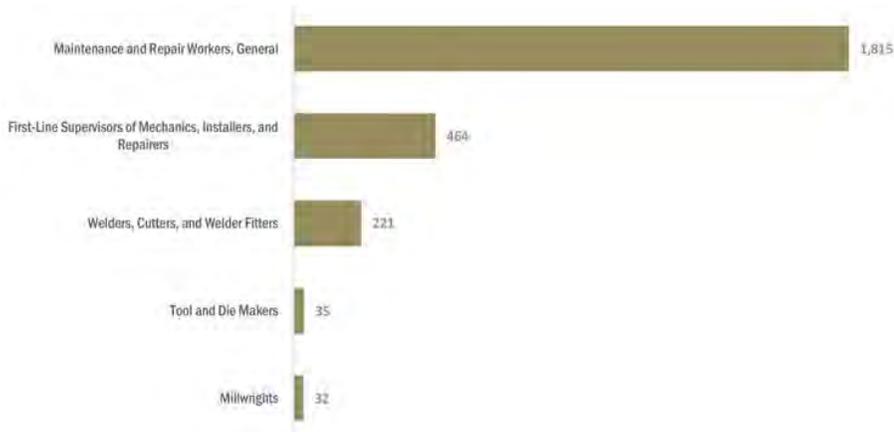
### Top posting jobs Machinists Q1 2017

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

General machinists were the most in-demand occupation in the Machinists sub-group during Q1 2017 with 162 postings, followed by Cutting, Punching and Press Machine Setters and Operators with 113. Other top jobs included Computer-controlled machine tool operators (98 postings) and industrial machinery mechanics (86 postings), which dropped from their top spot in Q4 2016.



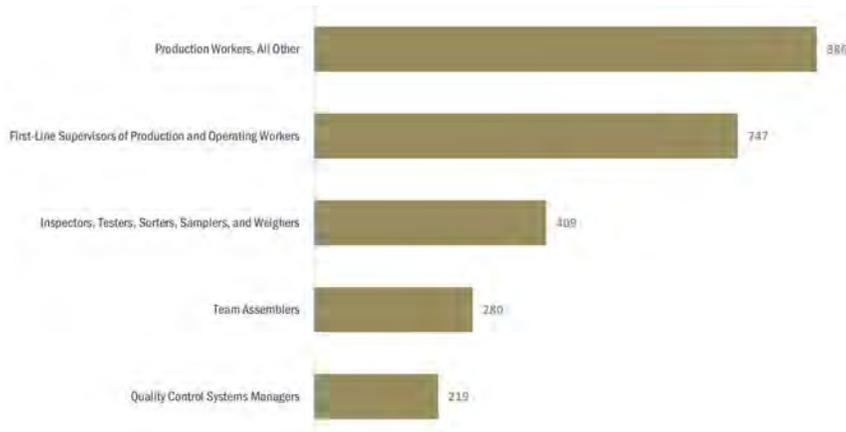
# SKILLED TRADES



## Top posting jobs Skilled Materials Workers Q1 2017

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network

Maintenance and repair workers (1,815 postings) had nearly four times the number of postings as the next most in-demand job in the Skilled Materials sub-group during Q1 2017. Postings also remain high for first-line supervisors of mechanics, installers, and repairers (464 postings), indicating career growth potential in this in-demand field. Welders, cutters, and welder fitters also showed a marked increase from Q4 2016 with 221 online job ads.



## Top posting jobs Assembly & Operations Q1 2017

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network

Production workers led the Assembly and Operations sub-group with nearly 900 online ads while first-line supervisors of production and operating workers saw 747 postings during Q1 2017, continuing their trend from 2016. The high demand for both these occupations indicate strong career growth potential in this lightweighting-related sub-group. Although inspectors, testers, samplers, sorters and weighers experienced a slight decrease in job ads from Q4 2016, they remain an in-demand occupation with 409 postings.

# SKILLED TRADES

## IN-DEMAND TECHNICAL SKILLS

The Skilled Trades group requires a wide array of high-level technical skills. While traditional skills like repair, inspection, and hand tool proficiency remain necessary, skills requiring post-secondary education and training have become more prevalent in Skilled Trades job postings. The increased frequency of requests for supervisory, scheduling and budgeting skills reflects the increased demand for managers within the Skilled Trades.

