

# 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.

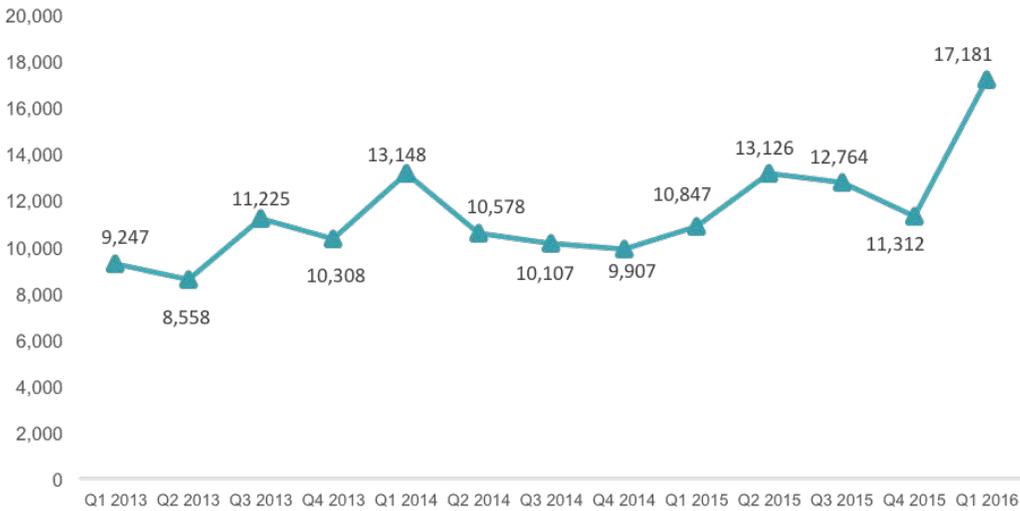
From welding to skilled metalwork, to logistics and mechanical and chemical engineering, to industrial design and manufacturing management, lightweighting-related jobs are found in nearly every manufacturing sector. This report provides an overview and examines the changing demand for workers in jobs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

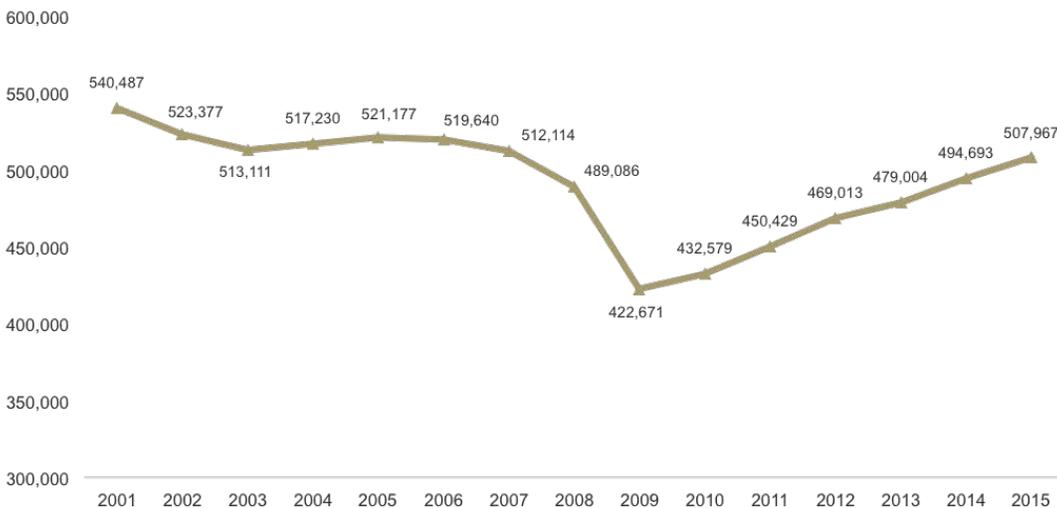
Following a slump in the second half of 2015, online ads for advanced manufacturing jobs related to lightweighting in Indiana surged to a record high in Q1 2016. The 17,181 ads posted this past quarter represented a 52% increase over the 11,312 ads during Q4 2015. Meanwhile, employment in the 140 occupations used in this analysis continues to grow since a recession low of 423,000 workers in 2009. The 508,000 Hoosiers employed in advanced manufacturing jobs related to lightweighting in 2015 marked the sixth consecutive year of employment growth.



