

Welding Occupational Groups

Inland Empire/Desert Region (Riverside-San Bernardino-Ontario Metropolitan Statistical Area)

Summary

- Employment for the welding occupational group is expected to **increase by 10% between 2017 and 2022** in the Inland Empire/Desert Region. More than **20,300 job openings** will be available over the five-year timeframe.
- The welding occupational group consists of primary welding occupations and secondary welding occupations. The primary welding occupational group consists of jobs that require workers to perform welding duties and tasks as the principal function of their daily work. Secondary welding occupations have a strong need for welding skills, but may not necessarily perform welding duties on a daily basis.
- The entry-level wage for each occupation in the primary and secondary welding occupational groups is **above the MIT Living Wage estimate of \$12.30 per hour** for a single adult living in the Inland Empire/Desert Region.
- There appears to be an opportunity for program growth based on the average annual number of program completions for the selected community college programs (**160 average annual community college credentials, 335 other institutional credentials, 495 total**), and the annual openings for primary and secondary welding occupations combined in the local region (**4,067 annual job openings**).

Introduction

This report details occupations relevant to the welding program. An idea welding program informs students about welding techniques, processes, and equipment applied in accordance with diagrams, blueprints, or other specifications. Most of the welding occupations as shown in Appendix A and B have an educational requirement of high school diploma or equivalent. Despite this, many of the incumbent workers possess some college education or a credential that may be obtained at a community college. The welding occupational group has been split into primary welding occupations and secondary welding occupations to illuminate the job opportunities available to students with welding skills.

The occupations included in the **primary** welding occupational group are:

- Structural Metal Fabricators and Fitters
- Welders, Cutters, Solderers, and Brazers
- Welding, Soldering and Brazing Machine Setters, Operators, and Tenders

The occupations included in the **secondary** welding occupational group are:

- Aircraft Structure, Surfaces, Rigging, and Systems Assemblers
- Boilermakers
- Commercial Drivers
- First-Line Supervisors of Production and Operating Workers
- Maintenance and Repair Workers, General
- Plumbers, Pipefitters, and Steamfitters
- Reinforcing Iron and Rebar Workers
- Sheet Metal Workers
- Structural Iron and Steel Workers

Job Opportunities

The primary welding occupational group consists of jobs that require workers to perform welding duties and tasks as the central function of their daily work. Across the local region, employment related to the primary welding occupational group is expected to increase 4% through 2022. Employers in the Inland Empire/Desert Region will need to hire nearly 2,700 workers over the next five years to fill new jobs and to backfill jobs that workers are leaving (includes retirements). Projected job growth for each of the detailed occupations in this occupational group is found in Appendix A.

The secondary welding occupations have a strong need for welding skills, but may not necessarily perform welding duties on a daily basis. The secondary welding group growing at a much faster pace over the next five years at 5%. Employers in the Inland Empire/Desert Region will need to hire more than 17,650 workers over the next five years. Projected job growth for each of the detailed occupations in this occupational group is found in Appendix B.

Exhibit 1: Five-year projections for the primary and secondary welding occupational groups in the Inland Empire/Desert Region

Welding Group	2017 Jobs	5-Yr % Change	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Primary Group	4,553	4%	2,682	536	21%
Secondary Group	27,994	11%	17,652	3,530	24%
Combined	32,547	10%	20,334	4,066	23%