- Repair, inspection
  - Scheduling
  - Supervisory skills
  - Familiarity with machinery
  - Welding
  - Industrial operations industry experience
- Hand tools
  - Plumbing, HVAC
  - Computer Numerical Control (CNC)
  - Cleaning
  - Forklift operation
  - Budgeting

## IN-DEMAND EMPLOYABILITY SKILLS

While Skilled Trades workers need mastery of advanced technical skills, they also need to maintain more traditional employability 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 planning and organizational abilities. These types of skills are crucial for Skilled Trades so that workers can collaborate effectively, especially in supervisor roles.

- Troubleshooting, problem solving
  - Communication skills
  - Ability to perform physical labor
  - Preventative maintenance
  - Writing
  - Computer skills
- Detail-oriented
  - Organizational skills
  - Quality assurance and control
  - Mathematics
  - Planning
  - Leadership

# IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Online job postings for Skilled Trades workers in Indiana mainly advertise openings that require less than five years of experience. About half of the Q1 2017 postings that specified a desired level were open to candidates with less than two years of experience (1,529 postings) while another 1,381 ask for three to five years. 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 2,619 postings in Q1 2017 requiring short-term post-secondary training (74 percent of postings with specified educational attainment). If potential candidates can learn valuable in-demand technical skills like welding, programming, or mathematics through a short-term training program, they can fill the entry-level openings that have such high demand among Indiana employers. Job postings requiring five or more years of experience most likely represent supervisor or management positions.

## Experience in-demand Q1 2017

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network



## Education & training in-demand Q1 2017

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network



# WAGES

## Advertised wages Q1 2017

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network

The average advertised annual salary in online job postings during Q1 2017 for Skilled Trades workers in Indiana was \$41,406, down slightly from Q4 2016's mean salary, \$43,980. While over half of postings advertising salaries offered less than \$35,000, Indiana employers are hiring more workers in the higher wage brackets as well. The ability to complete the necessary training and education in less than two years alongside higher wage levels make Skilled Trades occupations an exciting option for Indiana workers.



**<5 years**  
Experience  
required

**\$41,406**  
average  
advertised salary

**Post-secondary  
training is  
required**



## 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

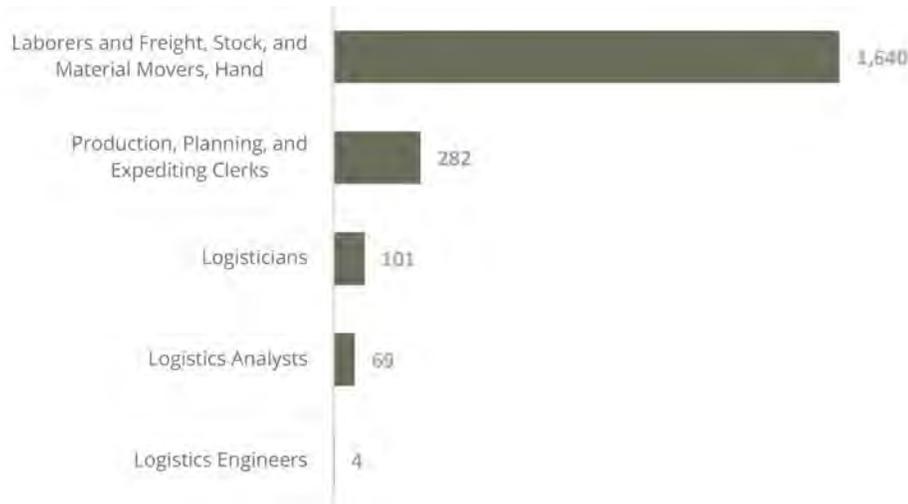
*Human Safety workers plan, implement, coordinate, review, and inspect safety programs and protocols to ensure a safe workforce environment.*