**Job postings over time**  
*Indiana*

Q1 2013 - Q1 2016

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network



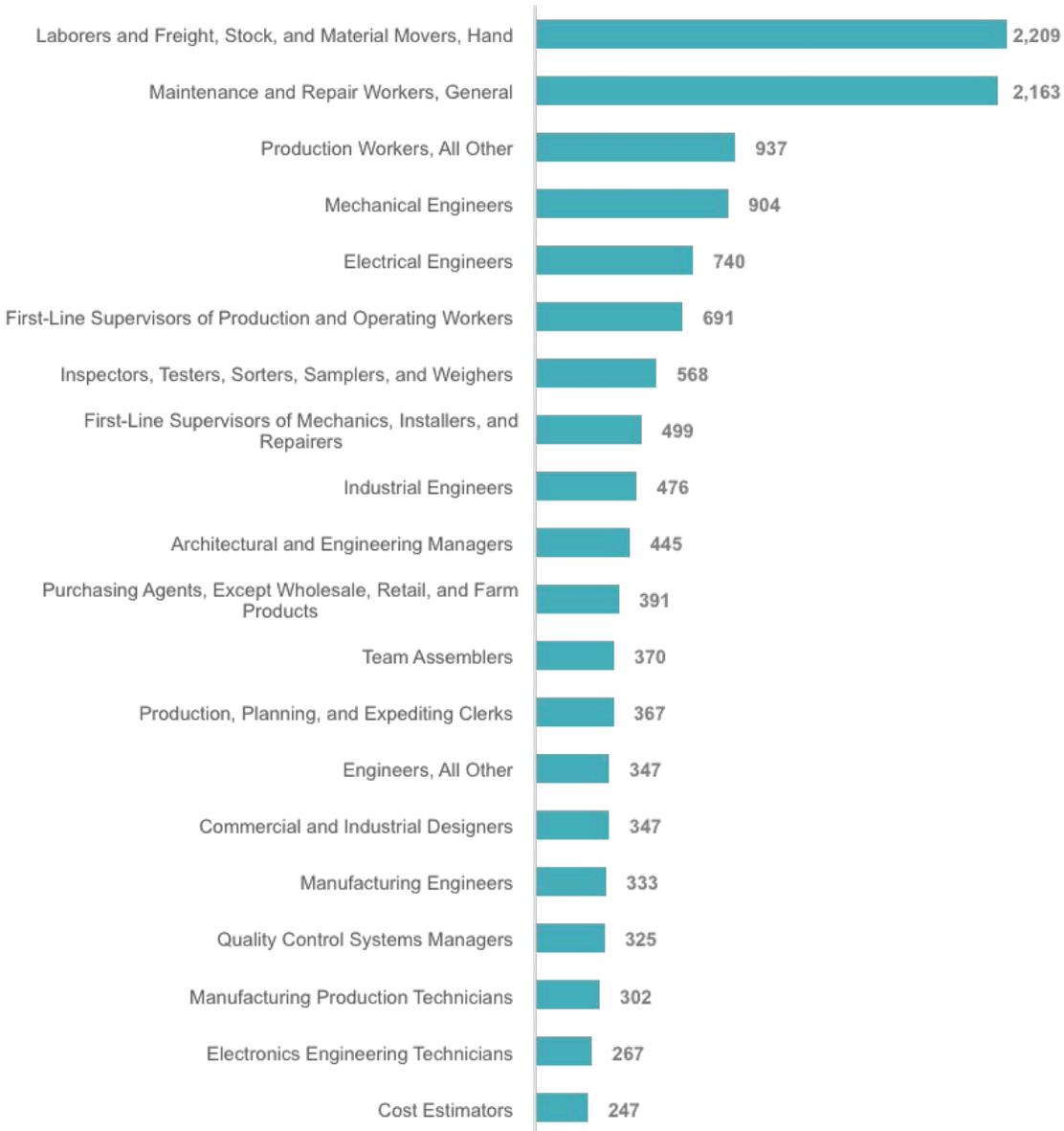
**Employment over time**  
*Indiana*

Q1 2013 - Q1 2016

Data: EMSI, QWI  
Analysis: Workforce Intelligence Network

# TOP JOBS

Materials handlers/laborers represented the most in-demand occupation in Indiana with over 2,200 online job ads during Q1 2016. Close in second were maintenance and repair workers with 2,160 postings. The Skilled Trades and Engineering occupation groups dominated the top jobs list with eight each during Q1 2016.



## Top posting jobs Indiana Q1 2016

Data: Burning Glass  
Technologies Analysis: Workforce  
Intelligence Network

**52%**  
growth in demand  
for advanced  
manufacturing  
workers

**17,181**  
Total online job  
ads in Q1 2016

**8:**  
The number of  
Engineer  
occupations in the  
top jobs



## 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

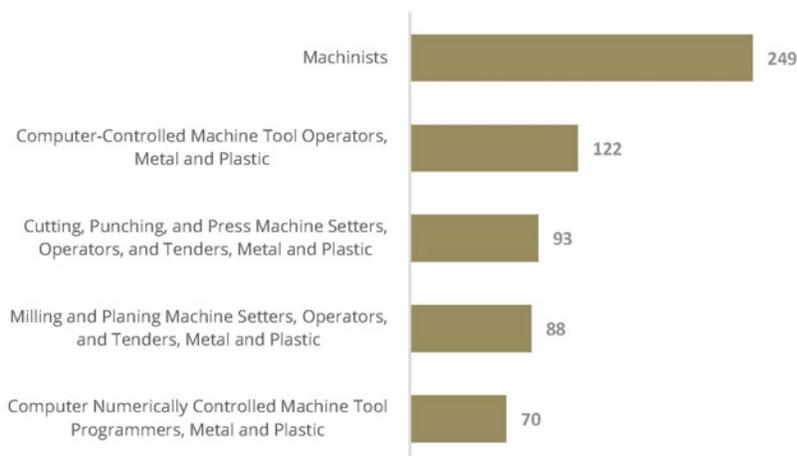