Source: EMSI 2018.3

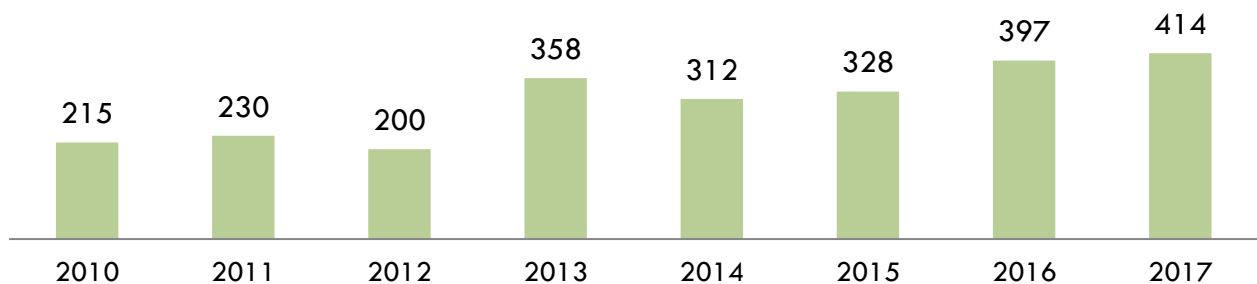
Job Ads, Top Employers, and Work Locations

Select occupations from the primary and secondary welding occupational groups from Appendix A and B along with the following skills were submitted into the search for relevant online job postings:

- Welding
- 6G Welding
- Arc Welding
- Pipe Welding
- Hand Welding
- Spot Welding
- Plate Welding
- Shell Welding
- Stick Welding

In the last 12 months (August 2017 to July 2018) there were 624 job advertisements (ads) for occupations in the primary and secondary welding occupational groups in the Inland Empire/Desert Region. From 2010 to 2017, there was an annual average of 307 job ads per year (Exhibit 3).

Exhibit 3: Number of online job postings for the welding occupational group in the Inland Empire/Desert Region, 2010 to 2017



Source: Burning Glass – Labor Insights

The average time to fill for welding occupations in the Inland Empire/Desert Region is about four days longer than the national average, indicating that it is somewhat harder for employers to find qualified candidates to fill their open positions in the local region. Exhibit 4 shows the number of job ads posted during the last 12 months along with the regional and national average time to fill. Primary welding occupations appear above the line, while secondary welding occupations appear below the line.

Exhibit 4: Job ads by each of the welding occupations in the Inland Empire/Desert Region and time to fill, August 2017 – July 2018

Occupation	Job Ads	Regional Average Time to Fill (Days)	National Average Time to Fill (Days)
Welders, Cutters, Solderers, and Brazers	272	39	34
Structural Metal Fabricators and Fitters	2	-	-
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	-	-	-
Maintenance and Repair Workers, General	259	44	40
Sheet Metal Workers	37	39	34

Plumbers, Pipefitters, and Steamfitters	28	36	30
First-Line Supervisors of Production and Operating Workers	13	37	36
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	6	43	39
Structural Iron and Steel Workers	4	37	32
Boilermakers	3	38	33
Reinforcing Iron and Rebar Workers	-	-	-
Commercial Divers	-	-	-
Total	624	-	-

Source: Burning Glass – Labor Insights

Earnings

The entry-level wage for each of the occupations in the welding occupational group is above the MIT Living Wage estimate of \$12.30 per hour for a single adult living in the Inland Empire/Desert Region. These wages are sufficient for an adult living in a household with one other working adult and one child (\$14.50 per hour, per adult or \$30,160 annually for each adult). Exhibit 5 displays wage information for this occupational group in the Inland Empire/Desert Region. Primary welding occupations appear above the line, while secondary welding occupations appear below the line.

Exhibit 5: Earnings for the welding occupational group in the Inland Empire/Desert Region

Occupation	Entry to Experienced Hourly Earnings Range*	Median Wage*	Average Annual Earnings
Welders, Cutters, Solderers, and Brazers	\$15.14 to \$22.09	\$17.90	\$39,500
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	\$13.97 to \$20.40	\$16.67	\$36,800
Structural Metal Fabricators and Fitters	\$12.95 to \$20.09	\$15.91	\$35,600
Boilermakers	\$25.64 to \$41.82	\$34.50	\$70,700

