Advanced Manufacturing

LINCOLN PARTNERSHIP FOR ECONOMIC DEVELOPMENT
1128 LINCOLN MALL, SUITE 100
LINCOLN, NE 68508
402.436.2350
WWW.SELECTLINCOLN.ORG

A PROFILE OF LINCOLN'S ADVANCED MANUFACTURING INDUSTRY CLUSTER

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A Bureau of Business Research Report
From the University of Nebraska—Lincoln

A Profile of Lincoln's Advanced Manufacturing Industry Cluster

Final Report, 2018

Prepared for the
Lincoln Partnership for Economic Development

Prepared by: Dr. Eric Thompson

December 10, 2018
Bureau of Business Research
Department of Economics
College of Business
University of Nebraska—Lincoln
Dr. Eric Thompson, Director

University of Nebraska Lincoln

A Profile of Lincoln's Advanced Manufacturing Cluster

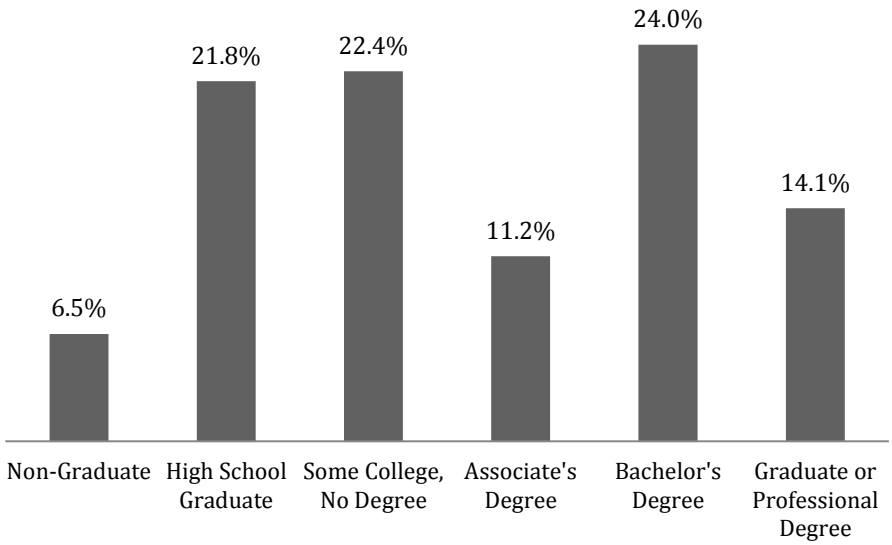
Introduction

Advanced manufacturing, and its related services, have been a major growth industry in Lincoln, Nebraska for over two decades. During this time the breadth of the industry has expanded with the increased dissemination of technology to nearly every industry and sector of the economy. Advanced manufacturing businesses benefit from Lincoln's central location, highly educated workforce, low labor costs, low cost of living, low traffic congestion costs, and business-friendly climate.

Why Lincoln?

The Lincoln Metropolitan Area, a centrally-located area of 330,000, is well positioned to cultivate this industry through its **highly educated workforce[1], existing finance and insurance presence, extensive university research** and **outstanding quality of life.**

Education Attainment, Age 25 and Over
Lincoln Metropolitan Area, 2017



Graph 1

Lincoln offers the ambiance of a friendly small town and the amenities, attractions and entertainment opportunities of a major metropolitan area. Lincoln is both the **state capital and home to the flagship campus of the University of Nebraska**; as a result it provides a greater range of offerings than might be expected in a community of its size. Efficient transportation, a stable business environment, advanced health-care technology and an excellent educational system are just a few of the reasons why **Lincoln ranks highly in livability studies**. As described in the pages that follow, Lincoln has significant cost advantages in terms of cost-of-living, wages, space costs, and other business costs. The University of Nebraska-Lincoln provides research services while universities, colleges and community colleges throughout the region graduate students in relevant majors for the