*Machinists set up and operate a variety of machine tools to produce parts and instruments. Some work on traditional industrial machinery while others operate or develop programs for computer-controlled machinery.*

### 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

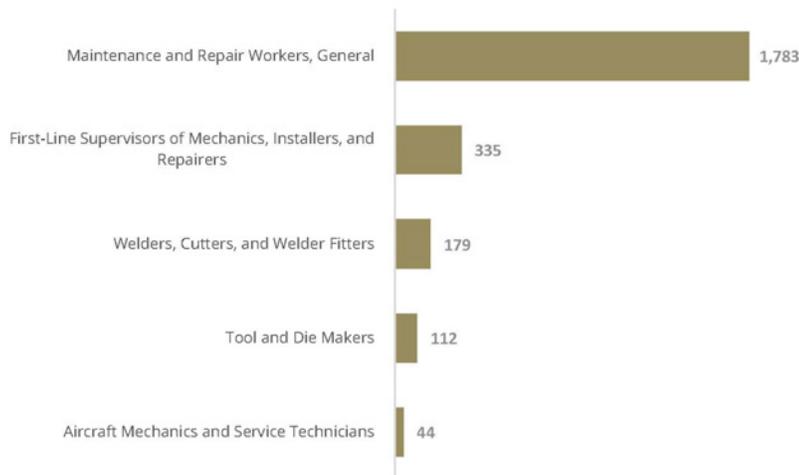
#### Machinists

Q1 2016

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network

Traditional machinists were the most in-demand occupation in this subgroup while computer-controlled machinists had the second most online postings. CNC Machine programmers were also in high demand during Q1 2016.

# SKILLED TRADES



## Top posting jobs Skilled Materials Workers Q1 2016

Data: Burning Glass Technologies Analysis:  
Workforce Intelligence Network

Maintenance and repair workers had more than five times the number of postings than the next most in-demand job in this subgroup. The over 300 online ads for supervisors of mechanics indicates career growth potential in this in-demand field.