Occupation	Entry to Experienced Hourly Earnings Range*	Median Wage*	Average Annual Earnings
Structural Iron and Steel Workers	\$26.75 to \$38.43	\$33.39	\$68,600
Sheet Metal Workers	\$18.47 to \$34.11	\$26.62	\$58,600
First-Line Supervisors of Production and Operating Workers	\$20.06 to \$36.36	\$26.37	\$61,100
Plumbers, Pipefitters, and Steamfitters	\$15.46 to \$27.75	\$21.05	\$46,600
Commercial Divers	\$17.17 to \$23.68	\$19.41	\$47,300
Maintenance and Repair Workers, General	\$14.07 to \$24.88	\$18.56	\$41,500
Reinforcing Iron and Rebar Workers	\$13.26 to \$19.28	\$14.91	\$38,800
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	\$12.61 to \$17.35	\$14.52	\$32,700

Source: EMSI 2018.3

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage.

Top Employers, Skills, and Education

Exhibit 6 displays the top employers posting job ads from the last 12 months for the Inland Empire/Desert Region. Primary welding occupations appear above the line, while secondary welding occupations appear below the line. N/A indicates that there were too few job postings to obtain data. Welding, soldering, and brazing machine setters, operators, and tenders; reinforcing iron and rebar workers; structural metal fabricators and fitters; aircraft structure, surfaces, rigging, and systems assemblers; structural iron and steel workers; and commercial divers were omitted due to lack of job ads.

Exhibit 6: The top employers posting job ads for welding occupations in the Inland Empire/Desert Region, Aug 2017 – July 2018

Occupation	Top Employers
Welders, Cutters, Solderers, and Brazers (n=102)	<ul style="list-style-type: none"> Vulcan Steel Company Supreme Corporation
Maintenance and Repair Workers, General (n=226)	<ul style="list-style-type: none"> CBRE Group, Inc. Staples, Inc.
Sheet Metal Workers (n=22)	<ul style="list-style-type: none"> CalPortland Company, Inc.
Plumbers, Pipefitters, and Steamfitters (n=24)	<ul style="list-style-type: none"> Jacobs Engineering Group, Inc. Palm Springs Unified School District
First-Line Supervisors of Production and Operating Workers (n=5)	<ul style="list-style-type: none"> RND Contractors, Inc. Nilfisk, Inc.
Boilermakers (n=3)	<ul style="list-style-type: none"> Ukpeagvik lupiat Corporation Phoenix Resource Group

Source: Burning Glass – Labor Insights

Exhibit 7 lists a sample of in-demand specialized and soft skills that employers are seeking when looking for workers to fill welding positions. Primary welding occupations appear above the line, while secondary welding occupations appear below the line. N/A indicates that there were too few job postings to obtain data, or that the skill is not applicable to the occupation. Welding, soldering, and brazing machine setters, operators, and tenders; structural metal fabricators and fitters; reinforcing iron and rebar workers; and commercial divers have been omitted due to lack of job ads.

Exhibit 7: Sample of in-demand skills from employer job ads for welding occupations in the Inland Empire/Desert Region, August 2017 – July 2018

Occupation	Specialized skills	Soft skills	Software and Programming skills
Welders, Cutters, Solderers, and Brazers (n=272)	<ul style="list-style-type: none"> Mig and Tig Welding Forklift Operation Machinery 	<ul style="list-style-type: none"> Work Area Maintenance Teamwork/ Collaboration English 	<ul style="list-style-type: none"> Microsoft Office
Maintenance and Repair Workers, General (n=260)	<ul style="list-style-type: none"> Welding Repair Plumbing 	<ul style="list-style-type: none"> Preventive Maintenance Troubleshooting Communication Skills 	<ul style="list-style-type: none"> Microsoft Office