### Top posting jobs

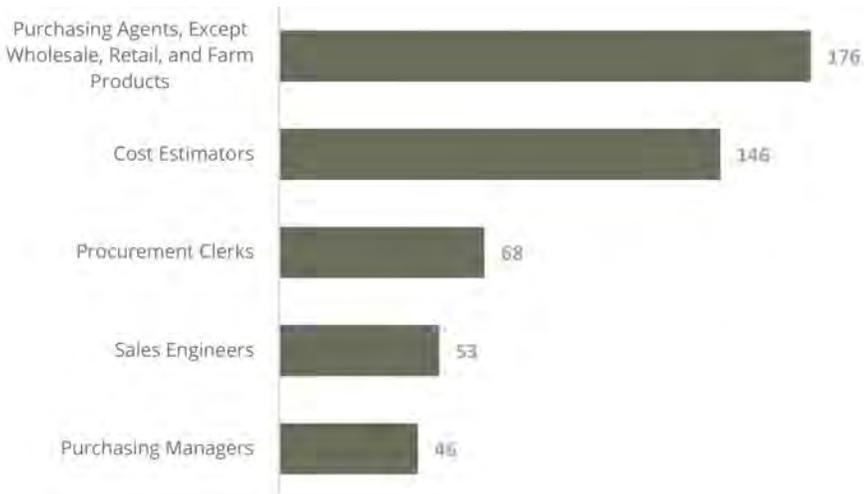
#### Logistics Q1 2017

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

Laborers and material movers dominated online postings for this sub-group with over 1,000 more online ads than the next most in-demand job during Q1 2017. Indiana employers posted 1,640 online job ads for these workers during Q1, making it one of the state's most in-demand lightweighting-related occupations overall. The next most in-demand occupation, production, planning, and expediting clerks, garnered 282 online job postings in Q1 2017.



# ADMINISTRATION

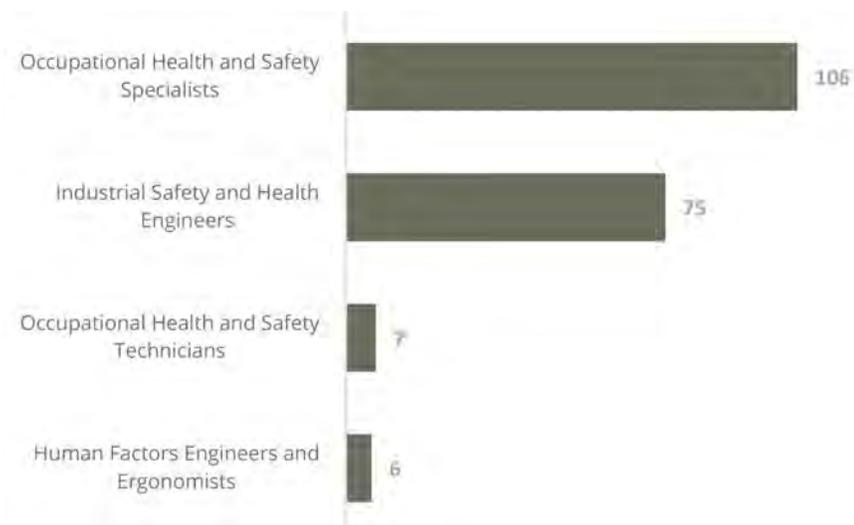


## Top posting jobs

### Procurement & Purchasing Q1 2017

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Postings in the Procurement and Purchasing sub-group are small compared to other groups. Purchasing agents led the sub-group with 199 online ads during Q1 2017. Cost estimators were also in high demand with 135 postings in Q1 2017.



## Top posting jobs

### Human Safety Q1 2017

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Demand in the Human Safety sub-group tends to be split between occupational health and safety specialists (106 postings) and industrial safety and health engineers (75 postings) from quarter to quarter. Other occupations in this sub-group garnered a handful of postings during Q1 2017.

# ADMINISTRATION

## IN-DEMAND TECHNICAL SKILLS

Occupations within the Administration group require a wide array of high-level technical and managerial skills. Traditional skills like forklift operation and inspection are present in many postings. The job postings for Administration workers reflect employer needs for more managers. Frequent requirements for project management experience communicate employer demand for talent in high-wage management occupations.

- Forklift operation
  - Purchasing, procurement
  - Scheduling
  - Customer service
  - Labeling, packaging
  - Inspection, repair
- Logistics
  - Scanners
  - Inventory management, inventory control
  - Project management
  - Data entry
  - Supply chain management

## IN-DEMAND EMPLOYABILITY SKILLS

Like the Skilled Trades group, Indiana employers seek Administration workers with traditional employability skills such as the ability to communicate, organize, and solve problems. The inclusion of mathematics as a common baseline skill in postings reflects the technical nature of Administration occupations and the higher levels of education required for most openings. Due to the numerous business-oriented duties Administration workers have, strong computer and writing skills are necessary for success.