## Top posting jobs Assembly & Operations Q1 2016

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network

Production workers led the subgroup with nearly 800 online ads while supervisors of production workers had over 750 postings during Q1 2016. The high demand for both these occupations indicate strong career growth potential in Assembly & Operations.

# SKILLED TRADES

## IN-DEMAND TECHNICAL SKILLS

The Skilled Trades group requires a wide array of high-level technical skills. While more traditional skills remain necessary, such as repair/inspection and the ability to use power tools, more skills requiring post-secondary education and training have become prevalent in Skilled Trades job postings. Skills like welding, mathematics, programming, and supervisory skills are in high-demand, especially in advanced manufacturing Skilled Trades jobs using computer-controlled machinery.

- Repair/Inspection
- Supervisory Skills/  
Scheduling
- Welding
- Machinery
- Advanced Mathematics
- Customer Service
- Programming
- Packaging/Schematic Diagrams
- Power Tools
- Lean Manufacturing

## 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 needed in high-demand supervisor rolls.

- Communication Skills/Team Work/  
Collaboration/Building Effective  
Relationships/Planning
- Multi-tasking
- Physical Demand
- Supervisory Skills/Organizational Skills/  
Planning/Leadership/Project  
Management/Decision Making/Time  
Management
- Writing/English
- Quality Assurance and Control/  
Detail-Oriented/Customer Service
- Microsoft Office
- Mathematics
- Creativity/Analytical Skills
- Troubleshooting/Preventative  
Maintenance/Problem Solving/  
Work Area Maintenance

**IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT**

Advertised experience in online job postings for Skilled Trades workers in Indiana 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 Hoosier employers. Job postings requiring five or more years of experience most likely indicate supervisor or management positions.

**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



**WAGES**

**Advertised wages  
Q1 2016**

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network

The average advertised salary in online job postings during Q1 2016 for Skilled Trades workers in Indiana was \$40,882, or 21% 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 296 in Q4 2015 to 378 in Q1 2016 (+27.7%). 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 Indiana workers.



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

**\$40,882**  
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

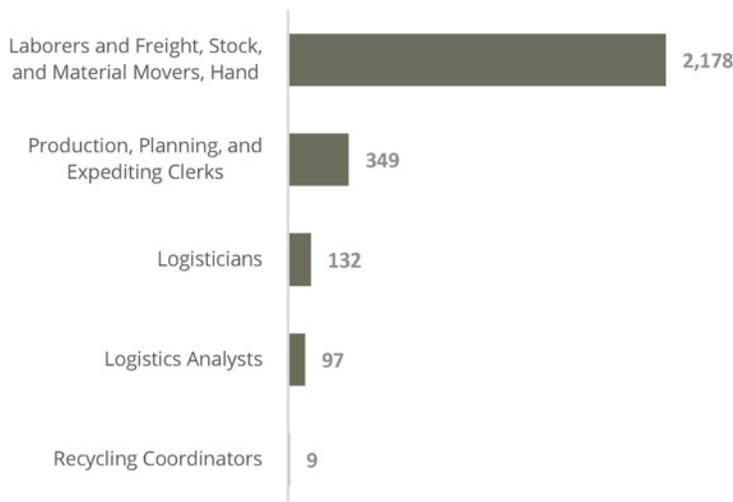
*Logistics workers ensure transportation optimization of materials within organizations, from designing efficient supply chain processes to engaging in the actual transport of material and freight.*