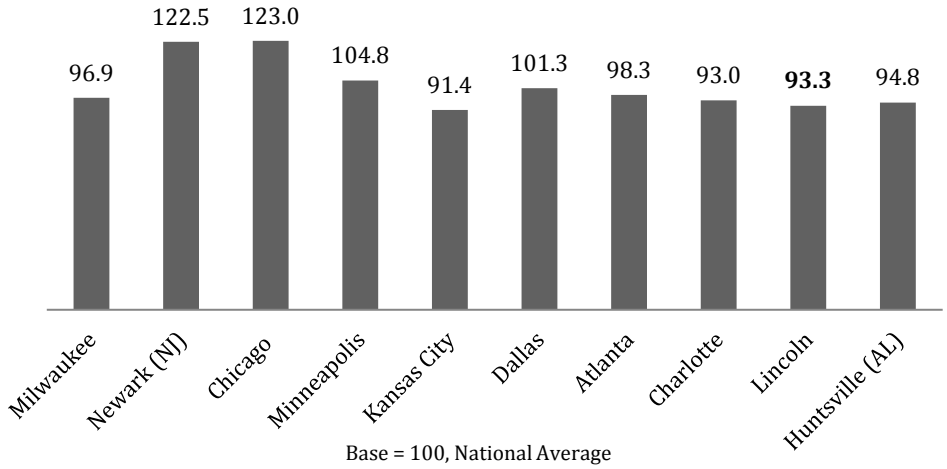
[1] U.S. Census Bureau, Table S1501, Lincoln Metropolitan Area, 2017.

advanced manufacturing industry. Lincoln also has an established cluster of advanced manufacturing firms.

Cost Comparisons

Lincoln's cost of living compares favorably with comparable metropolitan areas nationwide.[2]

Cost of Living Composite Index, Q1-Q3 2017

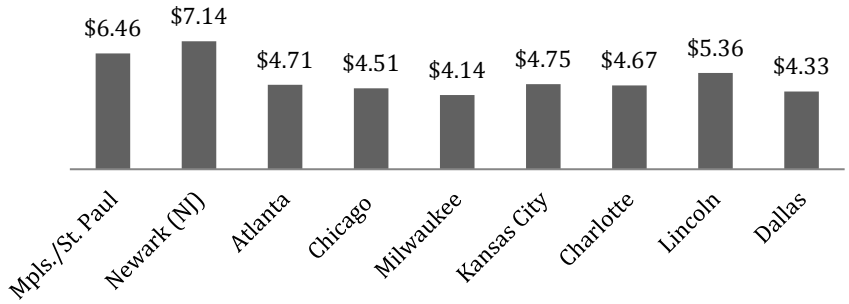


Base = 100, National Average

Graph 2

Lincoln has average costs for industrial space among peer metropolitan areas.[3] These particular rent costs refer to buildings in industrial settings - building space especially well suited to the advanced manufacturing industry.

Annual Rent per Square Foot:
Industrial Property Asking Rent
2017

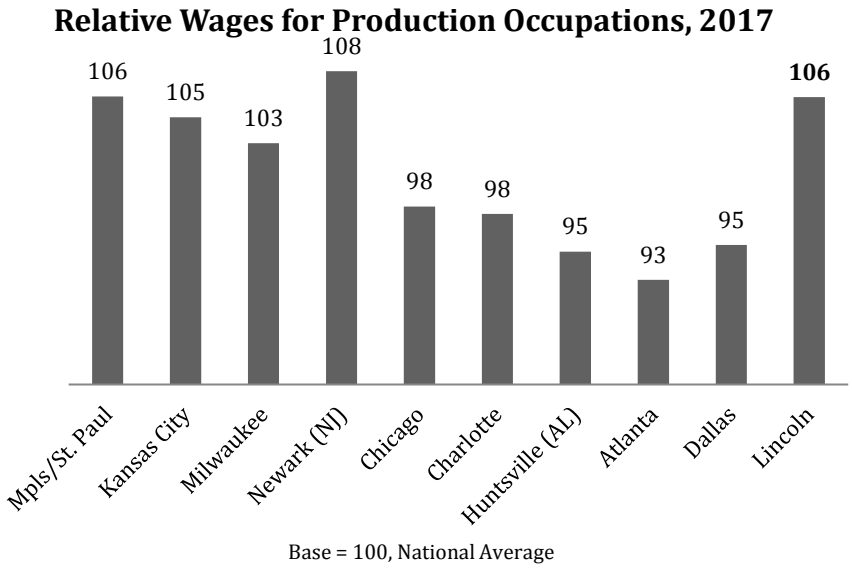


[2] Council for Community and Economic Research, "Cost of Living Index, Data for Q1-Q3 2017."