- Communication skills, teamwork, collaboration
  - Ability to perform physical labor
  - Detail-oriented
  - Organizational skills, multi-tasking
  - Computer skills
  - Writing
- Planning
  - Problem solving
  - Mathematics
  - Building effective relationships
  - Research
  - Quality assurance and control

# ADMINISTRATION

## IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Of the online postings that advertised experience requirements, 56 percent stated less than two years of experience (699 postings). Another 34 percent of postings required between three and five years of experience (418 postings), indicating that employers would like workers with prior experience and perhaps enough experience for management positions. The increase in this intermediate experience category from Q4 2016 is a good indicator of the growing demand for managers in Skilled Trades overall. Of the online postings that advertised minimum education required, 65 percent required post-secondary training or a related associate's degree. The remaining 30 percent required higher educational attainment (generally a bachelor's degree, with a few requesting a master's) for management roles.

### Experience in-demand

Q1 2017

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



### Education & training in-demand

Q1 2017

Data: Burning Glass Technologies Analysis:

Workforce Intelligence Network



## WAGES

### Advertised wages

Q1 2017

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network

Despite the substantial number of online ads requiring advanced levels of education, most Q1 2017 postings advertised wages for Administration occupations amounting to less than \$35,000 per year. While the average salary advertised (\$38,110) decreased from Q4 2016 (\$40,681), it is three percent above the median income for currently employed Administration workers in Indiana (\$37,000).



**0-2 years**  
Experience most  
in-demand by  
Indiana employers

**\$40,681**  
average  
advertised salary

**Post-secondary  
training is  
required**



## 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 group which can be split into four distinct occupation sub-groups: Electrical & Mechanical Engineering, Chemical Engineering & Metallurgy, Industrial Designers & Drafters, and Process Engineering & Testing.

### Process & Testing

*Process & 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.*

### Electrical & Mechanical

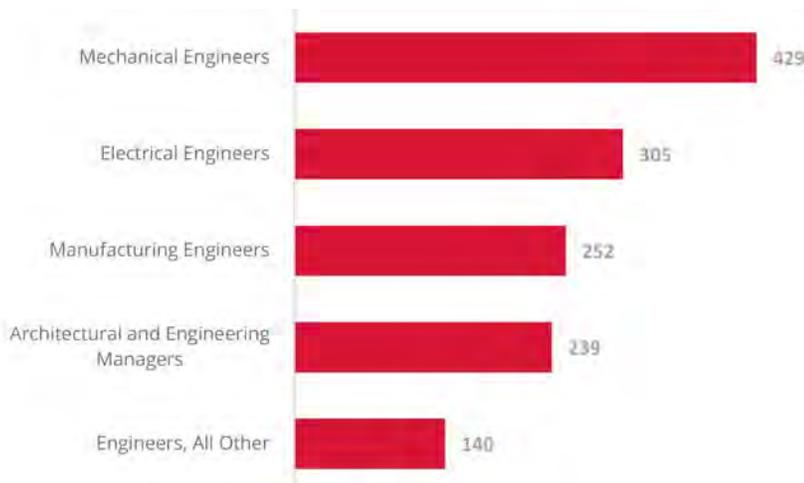
*Electrical & Mechanical Engineers perform duties related to the research, design, development, and testing of mechanical functioning, electrical, and manufacturing equipment, components, or systems for commercial, industrial, military, or scientific use.*