Occupation	Specialized skills	Soft skills	Software and Programming skills
Sheet Metal Workers (n=37)	<ul style="list-style-type: none"> Welding Repair Soldering 	<ul style="list-style-type: none"> Work Area Maintenance Organizational Skills Communication Skills 	<ul style="list-style-type: none"> Enterprise Resource Planning
Plumbers, Pipefitters, and Steamfitters (n=28)	<ul style="list-style-type: none"> Welding Repair Water Heaters 	<ul style="list-style-type: none"> Preventive Maintenance Planning Prioritizing Tasks 	<ul style="list-style-type: none"> Microsoft Office
First-Line Supervisors of Production and Operating Workers (n=13)	<ul style="list-style-type: none"> Welding Staff Management Manufacturing Industry Knowledge 	<ul style="list-style-type: none"> Creativity Planning Preventive Maintenance 	<ul style="list-style-type: none"> Microsoft Office
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers (n=6)	<ul style="list-style-type: none"> Welding Soldering Sheet Metal Installations 	<ul style="list-style-type: none"> Work Area Maintenance Organizational Skills Troubleshooting 	<ul style="list-style-type: none"> N/A
Structural Iron and Steel Workers (n=4)	<ul style="list-style-type: none"> Welding Cutting Torch Dimensional Drawings 	<ul style="list-style-type: none"> Written Communication Range of Motion Planning 	<ul style="list-style-type: none"> Lockout/Tagout (LOTO)
Boilermakers (n=3)	<ul style="list-style-type: none"> Welding Pressure Gauges Power Tools 	<ul style="list-style-type: none"> Positive Disposition Troubleshooting Computer Literacy 	<ul style="list-style-type: none"> Microsoft Office

Source: Burning Glass – Labor Insights

Exhibit 8 displays the entry-level education typically required to enter each occupation according to the Bureau of Labor Statistics, educational attainment for incumbent workers with “some college, no degree” and an “associate degree” according to the U.S. Census, and the minimum advertised education requirement requested by employers in online job ads. Primary welding occupations appear above the line, while secondary welding occupations appear below the line.

Exhibit 8: Educational attainment and online job ads with minimum advertised education requirements for the welding occupational group in the Inland Empire/Desert Region, August 2017 – July 2018

Occupation	Work Experience Required	Typical Entry-Level Education Requirement	Educational Attainment*	Minimum Advertised Education Requirement from Job Ads			
				Number of Job Postings (n=)	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
Welders, Cutters, Solderers, and Brazers	None	High school diploma or equivalent	31%	78	96%	1%	3%
Structural Metal Fabricators and Fitters	None	High school diploma or equivalent	33%	2	100%	-	-
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	None	High school diploma or equivalent	31%	-	-	-	-
Maintenance and Repair Workers, General	None	High school diploma or equivalent	38%	156	99%	1%	-
Sheet Metal Workers	None	High school diploma or equivalent	33%	14	100%	-	-
Plumbers, Pipefitters, and Steamfitters	None	High school diploma or equivalent	32%	9	89%	11%	-
First-Line Supervisors of Production and Operating Workers	Less than 5 years	High school diploma or equivalent	35%	9	67%	22%	11%
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	None	High school diploma or equivalent	35%	1	100%	-	-
Structural Iron and Steel Workers	None	High school diploma or equivalent	35%	-	-	-	-

Occupation	Work Experience Required	Typical Entry-Level Education Requirement	Educational Attainment*	Minimum Advertised Education Requirement from Job Ads			
				Number of Job Postings (n=)	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
Boilermakers	None	High school diploma or equivalent	36%	-	-	-	-
Reinforcing Iron and Rebar Workers	None	High school diploma or equivalent	18%	-	-	-	-
Commercial Divers	None	Postsecondary nondegree award	37%	-	-	-	-

Source: EMSI 2018.3, Burning Glass – Labor Insights

*Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework

Student Completions and Outcomes

Exhibits 9-12 show the annual average regional community college awards (associate degrees and certificates) conferred during the three academic years between 2014 and 2017, with the relevant TOP code. Awards granted from 2013 to 2016 outside of the California Community Colleges are displayed in Exhibit 13, along with the relevant CIP code. Please note, an award is not equivalent to a single person in search of a job opening since a student may earn more than one award, such as an associate degree in addition to a certificate. Community College student outcome information was obtained from the CTE LaunchBoard based on the selected TOP code(s) and region.