[3] JLL, *Minneapolis-St. Paul Industrial Insights 4Q 2017*; JLL, *New Jersey Industrial Insights Q1 2018*; NAI BrannoGoddard *Atlanta Market Review Q1 2018*; NAI Hiffman, *Chicago Industrial Market Statistics Fourth Quarter 2017*; JLL *Milwaukee Industrial Insight Q1 2018*; Newark Grubb Zimmer, *Kansas City 1Q18 Industrial Market*; NAI SouthernRealEstate *1Q'18 Charlotte Industrial Market Report*; NAIFMA Realty (Lincoln), *Market Report Second Half 2017;* JLL, *Dallas/Ft. Worth Industrial Insight Q4 2017.*

Graph 3

Lincoln has an above-average rank for wage costs.[4]



Graph 4

We provide detailed salary information for selected advanced manufacturing occupations on the next page. Average unemployment insurance tax rate on taxable wages, average price for industrial gas per thousand cubic feet, industrial electric service typical industrial bill, and top state corporate income tax rate can be found on page 6. Lincoln is among the three lowest cost metro areas among comparison cities for average unemployment insurance tax rate and typical industrial electric bill service rates.

[4] U.S. Bureau of Labor Statistics, *Occupation Employment Statistics, May 2017*," https://www.bls.gov/oes/current/oessrcma.htm

Advanced Manufacturing - Average Annual Salary, Lincoln MSA, Q1 2018			
	Annual Salary		
Occupation	Entry	Median	Experienced
TOTAL ALL OCCUPATIONS	$23,142	$37,505	$58,223
ARCHITECTURE AND ENGINEERING OCCUPATIONS	$45,622	$68,541	$85,606
Mechanical Engineers	$56,117	$75,985	$87,711
SALES AND RELATED OCCUPATIONS	$20,685	$26,826	$46,558
Sales Reps, Wholesale and Manufacturing, Except Tech. and Sci. Products	$32,686	$52,267	$73,519
LIFE, PHYSICAL AND SOCIAL SCIENCE OCCUPATIONS	$35,376	$52,717	$68,553
Chemists	$48,437	$62,700	$84,822
PRODUCTION OCCUPATIONS	$25,696	$39,129	$49,217
First-Line Supervisors of Production and Operating Workers	$45,884	$63,049	$77,124
Tool and Die Makers	$48,581	$67,345	$71,858
Mixing and Blending Machine Setters, Operators, and Tenders	$31,290	$45,146	$49,772
Machinists	$32,900	$43,809	$48,596
Cutting, Punching, Press Machine Setters, Ops., Tenders, Metal and Plastic	$22,323	$30,507	$38,756
Inspectors Testers Sorters Samplers and Weighers	$30,434	$45,609	$56,600
Welders, Cutters, Solderers, and Brazers	$33,479	$44,273	$48,752
Dental Laboratory Technicians	$38,611	$45,184	$48,346
Packaging and Filling Machine Operators and Tenders	$27,631	$33,321	$40,385
Molding, Coremaking, Casting Mach. Setters, Ops., Tenders, Metal & Plastic	$27,824	$37,896	$45,082
TRANSPORTATION AND MATERIAL MOVING OCCUPATIONS	$23,931	$36,615	$50,261
Packers and Packagers, Hand	$20,375	$22,134	$26,943
Source: Nebraska Department of Labor, Labor Market Information, Occupation Employment and Wage Rates, First Quarter 2018,"			

Table 1

Selected Business Costs for Advanced Manufacturing Industry (Three Lowest Cost Metro Areas Listed in Bold)						
Metropolitan Area[1]	Average Unemployment Insurance Tax Rate on Taxable Wages 2016 (State Average)	Right-to-Work State?	Avg. Price Industrial Gas/ Thousand Cubic Feet 2017 (State Avg.)	Typical Industrial Bill, Service Rates in Effect, January 1, 2018 (City)		Top State Corporate Income[2] Tax Rate 2018
				75kW, 50mWh	1000kW, 400mWh	
Lincoln	**1.13%**	Yes	$4.54	**$2,661**	**$31,080**	7.81%
Atlanta	1.87%	Yes	$4.74	**$3,812**	$41,147	**6.00%**
Charlotte	1.68%	Yes	$6.39	**$3,051**	**$28,328**	**3.00%**
Chicago	3.08%	No	$6.12	$4,308	**$35,389**	9.50%
Dallas	2.28%	Yes	**$3.28**	N/A	N/A	0.00%
Huntsville (AL)	**1.61%**	Yes	**$4.14**	$4,167	$37,187	6.50%
Kansas City	1.84%	Yes	$6.76	$4,737	$48,373	**6.25%**
Milwaukee	2.55%	Yes	$5.35	$4,363	$38,849	7.90%
Minneapolis/ St. Paul	**1.34%**	No	**$4.47**	$4,169	$41,383	9.80%
Newark (NJ)	2.34%	No	$7.99	$5,174	$41,007	9.00%

[1] For metropolitan areas located in multiple states (Minneapolis/St. Paul), the state averages from the state where the metropolitan areas' economic activity is concentrated are utilized (Minnesota).
[2] Tax may be eligible for use of credits earned in state incentive program; Texas has a gross receipts tax but gross receipt tax rates are not directly comparable to corporate income tax rates

Sources:
A. U.S. Department of Labor Office of Unemployment Insurance Division of Fiscal and Actuarial Services (2017), Significant Measures of State Unemployment Insurance Tax Systems, Average Tax Rate, http://workforcesecurity.doleta.gov/unemploy/pdf/sigmeasuitaxsys16.pdf
B. National Right to Work Legal Defense Foundation, Right to Work States, http://www.nrtw.org/right-to-work-states
C. US Energy Information Administration, Natural Gas, for Average Industrial Price, http://www.eia.gov/dnav/ng/ng_sum_lsum_a_EPG0_PIN_DMcf_a.htm
D. Lincoln Electric System, National Electric Rate Survey 2018, Average Price/KWH, http://www.les.com/pdf/rates/rate-survey.pdf
E. Tax Foundation, 2018, Facts & Figures: How Does Your State Compare?, https://files.taxfoundation.org/20180411102900/Facts-Figures-2018-How-Does-Your-State-Compare.pdf

Table 2

Education Resources

A Profile of Lincoln's Advanced Manufacturing Cluster

Lincoln's Advanced Manufacturing sector benefits from the vast array of programs that support the development of a specialized workforce for this industry.

The University of Nebraska-Lincoln (UNL) and Nebraska Wesleyan University both provide an excellent array of programs related to the field. In addition to which there are a number of programs and other institutions tailored to the needs of the advanced manufacturing production sector. While UNL is certainly the backbone of engineering research and education in Lincoln, there are many institutions that offer 2-year and 4-year degree programs in this field: **Concordia College, Doane University, Purdue University Global, Nebraska Wesleyan University, Southeast Community College,** and **Union College**. In particular, **Southeast Community College** has an extensive program in Mechanic and Repair Technologies.

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In 2017 alone, the colleges and universities in Lincoln graduated nearly **700 students with bachelor's degrees** in majors related to this sector, another **346 with associate's degrees**, and well over **126 with post-graduate degrees**.

Bachelor's Degrees Awarded	Concordia University	Doane University	Purdue Global Uni.	Nebraska Wesleyan Uni.	Peru State	Southeast Comm. College[A]	Union College[B]	UNL	Total
Agricultural/Biological/Biosystems Engineering								61	**61**
Biochemistry		6		2	9			45	**62**
Biology/Biological Sciences, General	27	19		33	5		1	112	**197**
Chemical Engineering								45	**45**
Chemistry, General	2	2		1			1	15	**21**
Computer Engineering, General								38	**38**
Computer and Information Sciences, General	4	5	2		7	75	7	77	**177**
Electrical and Electronics Engineering								76	**76**
Machine Tool Technology/Machinist						23			**23**
Manufacturing Engineering Technician						17			**17**
Mechanical Engineering								88	**88**
Physics, General	3	2						4	**9**
Quality Control Technology/Technician						20			**20**
Welding Technology/Welder						22			**22**
Mechanic and Repair Technologies/Technicians									
Autobody/Collision and Repair Tech./Technician						13			**13**
Automobile/Automotive Mech. Tech./Technician						68			**68**
Diesel Mechanics Tech./Technician						89			**89**
Heating/AC/Vent./Refrig Maint. Tech./Technician						19			**19**
Total	**36**	**34**	**2**	**36**	**21**	**346**	**9**	**561**	**1045**
A: Associates Degrees; B: Associates and Bachelors Degrees									
Source: http://nces.ed.gov/collegenavigator/									

Table 3

Post Graduate Degrees (M.A. & Ph.D.) Awarded	*UNL*	Total
Agricultural/Biological/Biosystems Eng.	8	**8**
Biochemistry	2	**2**
Chemical Engineering	1	**1**
Chemistry, General	22	**22**
Computer and Information Sciences, General	42	**42**
Electrical and Electronics Engineering	14	**14**
Mechanical Engineering	27	**27**
Physics, General	10	**10**
Total	**126**	**126**

Table 4

Research and Industry Services

The advanced manufacturing sector also benefits from the research facilities available at the **University of Nebraska-Lincoln (UNL).** These include:

Jeffrey S. Raikes School of Computer Science and Management
An innovative integration of computer science and management education, including a 2-year applied software design studio. The Jeffrey S. Raikes School develops leaders for a technology driven world. It is the recognized leader in interdisciplinary computer science and business management education for high ability and highly motivated students. The Raikes School is unique in that it is the premier program bringing together the domain of computer science and information technology with business, thereby developing leaders and entrepreneurs for the increasingly information technology-driven business world.

The Design Studio is the capstone learning experience of the Jeffrey S. Raikes School. In Design Studio, student teams partner with sponsoring businesses and government agencies to develop real-world, software-based solutions meeting their client's needs. Students gain project management, teamwork, and leadership skills essential in today's professional world. Design Studio gives students and clients the ability to interact and create innovative software based solution, while benefiting from the support of Raikes School faculty and facilities.

For more information, see the source of this passage: http://raikes.unl.edu/

College of Engineering
As the only engineering college in Nebraska the UNL College of Engineering provides its students with professors with national and international expertise in their fields, the latest technology, quality facilities, a vast network of successful alumni and friends of the college.

The college is located in two cities (Lincoln and Omaha) on three campuses (City Campus in Lincoln, the East Campus in Lincoln). The undergraduate program offers majors in: Agricultural Engineering, Architectural Engineering, Biological Systems Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Software Engineering, Architectural Engineering, Construction Engineering, Construction Management, Electrical Engineering and Mechanical Engineering. The graduate program offers Master of Science Degrees in 11 areas including Civil Engineering and Telecommunications Engineering and PhDs with specializations in 10 areas including Chemical & Biomolecular Engineering and Materials Engineering.