### Chemical & Metallurgy

*Chemical & 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.*



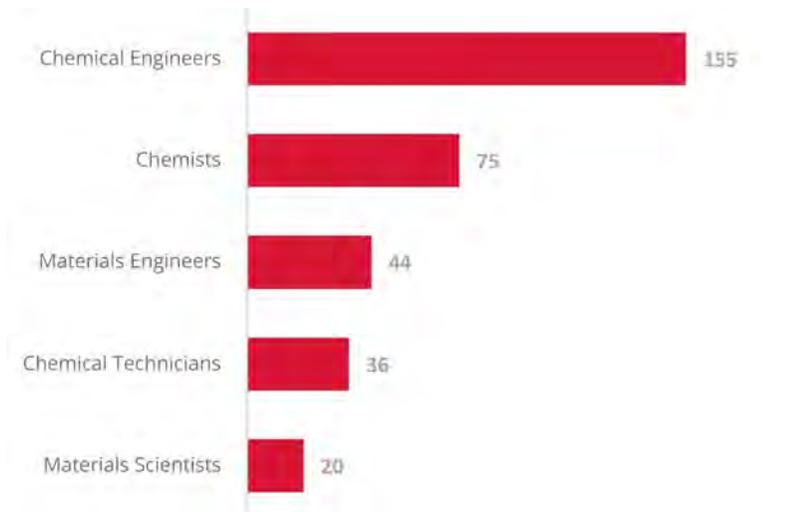
### Top posting jobs

#### Electrical & Mechanical Q1 2017

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

High demand for mechanical (429 postings) and electrical engineers (305 postings) continually pushes these occupations to the top of the in-demand list for their sub-group. Manufacturing engineers and architectural and engineering managers garnered over 200 postings each during Q1 2017 and could be seen alongside mechanical and electrical engineers in the state's overall top jobs list.

# ENGINEERING & DESIGN

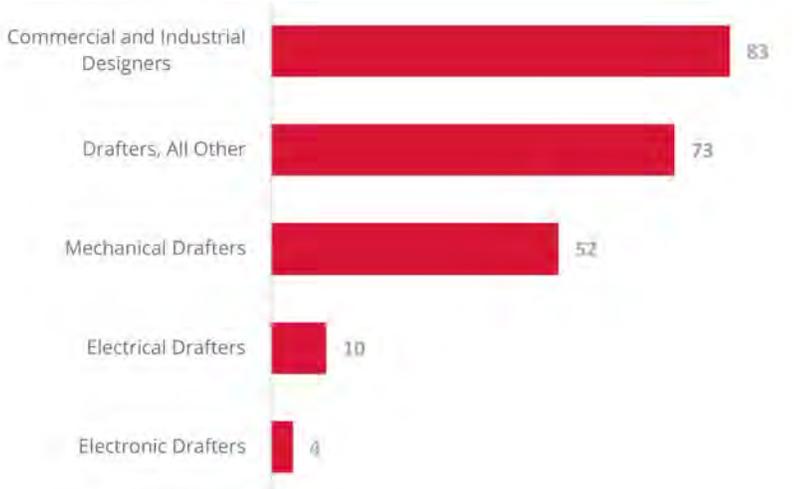


## Top posting jobs

### *Chemical & Metallurgy* Q1 2017

Data: Burning Glass Technologies Analysis:  
Workforce Intelligence Network

Chemical engineers led this sub-group again during Q1 2017 with 155 online ads. Demand for chemists also remained high with 75 online job ads. Other occupations in this sub-group saw fewer than 50 postings each between January and March 2017.

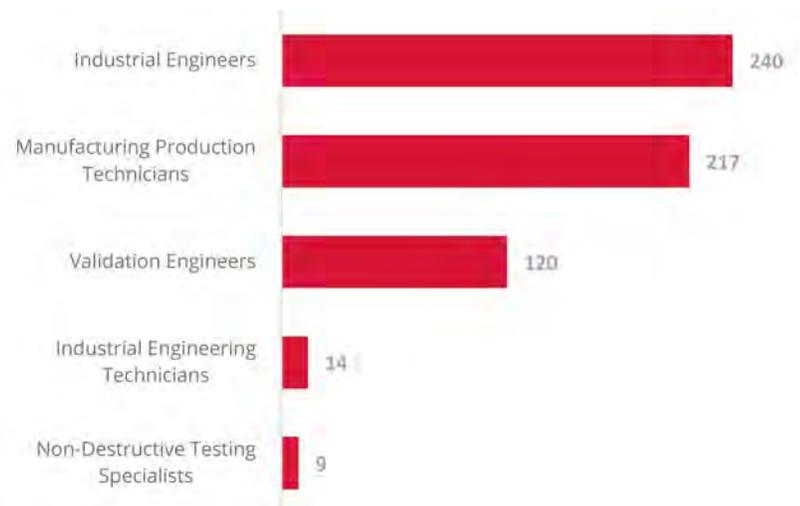


## Top posting jobs

### *Designers & Drafters* Q1 2017

Data: Burning Glass Technologies Analysis:  
Workforce Intelligence Network

Commercial and industrial designers retained the top spot in the Designers and Drafters sub-group during Q1 with 83 postings, showing a slight increase from Q4 2016's postings. Drafters (all other) and mechanical drafters held the second and third spots for the sub-group in Q1 2017.