Exhibit 9: Annual average community college student completions for aeronautical and aviation technology programs in the Inland Empire/Desert region

0950.00 – Aeronautical and Aviation Technology	CC Headcount (2016-17)	CC Annual Avg. Credentials (2014-17)
Chaffey – Aviation Maintenance	44	
Certificate 60+ semester units		5
San Bernardino – Aviation Maintenance Technician	42	
Associate degree		2
Certificate 30 to < 60 semester units		2
Victor Valley – Aviation Maintenance Technology	93	
Total Community College Headcount (2016-17)	179	
Total Annual Average Community College Credentials (2014-17)		9

Source: LaunchBoard, IPEDS, COCI

0950.00 Aeronautical and aviation technology program outcomes in the Inland Empire/Desert Region in the academic year 2014-15 [unless noted otherwise]:

- Number of course enrollments: 379 (California median: 109) [2016-17]
- Number of students who transferred to a 4-year institution: N/A (CA: 0)
- Employed in the second fiscal quarter after exit: 68% (CA: 69%)
- Median earnings in the second fiscal quarter after exit: \$6,917 (CA: \$10,970)
- Employed in the fourth fiscal quarter after exit: 58% (CA: 64%)
- Median annual earnings: \$37,370 (CA: \$30,000) [2015-16]
- The percentage in a job closely related to the field of study: N/A (CA: 73%)
- Median change in earnings: 131% (CA: 60%)
- The proportion of students who attained a living wage: 56% (CA: 62%)

Exhibit 10: Annual average community college student completions for aviation airframe mechanics programs in the Inland Empire/Desert Region

0950.10 – Aviation Airframe Mechanics	Annual Avg. CC Headcount (2016-17)	CC Annual Avg. Credentials (2014-17)
Chaffey - Aviation Maintenance Technology Airframe	57	
Associate degree		3
Certificate 30 to < 60 semester units		22
San Bernardino - Airframe Maintenance Technician	25	
Certificate 30 to < 60 semester units		9
Victor Valley - Aviation Airframe Technician	114	
Certificate 18 to < 30 semester units		3
Total Community College Headcount (2016-17)	196	
Total Annual Average Community College Credentials (2014-17)		37

Source: LaunchBoard, IPEDS, COCI

0950.10 Aviation airframe mechanics program outcomes in the Inland Empire/Desert Region in the academic year 2015-16 [unless otherwise noted]:

- Number of course enrollments: 429 (California median: 71) [2016-17]
- Number of students who transferred to a 4-year institution: N/A (CA: 0)
- Employed in the second fiscal quarter after exit: 66% (CA: 70%)
- Median earnings in the second fiscal quarter after exit: \$9,312 (CA: \$9,908)
- Employed in the fourth fiscal quarter after exit: 69% (CA: 75%)
- Median annual earnings: \$32,678 (CA: \$33,670)
- The percentage in a job closely related to the field of study: N/A (CA: 88%) [2014-15]
- Median change in earnings: 128% (CA: 87%)
- The proportion of students who attained a living wage: 68% (CA: 68%)

Exhibit 11: Annual average community college student completions for aviation powerplant mechanics programs in the Inland Empire/Desert Region

0950.20 – Aviation Powerplant Mechanics	Annual Avg. CC Headcount (2016-17)	CC Annual Avg. Credentials (2014-17)
Chaffey - Aeronautics: Powerplant, Aviation Maintenance Technology Powerplant	63	
Associate degree		3
Certificate 30 to < 60 semester units		24
San Bernardino	27	
Certificate 30 to < 60 semester units		7
Victor Valley - Aviation Powerplant Technician	108	
Certificate 30 to < 60 semester units		5
Total Community College Headcount (2016-17)	198	
Total Annual Average Community College Credentials (2014-17)		39

Source: LaunchBoard, IPEDS, COCI

0950.20 Aviation powerplant mechanics program outcomes in the Inland Empire/Desert Region in the academic year 2015-16 [unless noted otherwise]:

- Number of course enrollments: 450 (California median: 110) [2016-17]
- Number of students who transferred to a 4-year institution: N/A (CA: 0)
- Employed in the second fiscal quarter after exit: 68% (CA: 69%)
- Median earnings in the second fiscal quarter after exit: \$9,312 (CA: \$10,923)
- Employed in the fourth fiscal quarter after exit: 70% (CA: 75%)
- Median annual earnings: \$30,615 (CA: \$35,194)
- The percentage in a job closely related to the field of study: 89% (CA: 89%) [2014-15]
- Median change in earnings: 111% (CA: 119%)
- The proportion of students who attained a living wage: 64% (CA: 59%)

Exhibit 12: Annual average community college student completions for welding technology programs in the Inland Empire/Desert Region

0956.50 – Welding Technology	Annual Avg. CC Headcount (2016-17)	CC Annual Avg. Credentials (2014-17)
Barstow - Welding	121	
Associate degree		3
Certificate 18 to < 30 semester units		3
Desert	81	
Palo Verde – Welding Technology	166	
Associate degree		2
Certificate 18 to < 30 semester units		11
Certificate 6 to < 18 semester units		5
Riverside – Welding Technology	357	
Associate degree		3
Certificate 30 to < 60 semester units		6
Certificate 6 to < 18 semester units		26
San Bernardino – Welding Inspection Technology, Welding Technology	227	
Associate degree		3
Certificate 18 to < 30 semester units		2
Certificate 6 to < 18 semester units		3
Victor Valley - Welding	221	
Associate degree		3
Certificate 18 to < 30 semester units		5
Total Community College Headcount (2016-17)	1,171	
Total Annual Average Community College Credentials (2014-17)		75

Source: LaunchBoard, IPEDS, COCI

0956.50 Welding technology program outcomes in the Inland Empire/Desert Region in the academic year 2015-16 [unless noted otherwise]:

- Number of course enrollments: 2,257 (California median: 342) [2016-17]
- Number of students who transferred to a 4-year institution: 12 (CA: 0)
- Employed in the second fiscal quarter after exit: 61% (CA: 70%)
- Median earnings in the second fiscal quarter after exit: \$6,325 (CA: \$7,437)
- Employed in the fourth fiscal quarter after exit: 59% (CA: 70%)
- Median annual earnings: \$22,545 (CA: \$27,499)
- The percentage in a job closely related to the field of study: 55% (CA: 75%) [2014-15]
- Median change in earnings: 65% (CA: 60%)
- The proportion of students who attained a living wage: 45% (CA: 52%)

Exhibit 13: Annual average community college student completions for welding technology general programs in the Inland Empire/Desert Region

48.0508 – Welding Technology/Welder	Other Educational Institutions Annual Average Certificates or Other Credit Credentials (2013-16)
CET-Colton	
Credential 1 < 2 academic years	74
Riverside County Office of Education-School of Career Education	
Credential < 1 academic year	49
Summit College	
Credential < 1 academic year	122
The Fab School	
Credential < 1 academic year	90
Total annual average other credentials (2013-16)	335

Source: IPEDS

Sources

O*Net Online

Labor Insight/Jobs (Burning Glass)

Economic Modeling Specialists International (EMSI)

Employment Development Department, Labor Market Information Division, OES

Employment Development Department, Unemployment Insurance Dataset

CTE LaunchBoard

Statewide CTE Outcomes Survey

Living Insight Center for Community Economic Development

California Community Colleges Chancellor's Office Management Information Systems (MIS)

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Appendix A: Occupation definitions, five-year projections, and earnings for the primary and secondary welding occupational groups

Occupation Definitions (SOC code), Education and Training Requirement, Community College Education Attainment

Structural Metal Fabricators and Fitters (51-2041)

Fabricate, position, align, and fit parts of structural metal products.

Entry-Level Educational Requirement: High school diploma

Training Requirement: One to 12 months of on-the-job training

Percentage with Community College Credential or Some Postsecondary Coursework: 33%

Welders, Cutters, Solderers, and Brazers (51-4121)

Use hand-welding, flame-cutting, hand soldering, or brazing equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.