The college is at the forefront of cutting edge engineering research and is strong and growing especially in the areas of nanotechnology, transportation, structures, computer and electronics engineering, and materials research. The college is adding emphasis on biomechanics, materials and medicine; renewable energy production, distribution and consumption; and cyber infrastructures. The college is home to the Nebraska Center for Materials and Nanoscience , and the Center for Nontraditional Manufacturing Research

For more information, see the source of this passage: http://engineering.unl.edu/

Department of Computer Science & Engineering
Graduates from this UNL department are highly capable, creative individuals whose skills allow them to work seamlessly across a broad spectrum of careers. The department conducts state-of-the-art research in software engineering, informatics, and systems. The faculty receives funding from a variety of sources including: National Science Foundation (NSF), U.S. Department of Agriculture, Army Research Office, Airforce Office of Scientific Research, NASA, National Institute of Health, Microsoft, and Intel.

The department also hosts a number of research labs and facilities that form an important hub for information-technology R&D in the state of Nebraska:

The Abacus Distributed Storage Lab, aims to design and develop distributed and parallel storage systems with high scalability, performance, reliability and availability.

The **Constraint Systems Lab** investigations cover both theoretic and practical aspects of Constraint Processing, a sub-area of Artificial Intelligence. Constraint Processing provides powerful tools for modeling and solving effectively a wide variety of combinatorial problems spanning over Computer Science, Engineering, and Management.

Cyber-Physical Network, networks that are aware of, can adapt to, and change their environment. The focus areas are: cross-layer communications, real-time networking, underground sensor networks, mobile sensor networks, and cognitive radio networks.

For more information, see the source of this passage: http://cse.unl.edu/

Holland Computing Center (HCC)
HCC provides various services to researchers associated with any campus of the University of Nebraska system. The HCC houses and manages a number of supercomputers serving a broad range of functions. Crane has 7232 Intel Xeon cores in 452 nodes with 64GB RAM per node. Tusker consists of 106 AMD Interlagos-based nodes (6784 cores) interconnected with Mellanox QDR Infiniband. Sandhills has 1440 AMD cores housed in 42 nodes with 128GB per node and 2 nodes with 256GB per node. RED is a 337 node production-model LINUX cluster. HCC's cloud computing cluster based on Openstack.

For more information, see the source of this passage: http://hcc.unl.edu/

Nebraska Innovation Campus (NIC)
Nebraska Innovation Campus (NIC) is a research campus designed to facilitate new and in-depth partnerships between the University of Nebraska-Lincoln (UNL) and private sector businesses. NIC is located adjacent to UNL, strategically providing access to research faculty, facilities and students. At full build-out, NIC will be a 2.2 million square foot campus with uniquely designed buildings and amenities that encourage people to create and transform ideas into global innovation. NIC aspires to be the most sustainable research and technology campus in the U.S.

For more information about NIC visit: http://innovate.unl.edu/

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Lincoln's Advanced Manufacturing Sector

Lincoln's Advanced Manufacturing sector has includes a broad range of major employers including: **Lincoln Industries, Molex and Kawasaki Motors Manufacturing Corp USA**. In total, Lincoln is home to dozens of advanced manufacturers. Many of these firms are listed below:

Note: Please check with companies for most accurate employment data.

Archer Daniel Midlands Company
Soybean products, specialty food ingredients, including soy meal and oil, animal feed
www.admworld.com
Total Employment: 100-249

Benchmark Biolabs
Laboratory services & reagents for veterinary vaccine researchers; mfg vaccines
www.benchmarkbiolabs.com
Local employment: 20-49

Bosch Security Systems
Wireless communications equipment including headsets, microphones, intercoms & antennas
www.bosch.us
Total Employment: 100-249

Capital Contractors
Steel beams for bridges
Local employment: 20 - 49

Cleaver Brooks
Heat recovery steam generators for a wide variety of waste heat applications
www.hrsg.com
Local employment: 250 - 499

Concrete Industries Inc.
Concrete & fabricated steel products including pre-fabricated bridge components, pre-stressed wall panels, pre-cast columns and beams, hollow core, twin tees.
www.concreteindustries.com
Local Employment: 100-249

Dynamic Fusion Inc.
Configuration, fabrication & installation of equipment for flour & feed mills
Local employment: 1 - 9

Eidos Corporation
Ergonomic seating devices
www.eidosergonomics.com
Local employment: 1 - 9

