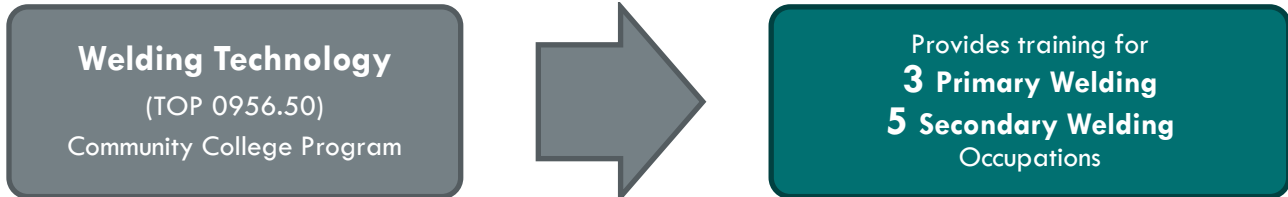


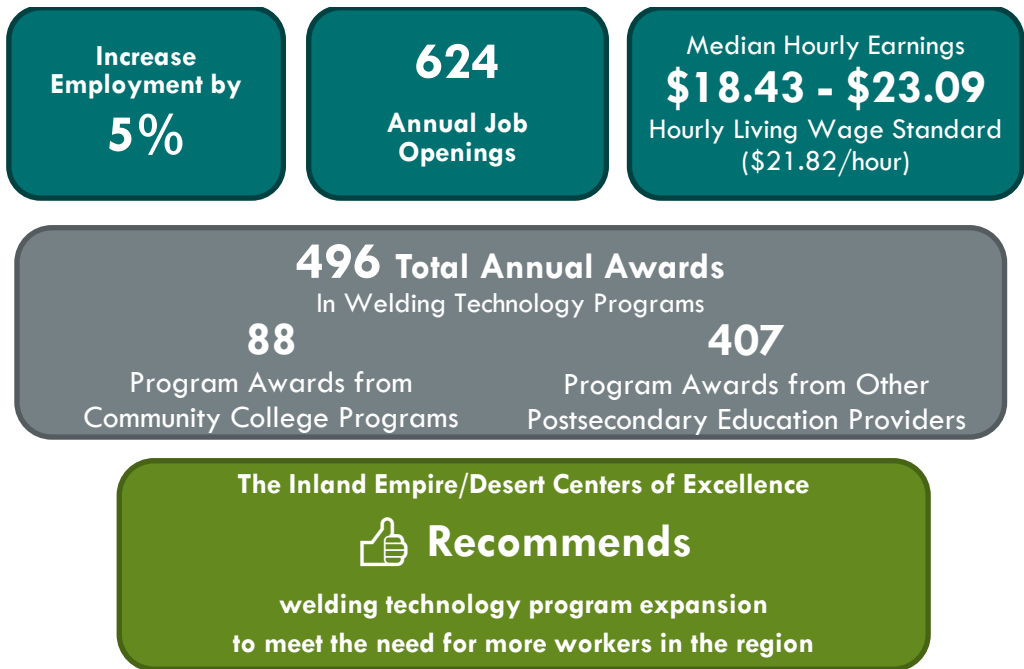
Welding Technology

Inland Empire/Desert Region (Riverside and San Bernardino counties)

Summary



Over the next five years (2022-2027), primary welding employment is projected to:



Introduction

This report provides data on programs and occupations related to welding. The California Community College program most likely to prepare students for welding employment is the welding technology program (TOP 0956.50). Welding technology programs prepare students for employment through instruction of welding techniques, processes, and equipment applied in accordance with diagrams, blueprints, or other specifications (Taxonomy of Programs, 2012). The knowledge, skills, and abilities trained by welding programs lead to eight distinct occupations, collectively referred to as the welding occupational group in this report. The welding occupational group is separated into primary and secondary welding occupations to illuminate the job opportunities available to students with welding skills. This reports recommendation is based on the primary welding occupation group’s job demand, earnings, and education supply data.

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 (SOC 51-2041)
- Welders, Cutters, Solderers, and Brazers (51-4121)
- Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders (51-4122)

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

- Boilermakers (SOC 47-2011)
- Industrial Machinery Mechanics (49-9041)
- Plumbers, Pipefitters, and Steamfitters (47-2152)
- Structural Iron and Steel Workers (47-2221)
- Sheet Metal Workers (47-2211)

This report's educational supply and employment demand portions focus solely on the primary welding jobs students will likely obtain after completing a community college welding program.

Job Counts and Projections

In 2022, there were 15,812 total jobs in the welding occupational group in the region. Employment for the primary welding occupational group is expected to increase by 5% through 2027, with 624 job openings expected annually to fill new jobs and to backfill jobs that workers are leaving (including occupational transfers and retirements).

Employment in the secondary welding occupational group is projected to grow 13% over the next five years, faster than the primary welding occupational group. The secondary welding occupational group will have 1,373 combined annual job openings through 2027. Exhibit 1 displays the job counts, five-year projected job growth, job openings, and the share of incumbent workers 55 years and older in the region.

Exhibit 1: Five-year projections for the welding occupational group, Inland Empire/Desert Region, 2022-2027

Occupation	2022 Jobs	2027 Jobs	5-Yr % Change	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Primary Welding Occupations						
Welders, Cutters, Solderers, and Brazers	4,265	4,510	6%	2,644	529	21%
Structural Metal Fabricators and Fitters	673	669	(1%)	341	68	28%
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	242	239	(1%)	134	27	22%
Primary Welding Total	5,181	5,419	5%	3,118	624	22%
Secondary Welding Occupations						
Plumbers, Pipefitters, and Steamfitters	5,061	5,709	13%	3,369	674	21%
Industrial Machinery Mechanics	2,613	2,981	14%	1,580	316	31%
Structural Iron and Steel Workers	1,476	1,670	13%	996	199	20%
Sheet Metal Workers	1,306	1,460	12%	826	165	21%
Boilermakers	176	189	7%	92	18	18%
Secondary Welding Total	10,631	12,008	13%	6,863	1,373	23%
Total	15,812	17,427	10%	9,981	1,996	23%

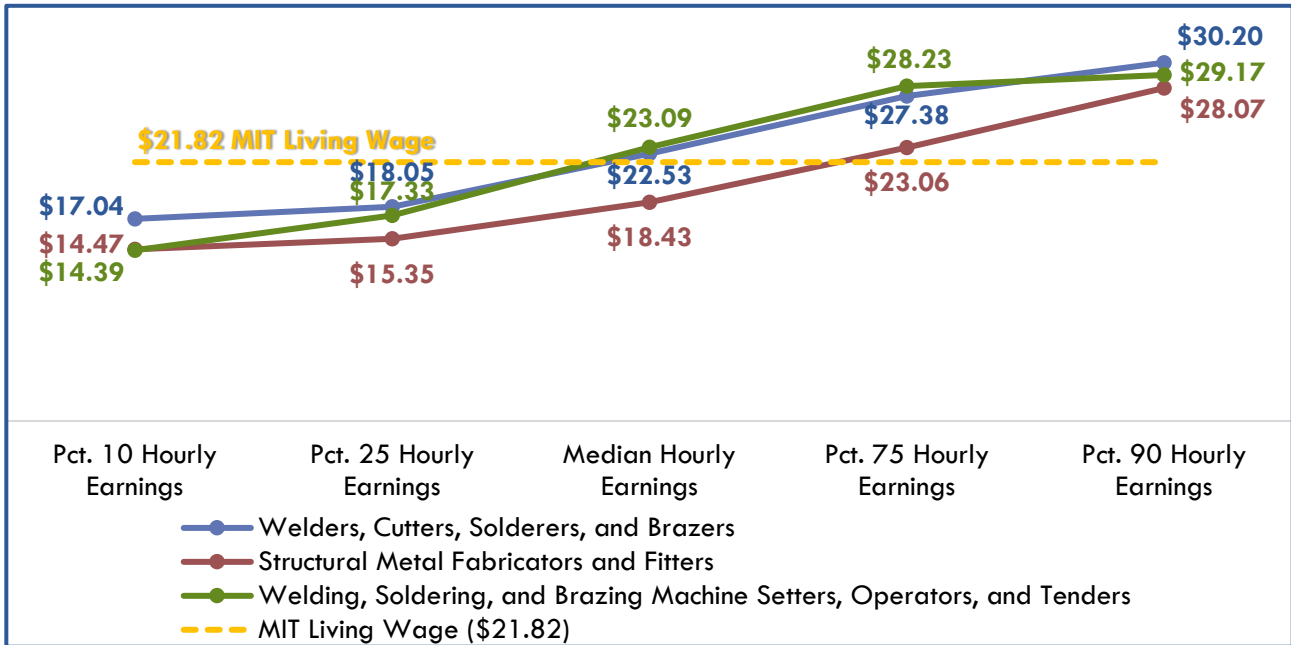
Source: Lightcast 2023.2

Earnings

Community colleges should ensure their training programs lead to employment opportunities that provide a living wage. The MIT living wage calculator estimates that an individual must earn \$21.82 per hour or \$45,386 annually in California to be self-sufficient (Glasmeier, 2023).

Exhibit 2 displays the hourly earnings for the primary welding occupational group in the Inland Empire/Desert Region. The median hourly earnings for welding, soldering, and brazing machine setters, operators, and tenders and welders, cutters, solderers, and brazers surpass the living wage estimate. The hourly earnings for structural metal fabricators and fitters do not exceed the self-sufficiency standard until the 75th percentile, indicating that only the top 25% of workers earn a living wage.

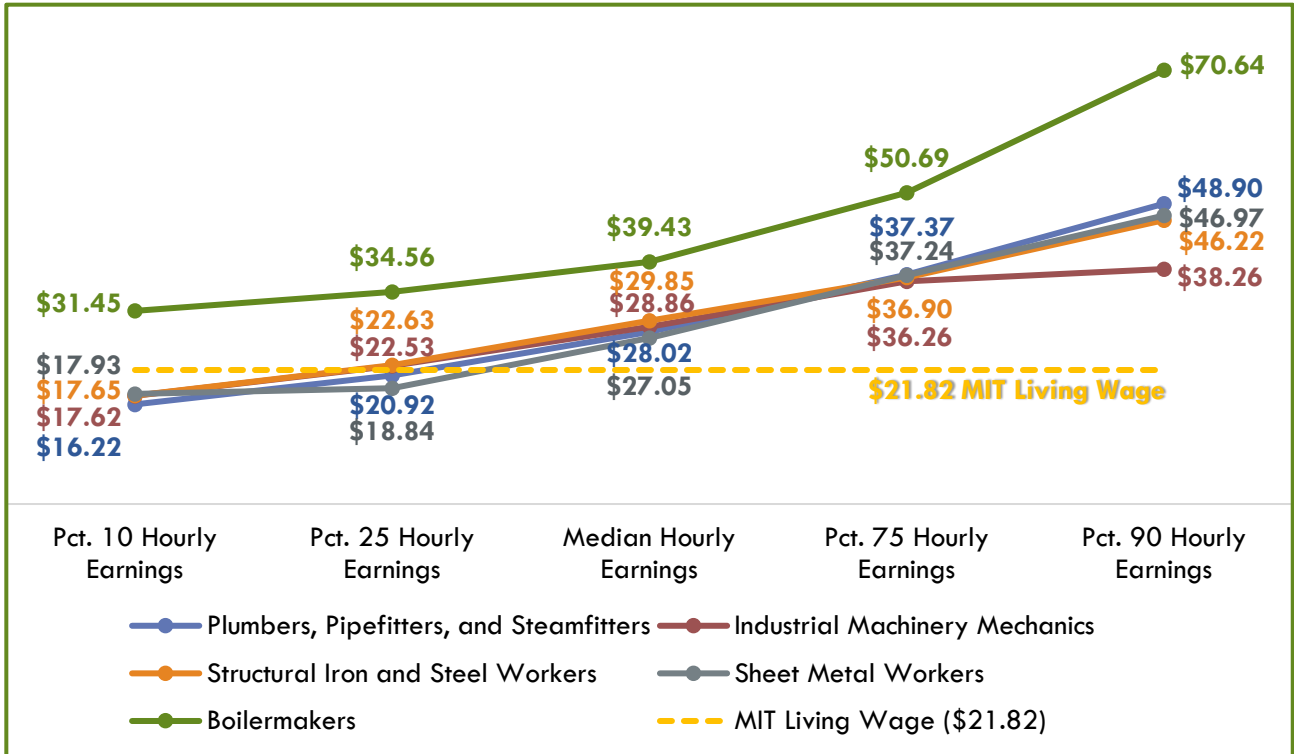
Exhibit 2: Hourly earnings by percentile for the primary welding occupational group, Inland Empire/Desert Region, 2022