Entry-Level Educational Requirement: High school diploma

Training Requirement: One to 12 months of on-the-job training

Percentage with Community College Credential or Some Postsecondary Coursework: 31%

Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders (51-4122)

Set up, operate, or tend welding, soldering, or brazing machines or robots that weld, braze, solder, or heat treat metal products, components, or assemblies. Includes workers who operate laser cutters or laser-beam machines.

Entry-Level Educational Requirement: High school diploma

Training Requirement: One to 12 months of on-the-job training

Percentage with Community College Credential or Some Postsecondary Coursework: 31%

Table 1. Primary Welding Occupations 2017 to 2022 job growth, wages, education, training, and work experience required

Occupation (SOC)	2017 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage*	Median Hourly Wage*	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Welders, Cutters, Solderers, and Brazers (51-4121)	3,081	230	7%	381	\$15.14 to \$22.09	\$17.90	\$39,500	High school diploma or equivalent & 1 to 12 months	None
Structural Metal Fabricators and Fitters (51-2041)	1,060	(55)	(5%)	112	\$12.95 to \$20.09	\$15.91	\$35,600	High school diploma or equivalent & 1 to 12 months	None
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders (51-4122)	412	(14)	(3%)	43	\$13.97 to \$20.40	\$16.67	\$36,800	High school diploma or equivalent & 1 to 12 months	None
TOTAL PRIMARY	4,553	161	4%	536					

Source: EMSI 2018.3

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage.

Appendix B: Occupation definitions, five-year projections, and earnings for the secondary welding occupational group

Occupation Definitions (SOC code), Education and Training Requirement, Community College Education Attainment

Boilermakers (47-2011)

Construct, assemble, maintain, and repair stationary steam boilers and boiler house auxiliaries. Align structures or plate sections to assemble boiler frame tanks or vats, following blueprints. Work involves use of hand and power tools, plumb bobs, levels, wedges, dogs, or turnbuckles. Assist in testing assembled vessels. Direct cleaning of boilers and boiler furnaces. Inspect and repair boiler fittings, such as safety valves, regulators, automatic-control mechanisms, water columns, and auxiliary machines.

Entry-Level Educational Requirement: High school diploma

Training Requirement: Apprenticeship

Percentage with Community College Credential or Some Postsecondary Coursework: 36%

Plumbers, Pipefitters, and Steamfitters (47-2152)

Assemble, install, alter, and repair pipelines or pipe systems that carry water, steam, air, or other liquids or gases. May install heating and cooling equipment and mechanical control systems. Includes sprinkler fitters.

Entry-Level Educational Requirement: High school diploma

Training Requirement: Apprenticeship

Percentage with Community College Credential or Some Postsecondary Coursework: 32%

Reinforcing Iron and Rebar Workers (47-2171)

Position and secure steel bars or mesh in concrete forms in order to reinforce concrete. Use a variety of fasteners, rod-bending machines, blowtorches, and hand tools. Includes rod busters.

Entry-Level Educational Requirement: High school diploma

Training Requirement: Apprenticeship

Percentage with Community College Credential or Some Postsecondary Coursework: 18%



Sheet Metal Workers (47-2211)

Fabricate, assemble, install, and repair sheet metal products and equipment, such as ducts, control boxes, drainpipes, and furnace casings. Work may involve any of the following: setting up and operating fabricating machines to cut, bend, and straighten sheet metal; shaping metal over anvils, blocks, or forms using hammer; operating soldering and welding equipment to join sheet metal parts; or inspecting, assembling, and smoothing seams and joints of burred surfaces. Includes sheet metal duct installers who install prefabricated sheet metal ducts used for heating, air conditioning, or other purposes.

Entry-Level Educational Requirement: High school diploma

Training Requirement: Apprenticeship

Percentage with Community College Credential or Some Postsecondary Coursework: 33%

Structural Iron and Steel Workers (47-2221)

Raise, place, and unite iron or steel girders, columns, and other structural members to form completed structures or structural frameworks. May erect metal storage tanks and assemble prefabricated metal buildings.