Eley Corporation
Industrial, air, garden & power cord reels
www.rapidreel.com
Local employment: 1 - 9

Garner Industries
Level indicators, plastic injection molding, CNC machining, plastic rain gauges
www.garnerindustries.com
Total Employment: 100-249

Geist Manufacturing
Power extensions, outlet strips & surge suppressors; horizontal & vertical power strips
www.geistmfg.com
Local employment: 100 - 249

General Dynamics
Composites for fuel tanks, rockets & missiles, launch tubes
www.generaldynamics.com
Local Employment: 100-249

GSK Consumer Healthcare
Over-the-counter pharmaceuticals
www.us.novartis.com
Local employment: 500 – 999

Hexagon Lincoln
Composite pressure vessels, fuel tanks, utility components for aerospace & defense
www.hexagonlincoln.com
Local Employment: 250-499

HTI Plastics Inc.
Thermoplastic injection molded prods including pharma, food & animal health packaging
www.htiplastic.com
Local employment: 50 - 99

Intometal Inc.
Metal fabrication & machine tooling
www.intometal.com
Local employment: 50 - 99

Kawasaki Motors Manufacturing Corp. USA
Rail passenger cars, motorcycles, industrial robots, utility vehicles
www.kawasaki.com
Local employment: 1000-22499

Land and Sky Manufacturing
Memory foam, natural latex, flotation & air mattresses, contour pillows & mattress pads
www.landandsky.com
Local employment: 10 - 19

LENCO PMC Inc.
Custom injection molding, two-color & over molding, mold design, molding part assembly
www.lencopmc.com
Local employment: 100 – 249

Lester Electrical
Industrial battery chargers, custom elec. products & power mgmt systems for elec. vehicle & stationary power market
www.lesterelectrical.com
Total Employment: 100-249

Lincoln Industries
Custom & production plating, metal anodizing & hard coating
www.lincolnindustries.com
Local employment: 500 - 999

Lincoln Tool & Design Co.
Custom tool, die & machine shop services; plastic injection molding
www.lintool.com
Local employment: 20 - 49

Mapes Industries
Laminated architectural panels, canopies & walkway covers
www.mapes.com
Local employment: 50 - 99

Midwest Steel Works Inc.
Structural steel fabrication, metal fabrication, steel joists, stairs & railings, metal decking
www.midweststeelworks.com
Local employment: 50 - 99

Molex
Manufacturer of electronic interconnectors
www.molex.com
Local employment:1000 - 2499

Rexnord
Carbon fiber rollers
www.rexnord.com
Local employment: 20-49

Rivers Metal Products Inc.
Custom metal fabrication, rotational molds, trailer parts; materials sales &processing
www.riversmetal.com
Local employment: 50 - 99

Snyder Industries
Industrial storage tanks for storage & transportation of chemicals and fluids
www.snydernet.com
Local Employment: 100-249

Source One
Machining, fabrication, & finishing services to industry; powder coat finishing; production painting
www.sourceonex.com
Total Employment: 50-99

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Speedway Motors Inc.
Specialty automotive products for racing & street rod markets
www.speedwaymotors.com
Local employment: 250 – 449

Schneider Electric
Electronic circuit breakers
www.squared.com
Local employment: 250 - 499

TMCO Inc.
Metal fabrication & powder coating
www.tmcoinc.com
Local employment: 100 - 249

Tri-Con Industries Stamping Plant
www.tstna.com/triconindustries.php
Press & welding for automotive seat frames
Local employment: 100 - 249

Van Sickle Paint Manufacturing Inc.
Interior & exterior paints, stains, coatings, sealants & lubricants
www.vansicklepaint.com
Local employment: 10 - 19

Veyance Technologies
Power transmission products
www.goodyear.com
Local Employment: 500-999

Yasufuku USA Inc.
Rubber & plastic products for recreational vehicles & automobiles
www.yuinc.com
Local employment: 50 - 99

Zoetis Inc.
Veterinary pharmaceuticals & biological
www.pfizer.com
Local employment: 500 - 999