Source: Lightcast 2023.2

Exhibit 3 displays the hourly earnings for the secondary welding occupational group. The median hourly earnings for the secondary welding occupational group exceed the living wage standard, indicating that at least the top 50% of workers earn a living wage.

Exhibit 3: Hourly earnings by percentile for the secondary welding occupational group, Inland Empire/Desert Region, 2022



Source: Lightcast 2023.2

Student Completions and Programs Outcomes

Exhibit 4 displays student completions for welding technology (TOP 0956.50) programs over the last three academic years, 2019-2022. Regional community colleges have issued 88 awards annually in welding technology programs over the previous three academic years (2019-22). Program completion and student outcome methodologies can be found in the appendix.

Exhibit 4: Annual average community college awards for welding technology programs, Inland Empire/Desert Region, Academic Years 2019-2022

TOP 0956.50 – Welding Technology (Local Program Title)	Academic Year 2019-20	Academic Year 2020-21	Academic Year 2021-22	Total CC Annual Average Awards, Academic Years 2019-22
Barstow College (Welding Technology – Semi-Automatic Arc Welding (GMAW/FCAW)/Gas Tungsten Arc Welding (GTAW)/Shielded Metal Arc Welding (SMAW)/Welding Fabrication)				19
Associate Degree	16	5	4	8
Certificate 16 < 30-semester units	19	5	2	9
Certificate 8 < 16-semester units	0	3	4	2
College of the Desert (Gas Metal Arc Welding/Gas Tungsten Arc Welding/Shield Metal Arc Welding)				0
Noncredit	0	0	0	0
Palo Verde College (Fundamentals of Welding/Industrial Steel Welding/Welding Applications/Welding Technology)				14
Associate Degree	2	2	0	1
Certificate 16 < 30-semester units	20	1	0	7
Certificate 6 < 18-semester units	1	17	0	6
Riverside City College (Pipe Welding (SMAW,GMAW)/Stick Welding (SMAW)/TIG Welding (GTAW)/Welding Technology/Wire Welding (FCAW,GMAW))				32
Associate Degree	1	3	4	3
Certificate 30 < 60-semester units	3	5	6	5
Certificate 6 < 18-semester units	34	14	26	25
San Bernardino Valley College (Flux Cored Arc Welding (FCAW), Gas Metal Arc Welding (GMAW), Gas Tungsten Arc Welding (GTAW), Pipe Welding, Shielded Metal Arc Welding (SMAW), Welding Inspection Technology, Welding Job Readiness, Welding Technology)				7
Associate Degree	3	2	4	3
Certificate 16 < 30-semester units	2	0	3	2
Certificate 6 < 18-semester units	2	0	4	2
Victor Valley College (Welding)				16
Associate Degree	5	7	8	7
Certificate 16 < 30-semester units	7	5	16	9

TOP 0956.50 – Welding Technology (Local Program Title)	Academic Year 2019-20	Academic Year 2020-21	Academic Year 2021-22	Total CC Annual Average Awards, Academic Years 2019-22
Total	115	69	81	88

Source: MIS Data Mart, COCI

California program outcome data may provide useful insight into the likelihood of success for the proposed program. Community college student outcome information based on the selected TOP code and region is provided in Exhibit 5.

Exhibit 5: 0956.50 – Welding technology strong workforce program outcomes, Inland Empire/Desert Region, Academic Year 2020-21 (Unless Noted)

Strong Workforce Program Metrics: 0956.50 – Welding Technology Academic Year 2020-21, unless noted otherwise	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2021-22)	684	10,226
Completed 9+ career education units in one year (2021-22)	25%	29%
Students who completed a noncredit CTE course (2021-222)	76%	46%
Students who earned a degree, certificate, or attained apprenticeship (2021-22)	38	862
Job closely related to the field of study (2019-20)	62%	70%
Median annual earnings (all exiters)	\$33,952	\$39,750
Median change in earnings (all exiters)	27%	43%
Attained a living wage (completers and skills-builders)	59%	59%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Exhibit 6 displays awards for other postsecondary education providers reported in welding technology/welder (CIP 48.0508) programs. Completion data is compiled from the Integrated Postsecondary Education Data System (IPEDS) for the most recent three years. Four other regional postsecondary education providers issued 407 awards annually over the last three academic years.

Exhibit 6: Other educational providers welding technology/welder training programs, three-year annual average credentials, Inland Empire/Desert Region, Academic Years 2018-2021

48.0508 – Welding Technology/Welder	Academic Year 2018-19	Academic Year 2019-20	Academic Year 2020-21	Other Educational Providers Annual Average Credentials, 2018-2021
CET-Colton				34
Certificates 1 > 2 years	33	37	32	34
Riverside County Office of Education-School of Career Education				28
Certificates < 1 year	47	36	0	28
Summit College				221
Certificates < 1 year	254	216	194	221
Universal Technical Institute of California Inc				124
Certificates 1 > 2 years	131	108	134	124
Total	465	397	360	407

Source: IPEDS

Summary of Findings

Community college welding technology programs provide the knowledge, skills, and abilities that prepare students for employment in three primary welding (occupations that use welding skills daily) and five secondary welding (occupations that may utilize welding as part of their job but less frequently) occupations. This report’s recommendation focuses on the demand for primary welding occupations.

The three combined primary welding occupations are projected to increase employment by 5% and have 624 annual job openings through 2027. The median hourly earnings for the primary welding occupations range from \$18.43 to \$23.09 per hour; only one primary welding occupation’s (structural metal fabricators and fitters) earnings fall short of the region’s \$21.82 per hour living wage standard. All three occupations’ 75th percentile hourly earnings exceed the regional living wage standard.

Regional community colleges have issued 88 annual average awards in welding technology programs (TOP 0956.50) programs over the previous three academic years (2019-22). Other regional postsecondary educational institutions issued 407 annual average awards related to welding over the last three academic years.

The COE recommends developing welding training programs due to the relatively high employment demand, earnings that mostly exceed the region's living wage standard, and low supply of welding technology program completers. Colleges considering this program should partner with applicable employers and unions to document their demand for more workers in this field.

Contact

Michael Goss
Paul Vaccher
Centers of Excellence, Inland Empire/Desert Region
michael.goss@chaffey.edu
July 2023

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

Occupation Definitions (SOC code), Education and Training Requirements, 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.

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

Training Requirement: Apprenticeship

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 32%

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: Drain Technician, Fire Sprinkler Service Technician, Pipe Welder, Pipefitter, Plumber, Plumbing Installer, Residential Plumber, Service Plumber, Sprinkler Fitter, Steamfitter

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: Apprenticeship

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 33%

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.

Sample job titles: Field Installer; HVAC Sheet Metal Installer (Heating, Ventilation, and Air Conditioning Sheet Metal Installer); Sheet Metal Fabricator; Sheet Metal Installer; Sheet Metal Layout Mechanic; Sheet Metal Mechanic; Sheet Metal Worker

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: Apprenticeship

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 34%

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, Iron Worker, Ironworker, Steel Fabricator, Steel Worker, Structural Steel Erector, Tower Hand

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: Apprenticeship

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 34%

Industrial Machinery Mechanics (49-9041)

Repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems. May also install, dismantle, or move machinery and heavy equipment according to plans.