## Top posting jobs

### *Process & Testing* Q1 2017

Data: Burning Glass Technologies Analysis:  
Workforce Intelligence Network

Industrial engineers remained the top in-demand occupation for the Process Engineering and Testing sub-group in Q1 2017, with 240 postings pushing them into Indiana's top jobs list overall. Manufacturing production technicians (217 postings) and validation engineers (120 postings) showed increased demand from 2016 while other occupations in this sub-group saw few postings during Q1 2017.

# ENGINEERING & DESIGN

## IN-DEMAND TECHNICAL SKILLS

STEM-related skills such as mechanical and electrical engineering, AutoCAD, and experience in manufacturing processes dominate the technical proficiency list for the Engineers group. Business and management-related skills such as project management, budgeting, and scheduling were also prevalent in Q1 2017 postings for Indiana Engineers.

- Project management
- Mechanical engineering
- AutoCAD
- Scheduling
- Manufacturing processes, Six Sigma
- Electrical engineering

- Inspection, repair
- Validation
- Budgeting
- Product development
- Process engineering
- Programmable Logic Controller (PLC) programming

## IN-DEMAND EMPLOYABILITY SKILLS

While Engineers and Designers require critical technical skills learned through rigorous, advanced education, employers also require these workers to have foundational skills necessary to function efficiently on a team such as communication, planning, and teamwork. They must also have important project-oriented skills like writing, research, and quality assurance experience. Overall, the top employability and technical skills reflect that Indiana employers seek well-rounded candidates for Engineering and Design job openings.

- Communication skills, teamwork, collaboration
- Problem solving, troubleshooting
- Writing
- Planning
- Computer skills
- Research

- Organization skills
- Quality assurance and control
- Ability to perform physical labor
- Detail-oriented
- Leadership
- Mathematics

# ENGINEERING & DESIGN

## IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Of online job postings advertising a preferred level of experience in Q1 2017, most (55 percent) preferred candidates with three to five years of experience. The entry level experience range, less than two years, also had a high share of postings (28 percent). This indicates that employers prefer Engineer and Design workers with previous experience but opportunities do exist at the entry-level.

Employers seeking to hire workers in this group overwhelmingly desire candidates with a bachelor's degree. Of the 2,100 postings for Engineers and Designers in Indiana during Q1 that advertised an education requirement, 81 percent required a bachelor's degree. Some engineering technician positions in the group are open to candidates with some post-secondary training or a related associate's degree.

### Experience in-demand Q1 2017

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network



### Education & training in-demand Q1 2017

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network

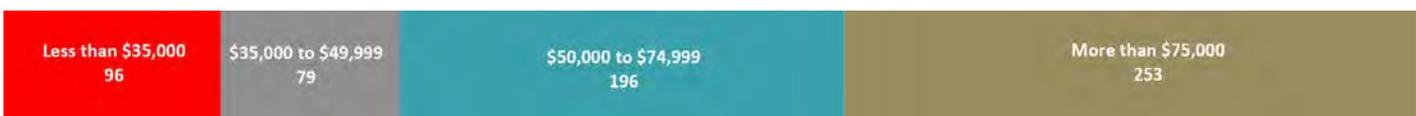


## WAGES

### Advertised wages Q3 2016

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network

The higher experience and education requirements for Engineers and Designers translate into higher, more competitive wage advertisements by employers in Indiana. Seventy-two percent of the postings that included wage information advertised salaries above \$50,000 annually. The average advertised annual salary in postings during Q1 was \$68,059, an increase from \$66,029 in Q4 2016.



**3-5 years**  
Experience  
most in-demand  
by Indiana  
Employers

**\$68,059**  
average  
advertised salary

**Bachelor's  
degree most  
often required**



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For more information about LIFT and additional workforce data visit [www.lift.technology](http://www.lift.technology)