Entry-Level Educational Requirement: High school diploma

Training Requirement: Apprenticeship

Percentage with Community College Credential or Some Postsecondary Coursework: 35%

Maintenance and Repair Workers, General (49-9071)

Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs.

Entry-Level Educational Requirement: High school diploma

Training Requirement: One to 12 months on-the-job-training

Percentage with Community College Credential or Some Postsecondary Coursework: 38%



Commercial Divers (49-9092)

Work below the surface of water, using scuba gear to inspect, repair, remove, or install equipment and structures. May use a variety of power and hand tools, such as drills, sledgehammers, torches, and welding equipment. May conduct tests or experiments, rig explosives, or photograph structures or marine life.

Entry-Level Educational Requirement: Postsecondary nondegree credential

Training Requirement: One to 12 months of on-the-job training

Percentage with Community College Credential or Some Postsecondary Coursework: 37%

First-Line Supervisors of Production and Operating Workers (51-1011)

Directly supervise and coordinate the activities of production and operating workers, such as inspectors, precision workers, machine setters and operators, assemblers, fabricators, and plant and system operators.

Entry-Level Educational Requirement: High school diploma

Training Requirement: None

Percentage with Community College Credential or Some Postsecondary Coursework: 35%

Aircraft Structure, Surfaces, Rigging, and Systems Assemblers (51-2011)

Assemble, fit, fasten, and install parts of airplanes, space vehicles, or missiles, such as tails, wings, fuselage, bulkheads, stabilizers, landing gear, rigging and control equipment, or heating and ventilating systems.

Entry-Level Educational Requirement: High school diploma

Training Requirement: One to 12 months of on-the-job training

Percentage with Community College Credential or Some Postsecondary Coursework: 35%

Table 1. Secondary Welding Occupations. 2017 to 2022 job growth, wages, education, training, and work experience required

Occupation (SOC)	2017 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage*	Median Hourly Wage*	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Maintenance and Repair Workers, General (49-9071)	13,328	1,422	11%	1,629	\$14.07 to \$24.88	\$18.56	\$41,500	High school diploma or equivalent & 1 to 12 months	None
Plumbers, Pipefitters, and Steamfitters (47-2152)	5,708	1,018	18%	841	\$15.46 to \$27.75	\$21.05	\$46,600	High school diploma or equivalent & apprenticeship	None
First-Line Supervisors of Production and Operating Workers (51-1011)	5,383	223	4%	575	\$20.06 to \$36.36	\$26.37	\$61,100	High school diploma or equivalent & none	Less than 5 years
Sheet Metal Workers (47-2211)	1,661	225	14%	227	\$18.47 to \$34.11	\$26.62	\$58,600	High school diploma or equivalent & apprenticeship	None
Structural Iron and Steel Workers (47-2221)	1,212	158	13%	166	\$26.75 to \$38.43	\$33.39	\$68,600	High school diploma or equivalent & apprenticeship	None
Reinforcing Iron and Rebar Workers (47-2171)	422	40	9%	54	\$13.26 to \$19.28	\$14.91	\$38,800	High school diploma or equivalent & apprenticeship	None
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers (51-2011)	195	26	13%	27	\$12.61 to \$17.35	\$14.52	\$32,700	High school diploma or equivalent & 1 to 12 months	None

Occupation (SOC)	2017 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage*	Median Hourly Wage*	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Boilermakers (47-2011)	50	15	30%	8	\$25.64 to \$41.82	\$34.50	\$70,700	High school diploma or equivalent & apprenticeship	None
Commercial Divers (49-9092)	37	2	5%	4	\$17.17 to \$23.68	\$19.41	\$47,300	Postsecondary nondegree credential & 1 to 12 months	None
Total SECONDARY	27,994	3,130	11%	3,530	-	-	-	-	-

Source: EMSI 2018.3

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage.