

Welding Technology

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

Summary

- Employment for the welding technology occupational group is expected to **increase by 12%** through 2022 in the Inland Empire/Desert Region. **A total of 9,436 job openings** will be available over the next five years.
- The **entry-level wage** for welding technology 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.
- There appears to be an opportunity for program growth based on the average annual number of program completions for the welding technology program (**75 average annual community college credentials, 335 other institutional credentials, 410 total**), compared to the annual job openings (**1,887 annual job openings**) for the welding technology occupations in the Inland Empire/Desert region.

Introduction

Completion of the welding technology program (TOP 0956.50) provides knowledge of welding techniques, processes, and equipment applied in accordance with diagrams, blueprints, or other specifications. All occupations in the welding occupational group have an educational requirement of a 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 primary welding occupational group consists of jobs that require workers to perform welding duties and tasks as the central function of their daily work and job duties. 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



Secondary welding occupations have a strong need for welding skills to be fully competent or well qualified for employment but will use these skills less frequently. The occupations included in the **secondary** welding occupational group are:

- Boilermakers
- Industrial Machinery Mechanics
- Plumbers, Pipefitters, and Steamfitters
- Structural Iron and Steel Workers

Job Opportunities

Across the local region, new job employment related to the primary welding occupational group is expected to increase by 5% through 2022. Employers will have a total of 2,741 job openings over the next five years to fill new jobs and to backfill jobs that workers are leaving (includes retirements). Appendix A displays projected job growth for each of the detailed occupations in this group.

New job employment in the secondary welding group is projected to grow at a much faster pace over the next five years at 15%. Employers will have a total of 6,695 job openings 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 B.

Exhibit 1: Job counts and five-year projections for the two welding occupational groups

Occupational Group	2017 Jobs	5-Yr % Change (New Job)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)
Primary Group	4,545	5%	2,741	548
Secondary Group	9,900	15%	6,695	1,339
Combined	14,535	12%	9,436	1,887

Source: EMSI 2018.4

Earnings

The entry-level wages for welding technology occupations are above the MIT Living Wage estimate of \$12.30 per hour for a single adult living in the Inland Empire/Desert region. Detailed information about the MIT Living Wage Calculator, including additional wage requirements for adults with dependent children, is available on their website:

<http://livingwage.mit.edu/metros/40140>.

Exhibit 2: Earnings for the welding technology occupations

Occupation	Entry to Experienced Hourly Earnings Range*	Median Earnings*	Avg. Annual Earnings
Primary Welding Occupations			
Welders, Cutters, Solderers, and Brazers	\$15.14 to \$22.10	\$17.91	\$39,500
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	\$13.97 to \$20.40	\$16.68	\$36,800
Structural Metal Fabricators and Fitters	\$12.95 to \$20.90	\$15.91	\$35,600
Secondary Welding Occupations			
Boilermakers	\$25.64 to \$41.83	\$34.49	\$70,700
Structural Iron and Steel Workers	\$26.75 to \$38.43	\$33.40	\$68,600
Industrial Machinery Mechanics	\$20.80 to \$32.15	\$25.64	\$55,200
Plumbers, Pipefitters, and Steamfitters	\$15.45 to \$27.74	\$21.01	\$46,600

Source: EMSI 2018.4

*Entry hourly is 25th percentile earnings, the median is 50th percentile earnings, experienced is 75th percentile earnings.

Job Posting Data (Real-Time Labor Market Information)

Exhibit 3 displays the number of job ads posted for welding technology occupations during the last 12 months along with the regional and national average time it takes to fill jobs. On average, local employers fill online job posting for the welding technology occupational group within 40 days. When compared to the national average, it takes five days longer for local employers to find qualified candidates, indicating that welding technology positions are harder to fill in the Inland Empire/Desert Region. Exhibit 3 shows the number of job ads posted during the last 12 months for each occupation along with the regional and national average time to fill. The structural metal fabricators and fitters occupation was omitted from Exhibits 4 through 6 due to a lack of job postings in the region.

Exhibit 3: Job ads and time to fill for welding technology occupations, Dec 2017 – Nov 2018

Occupation	Job Ads	Region Average Time to Fill (Days)	National Average Time to Fill (Days)
Primary Welding Occupations			
Welders, Cutters, Solderers, and Brazers	363	43	34
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	2	39	34
Structural Metal Fabricators and Fitters	0	-	-
Secondary Welding Occupations			
Industrial Machinery Mechanics	466	43	39
Plumbers, Pipefitters, and Steamfitters	268	36	32
Boilermakers	8	38	33
Structural Iron and Steel Workers	3	37	32
Total	1,110	-	-

Source: Burning Glass – Labor Insights

Employers

Exhibit 4 displays a sample of the employers that have been posting job ads for welding technology occupations over the last 12 months. There were too few job postings for the structural iron and steel workers and the welding, soldering, and the brazing machine setters, operators, and tenders occupations to display reliable employer data.

Exhibit 4: Employers posting the most job ads for welding technology occupations, Dec 2017 – Nov 2018

Occupation	Employers
Primary Welding Occupations	
Welders, Cutters, Solderers, and Brazers (n=152)	<ul style="list-style-type: none"> Acronics Supreme Corporation
Secondary Welding Occupations	
Industrial Machinery Mechanics (n=363)	<ul style="list-style-type: none"> Niagara Bottling LLC Cemex
Plumbers, Pipefitters, and Steamfitters (n=185)	<ul style="list-style-type: none"> American Residential Services/ARS Rescue Rooter Riverside County
Boilermakers (n=7)	<ul style="list-style-type: none"> Zachry Group Ukeagvik Inupiat Corporation (UIC)
Structural Iron and Steel Workers	<ul style="list-style-type: none"> N/A

Source: Burning Glass – Labor Insights

In-Demand Skills

Exhibit 5 lists the in-demand skills that employers are seeking when looking for workers to fill welding technology positions. The skills reported in job postings may be utilized as a helpful guide for curriculum development. Specialized skills are occupation-specific skills employers are requesting for industry or job competency. Employability skills are foundational skills that transcend industries and occupations; this category is commonly referred to as “soft skills.” There were too few job postings for the structural iron and steel workers and the welding, soldering, and the brazing machine setters, operators, and tenders occupations to display reliable in-demand skills employer data.

Exhibit 5: Skills in-demand for welding technology occupations, Dec 2017 – Nov 2018

Occupation	Specialized skills	Employability skills
Primary Welding Occupations		
Welders, Cutters, Solderers, and Brazers (n=261)	<ul style="list-style-type: none"> • MIG and TIG Welding • Repair • Forklift Operation 	<ul style="list-style-type: none"> • Physical Abilities • English • Teamwork/Collaboration
Secondary Welding Occupations		
Industrial Machinery Mechanics (n=439)	<ul style="list-style-type: none"> • Repair • Welding • Predictive/Preventative Maintenance 	<ul style="list-style-type: none"> • Troubleshooting • Physical Abilities • Communication Skills
Plumbers, Pipefitters, and Steamfitters (n=212)	<ul style="list-style-type: none"> • Repair • Water Heaters • Commercial Plumbing 	<ul style="list-style-type: none"> • Troubleshooting • Communication Skills • Physical Abilities
Boilermakers (n=8)	<ul style="list-style-type: none"> • Repair • Welding • Power Tools 	<ul style="list-style-type: none"> • Physical Abilities • Teamwork/Collaboration • Communication Skills

Source: Burning Glass – Labor Insights

Educational Requirements

Exhibit 6 displays the entry-level education typically required for welding technology occupations 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 Bureau Current Population Survey, and the minimum advertised education requirement requested by employers in online job ads. There were too few job postings for boilermakers and structural iron and steel workers to obtain minimum advertised education requirement data.

Exhibit 6: Educational attainment and online job ads with minimum advertised education requirements for welding technology occupations, Dec 2017 – Nov 2018

Occupation	Work Experience Required	Typical Entry-Level Education Requirement	Two-Year Postsecondary Level of 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
Primary Welding Occupations							
Welders, Cutters, Solderers, and Brazers	None	High school diploma or equivalent	31%	100	97%	2%	1%
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	None	High school diploma or equivalent	31%	2	100%	-	-
Secondary Welding Occupations							
Industrial Machinery Mechanics	None	High school diploma or equivalent	41%	251	92%	8%	-
Plumbers, Pipefitters, and Steamfitters	None	High school diploma or equivalent	32%	34	100%	-	-
Boilermakers	None	High school diploma or equivalent	36%	-	N/A	N/A	N/A
Structural Iron and Steel Workers	None	High school diploma or equivalent	35%	-	N/A	N/A	N/A

Source: EMSI 2018.4, Current Population Survey, Burning Glass – Labor Insights

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

Student Completions

Exhibit 7 shows the annual average regional community college credentials (associate degrees and certificates) conferred during the three academic years between 2014 and 2017, with the relevant TOP code as well as the program titles used at each college, sourced from the Chancellor’s Office Curriculum Inventory (COCI). Credentials granted from other educational institutions from 2013 to 2016 are displayed in Exhibit 8, along with the relevant CIP code. Please note, a credential 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 is from the CTE LaunchBoard based on the selected TOP code(s) and region.

Exhibit 7: Annual average community college student completions for welding technology programs

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 2015-16 academic year [unless noted otherwise]:

- Number of course enrollments: 2,257 (California median: 342) [2016-17]
- Completed 12+ CTE units in one year: 221 (CA: 47)
- Number of students who transferred to a 4-year institution: 12 (CA: 0)
- Employed in the second fiscal quarter after exit: 61% (CA: 71%)
- Median earnings in the second fiscal quarter after exit: \$5,952 (CA: \$7,731)
- Employed in the fourth fiscal quarter after exit: 59% (CA: 70%)
- Median annual earnings: \$22,225 (CA: \$27,283)
- The percentage in a job closely related to the field of study: 55% (CA: 75%) [2014-15]
- Median change in earnings: 68% (CA: 57%)
- The proportion of students who attained a living wage: 45% (CA: 52%)

Exhibit 8: Annual average community college student completions for welding technology general programs

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

Source: IPEDS



Sources

California Community Colleges Chancellor's Office Management Information Systems (MIS)
CTE LaunchBoard
Economic Modeling Specialists International (EMSI)
Integrated Postsecondary Education Data System (IPEDS)
Labor Insight/Jobs (Burning Glass)
MIT Living Wage Calculator
O*Net Online
The Taxonomy of Programs, 6th Edition
U.S. Census Bureau Current Population Survey

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Appendix A: Occupation definitions, sample job titles, five-year projections, and earnings for primary welding occupations

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.

Sample job titles: Fabricator; Fitter; Fitter, Welder; Layout Man; Mill Beam Fitter; Ship Fitter; Structural Steel Fitter; Tack Welder; Weld Technician; Welder-Fabricator

Entry-Level Educational Requirement: High school diploma or equivalent

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

Percentage of incumbent workers with a Community College Award 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.

Sample job titles: Aluminum Welder, Fabrication Welder, Fabricator, Fitter/Welder, Maintenance Welder, Mig Welder, Sub Arc Operator, Welder, Welder-Fitter, Welder/Fabricator, Assembly Line Brazer, Brazer, Connector, Electronic Technician, Fabricator, Production Technician, Refrigeration Brazer/Solderer, Refrigeration Specialist, Solderer, Wirer

Entry-Level Educational Requirement: High school diploma or equivalent

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

Percentage of incumbent workers with a Community College Award 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.

Sample job titles: *Braze Operator, Fabricator, Finishing Technician, Fitter-Welder, Machine Operator, Mig Welder, Operator, Robot Operator, Spot Welder, Technical Associate (TA)*

Entry-Level Educational Requirement: High school diploma or equivalent

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

Percentage of incumbent workers with a Community College Award or Some Postsecondary

Coursework: 31%



Table 1. 2017 to 2022 job growth, wages, education, training, and work experience required for the primary welding occupations in the Inland Empire/Desert Region

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)	3,069	278	9%	392	\$15.14 to \$22.10	\$17.91	\$39,500	High school diploma or equivalent & 1 to 12 months	None
Structural Metal Fabricators and Fitters (51-2041)	1,062	(37)	(3%)	113	\$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)	414	(14)	(3%)	43	\$13.97 to \$20.40	\$16.68	\$36,800	High school diploma or equivalent & 1 to 12 months	None
Primary Total	4,545	227	5%	548	-	-	-	-	-

Source: EMSI 2018.4

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

Appendix B: Occupation definitions, sample job titles, five-year projections, and earnings for secondary welding occupations

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.

Sample job titles: *Boiler Maker, Boiler Mechanic, Boiler Repairman, Boiler Service Technician, Boiler Technician, Boilermaker, Boilermaker Mechanic, Boilermaker Pipe Fitter, Boilermaker Welder, Service Technician*

Entry-Level Educational Requirement: High school diploma or equivalent or equivalent

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.

Sample job titles: *Equipment Service Associate (ESA), Fire Sprinkler Service Technician, Journeyman Pipe Fitter, Journeyman Pipefitter, Machine Repairman, Pipe Fitter, Pipe Welder, Pipefitter, Sprinkler Fitter, Steamfitter, Commercial Plumber; Drain Cleaner, Plumber; Drain Technician; Journeyman Plumber; Master Plumber; Plumber; Plumber Gasfitter; Plumbing and Heating Mechanic; Residential Plumber; Service Plumber*

Entry-Level Educational Requirement: High school diploma or equivalent or equivalent

Training Requirement: Apprenticeship

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



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.

Sample job titles: *Fitter, Fitter/Welder, Iron Worker, Iron Worker Foreman, Ironworker, Rigger, Steel Fabricator, Steel Worker, Structural Steel Erector, Tower Hand*

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: Apprenticeship

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

Industrial Machinery Mechanics (49-9041)

Repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems.

Sample job titles: *Fixer, Industrial Machinery Mechanic, Industrial Mechanic, Loom Fixer, Machine Adjuster, Maintenance Mechanic, Maintenance Technician, Master Mechanic, Mechanic, Overhauler*

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: More than twelve months on-the-job training

Percentage with Community College Credential or Some Postsecondary Coursework: 41%



Table 1. 2017 to 2022 job growth, wages, education, training, and work experience required for the secondary welding occupations in the Inland Empire/Desert Region

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
Plumbers, Pipefitters, and Steamfitters (47-2152)	5,720	920	16%	811	\$15.45 to \$27.74	\$21.01	\$46,600	High school diploma or equivalent & Apprenticeship	None
Industrial Machinery Mechanics (49-9041)	3,006	243	8%	313	\$20.80 to \$32.15	\$25.64	\$55,200	High school diploma or equivalent & more than 12 months	None
Structural Iron and Steel Workers (47-2221)	1,214	324	27%	206	\$26.75 to \$38.43	\$33.40	\$68,600	High school diploma or equivalent & Apprenticeship	None
Boilermakers (47-2011)	50	14	28%	8	\$25.64 to \$41.83	\$34.49	\$70,700	High school diploma or equivalent & Apprenticeship	None
Secondary Total	9,990	1,501	15%	1,339	-	-	-	-	-

Source: EMSI 2018.4

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