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

Entry-Level Educational Requirement: High school diploma or equivalent

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

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 41%

Structural Metal Fabricators and Fitters (51-2041)

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

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

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: Between one- and twelve-months on-the-job training

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 34%

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: Assembly Line Brazer, Brazer, Fabrication Welder, Maintenance Welder, MIG Welder (Metal Inert Gas Welder), Solderer, TIG Welder (Tungsten Inert Gas Welder), Welder, Welder Fitter, Wire

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: Between one- and twelve-months on-the-job training

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 32%

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, Finishing Technician, Machine Operator, Mig Welder, Robot Operator, Spot Welder

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: Between one- and twelve-months on-the-job training

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 32%

Appendix: Methodology

Exhibit 11 displays the average annual California Community College (CCC) awards conferred during the three academic years between 2019 and 2022 from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. Awards are the combined total of associate degrees and certificates issued during the timeframe, divided by three to calculate an annual average. This is done to minimize the effect of atypical variations that might be present in a single year.

Community college student outcome information is from LaunchBoard and is based on the selected TOP code and region. These metrics are based on records submitted to the California Community Colleges Chancellor's Office Management Information Systems (MIS) by community colleges, which come from self-reported student information from CCC Apply and the National Student Clearinghouse. Employment and earnings metrics are sourced from California's Employment Development Department's Unemployment Insurance database records. When available, outcomes for completers are reported to demonstrate the impact that earning a degree or certificate can have on employment and earnings. For more information on the types of students included for each metric, please see the link for LaunchBoard's Strong Workforce Program Metrics Data Element Dictionary in the References section (LaunchBoard, 2023a). Finally, employment in a job closely related to the field of study comes from self-reported student responses on the CTE Employment Outcomes Survey (CTEOS), administered by Santa Rosa Junior College (LaunchBoard, 2023a).

Table 1. 2022 to 2027 job growth, wages, entry-level education, training, and work experience required for the welding occupational group in the Inland Empire/Desert Region (Riverside and San Bernardino Counties combined)

Occupation (SOC)	2022 Jobs	5-Year Change	5-Year % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage (10 th to 90 th percentile)	Median Hourly Wage (50 th percentile)	Average Annual Earnings	Entry-Level Education & On-The-Job-Training	Work Experience Required
Primary Welding Occupations									
Welders, Cutters, Solderers, and Brazers (51-4121)	4,265	245	6%	529	\$17.04 to \$30.20	\$22.53	\$48,300	High school diploma or equivalent & 1-12 months	None
Structural Metal Fabricators and Fitters (51-2041)	673	(4)	(1%)	68	\$14.47 to \$28.07	\$18.43	\$41,800	High school diploma or equivalent & 1-12 months	None
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders (51-4122)	242	(3)	(1%)	27	\$14.39 to \$29.17	\$23.09	\$48,300	High school diploma or equivalent & 1-12 months	None
Primary Total	5,181	238	5%	624	-	-	-	-	-
Secondary Welding Occupations									
Plumbers, Pipefitters, and Steamfitters (47-2152)	5,061	648	13%	674	\$16.22 to \$48.90	\$28.02	\$65,200	High school diploma or equivalent & Apprenticeship	None
Industrial Machinery Mechanics (49-9041)	2,613	368	14%	316	\$17.62 to \$38.26	\$28.86	\$59,800	High school diploma or equivalent & Apprenticeship	None
Structural Iron and Steel Workers (47-2221)	1,476	194	13%	199	\$17.65 to \$46.22	\$29.85	\$66,400	High school diploma or equivalent & Apprenticeship	None
Sheet Metal Workers (47-2211)	1,306	154	12%	165	\$17.93 to \$46.97	\$27.05	\$61,900	High school diploma or equivalent & Apprenticeship	None
Boilermakers (47-2011)	176	12	7%	18	\$31.45 to \$70.64	\$39.43	\$94,200	High school diploma or equivalent & Apprenticeship	None
Secondary Total	10,631	1,377	13%	1,373	-	-	-	-	-
Total	15,812	1,615	10%	1,996	-	-	-	-	-

Source: Lightcast 2023.2