### 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.*



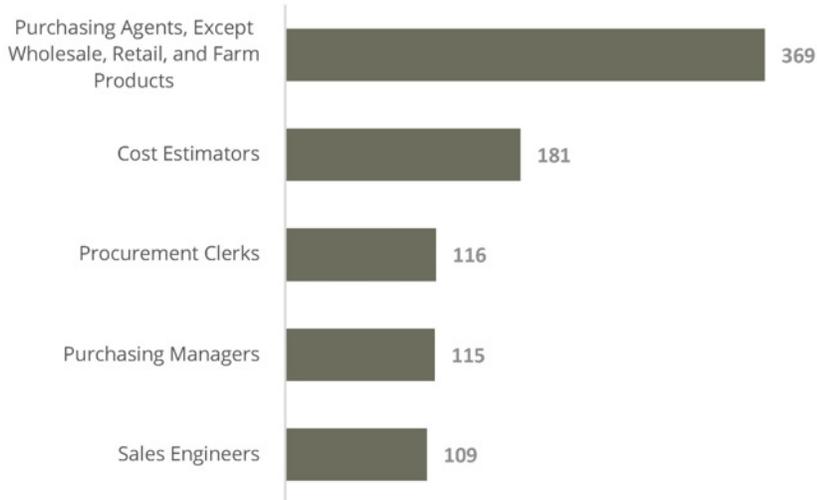
### Top posting jobs

#### Logistics Q1 2016

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

Laborers & material movers dominated online postings for this subgroup with more than six times the number of online ads than the next most in-demand job during Q1 2016.

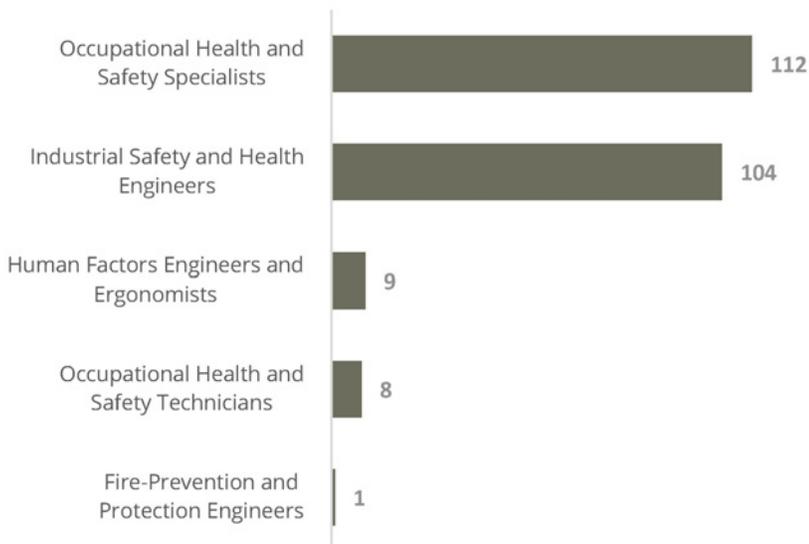
# ADMINISTRATION



## Top posting jobs *Procurement & Purchasing* Q1 2016

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Purchasing agents led the subgroup with nearly 370 online ads during Q1 2016. Sales engineers, which require a unique combination of traditional sales skills and an engineering degree for technical expertise had over 100 job postings in Indiana.



## Top posting jobs *Human Safety* Q1 2016

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Occupational health & safety specialists and industrial safety & health engineers dominated postings for this subgroup with over 100 ads each during Q1 2016.

# ADMINISTRATION

## IN-DEMAND TECHNICAL SKILLS

Occupations within the Administration group require a unique combination of hands-on technical skills, similar to the Skilled Trades, in conjunction with business and management prowess. For example, online job postings in Indiana showed that Administration workers need to understand manufacturing-related subjects such as machinery and inspection/repair while also having customer service, supply chain, and logistics skills. Common skill listings like project management and supervisory skills communicate employer demand for Administration workers in high-wage management occupations.

- Machinery/Forklift Operation
- Purchasing/Procurement/Supply Chain/Budgeting/Logistics/Supply Chain Management & Knowledge/Cost Control
- Labeling/Sorting/Cleaning/Packaging
- SAP
- Project Management/Contract Management/Supervisory Skills
- Inspection/Repair
- Inventory Control/Inventory Maintenance/Data Entry
- Occupational Health and Safety
- Customer Contact/Customer Service/Building Relationships
- Manufacturing Resource Planning (MRP)/Enterprise Resource Planning (ERP)

## IN-DEMAND EMPLOYABILITY SKILLS

Similar to the Skilled Trades group, Indiana employers seek Administration workers with traditional foundation 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 skills in Microsoft Office and writing are necessary for success.

- Communication Skills/Organizational Skills/Team Work-Collaboration/Detail-Oriented
- Physical Demand
- Microsoft Office
- Writing/English
- Problem Solving/Work Area Maintenance/Quality and Assurance Control
- Planning/Project Management/Building Effective Relationships/Time Management/Leadership/Supervisory Skills/Meeting Deadlines
- Customer Service
- Mathematics
- Multi-Tasking
- Creativity

# ADMINISTRATION

## IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Of the online postings that advertised experience required, a majority stated that little to no experience was required for job openings for Administration workers. A substantial amount of postings also required three to five years, possibly indicating that employers would like sales/analysts with previous experience or enough experience for management positions. Of the online postings that advertised minimum education required, a small majority required post-secondary training of less than two years for openings. Another substantial batch of ads required a Bachelor's degree, most likely for high-wage sales, logistics, and management positions.

### Experience in-demand

Q1 2016

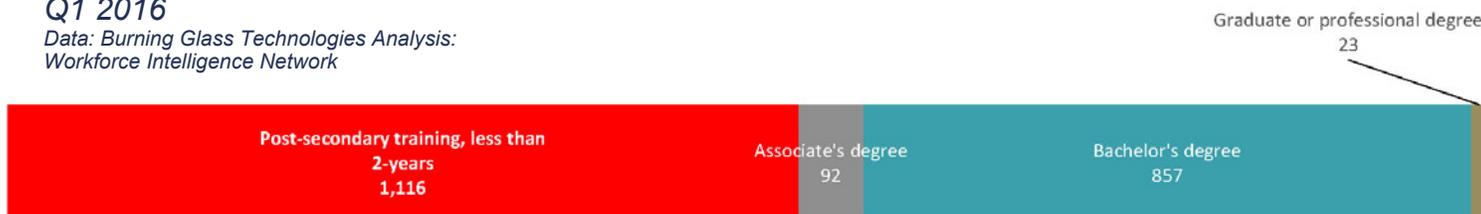
Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network



### Education & training in-demand

Q1 2016

Data: Burning Glass Technologies Analysis:  
Workforce Intelligence Network



## WAGES

### Advertised wages

Q1 2016

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network

Despite the substantial number of online ads requiring advanced levels of education, a substantial majority of postings advertising wages for Administration occupations offer less than \$35,000 per year. The average salary advertised (\$36,900) was about par with median incomes for currently employed Administration workers in Indiana (\$37,000) and 9% higher than the median income for Indiana workers over the age of 25 (\$33,800). The number of postings increased for all four salary ranges between Q4 2015 and Q1 2016. The less than \$35,000 salary range saw the largest increase, however, with an additional 250 online ads in Q1 compared to Q4, highlighting the increase in demand for entry-level workers.



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

**\$36,900**  
average  
advertised salary

**Post-secondary  
training and  
education are  
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 groups 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

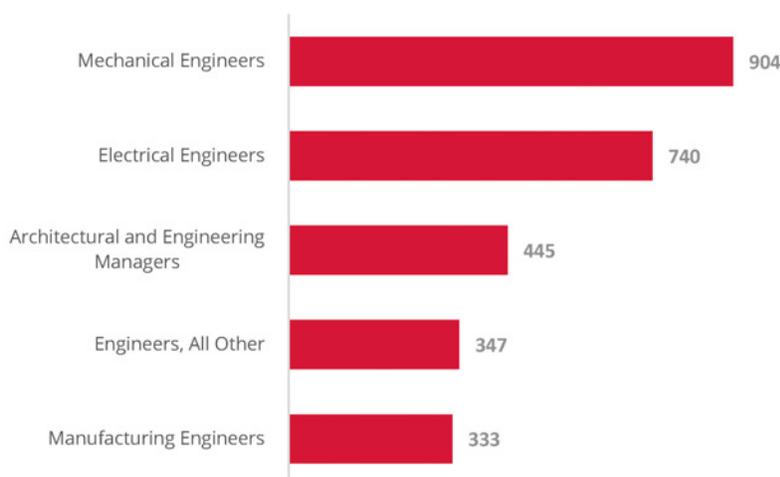
*Electrical & Mechanical Engineers perform duties related to the research, design, development, and testing of mechanical functioning, electrical, and manufacturing equipment, components, or systems for commercial, industrial, military, or scientific use.*

### 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.*



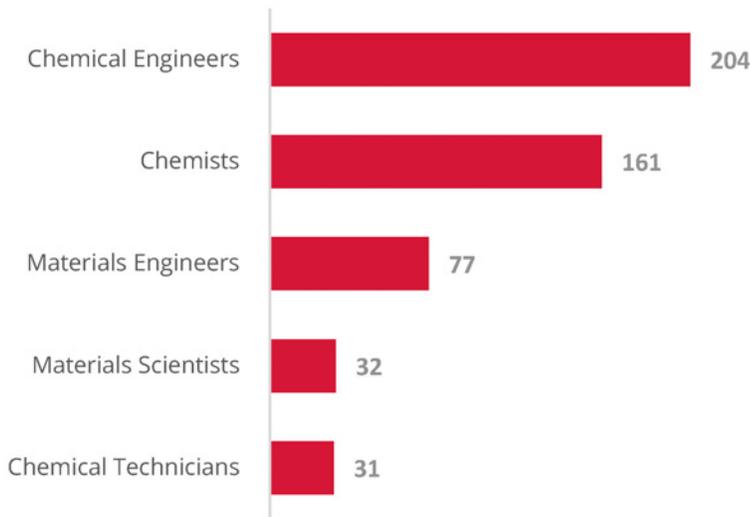
### Top posting jobs

#### Electrical & Mechanical Q1 2016

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

This subgroup represents the largest in the Engineer group in terms of employer demand. Mechanical engineers had the highest demand with over 900 online ads during Q1 2016. The top five occupations in this group also made the overall top jobs list (see page 4).

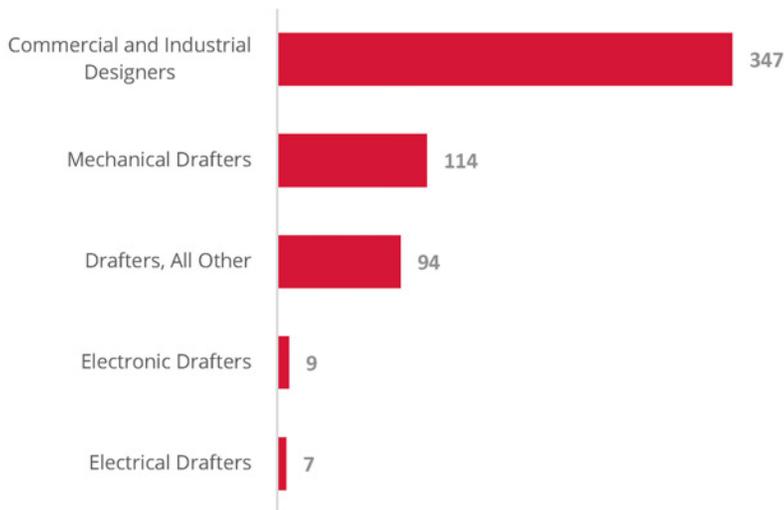
# ENGINEERING & DESIGN



## Top posting jobs Chemical & Metallurgy Q1 2016

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network

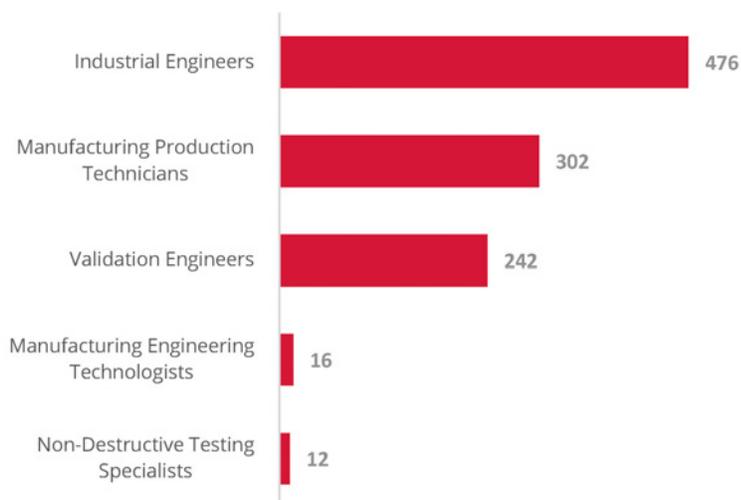
Chemical engineers led this subgroup with over 200 online ads while chemists, second most in-demand, had 160 postings during Q1 2016.



## Top posting jobs Designers & Drafters Q1 2016

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network

Commercial & industrial designers led the subgroup with nearly 350 online postings during Q1 2016. Mechanical drafters and drafters (all other) were also in high demand.



## Top posting jobs Process & Testing Q1 2016

Data: Burning Glass Technologies  
Analysis: Workforce Intelligence Network

Industrial engineers led this subgroup with nearly 480 online job postings during Q1 2016. Also in high demand were manufacturing production technicians and validation engineers.

# ENGINEERING & DESIGN

## IN-DEMAND TECHNICAL SKILLS

STEM-related skills dominate the technical proficiency list for the Engineers group such as mechanical, electrical, and manufacturing engineering as well as chemistry, AutoCad and programming. Business and management-related skills such as project management, budgeting, purchasing, and supervisory skills were also prevalent in postings for Indiana Engineers.

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>• Project Management/<br/>Budgeting/Supervisory Skills</li><li>• Mechanical/Electrical/<br/>Process/Manufacturing<br/>Engineering</li><li>• Chemistry</li><li>• Inspection/Repair</li><li>• AutoCAD/CAD</li></ul> | <ul style="list-style-type: none"><li>• Programming</li><li>• Industrial Engineering<br/>Industry Experience</li><li>• Purchasing/Cost Control</li><li>• Packaging/Process<br/>Improvement</li><li>• Six Sigma</li></ul> |
|---|--|

## IN-DEMAND EMPLOYABILITY SKILLS

While Engineer & 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 team-work. They must also have important project-oriented goals like project management, multi-tasking, attention to detail, problem solving, and creativity. Overall, the top employability and technical skills reflect that Indiana employers seek well-rounded candidates for Engineer & Designer openings.

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• Microsoft Office</li><li>• Project Management/<br/>Communication/Planning/<br/>Team Work</li><li>• Problem Solving/Trouble<br/>Shooting</li><li>• Supervisory Skills/<br/>Leadership</li><li>• Customer Service</li></ul> | <ul style="list-style-type: none"><li>• English</li><li>• Multi-Tasking</li><li>• Detail Oriented</li><li>• Self-Starter</li><li>• Creativity</li></ul> |
|---|---|

# ENGINEERING & DESIGN

## IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

The most advertised experience range for Engineers & Designers in Indiana during Q1 2016 was three to five years with nearly 1,900 online ads. The low experience range, zero to two years, also had a high proportion with 1,000 postings. This indicates that employers mostly want Engineer & Designer workers with previous experience but opportunities do exist at the entry-level.

Employers seeking to hire workers in this group overwhelmingly want candidates with a Bachelor's degree. Of the over 4,000 postings for Engineers & Designers in Indiana during Q1 that advertised an education requirement, 85% required a Bachelor's.

### 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



## WAGES

### Advertised wages

Q1 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network

The higher levels of experience and education requirement in online job postings for Engineers & Designers has translated into higher, more competitive wage advertisements by employers in the Hoosier state. A majority of the postings that included wage information advertised salaries above \$50,000 annually. The average advertised annual salary in postings was \$68,400, about 4% less than the median annual salary of currently employed Engineer & Designers in Indiana (\$71,400).



**3-5 years**

*Experience most in-demand by Indiana Employers*

**\$68,387**

*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)