

# Welding Occupational Groups

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*California and the Riverside-San Bernardino-Ontario Metropolitan Statistical Area  
 (Riverside and San Bernardino counties combined)*

## Job Opportunities

The primary welding occupational group consists of jobs that require workers to perform welding duties and tasks as the major function of their daily work. In 2016, there were nearly 42,600 primary welding related occupational jobs in California. About 11% or over 4,700 of these job opportunities were located in the Riverside-San Bernardino-Ontario MSA. Across the local region, employment related to the primary welding occupational group is expected to increase 4% through 2021, slightly faster than the state overall at 3% growth. Employers in the Riverside-San Bernardino-Ontario MSA will need to hire 860 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 are found in Appendix A.

*Exhibit 1: Five-year projections for the primary welding occupational group in the Riverside-San Bernardino-Ontario MSA and California*

| Region                               | 2016 Jobs | 2021 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Openings (New + Replacement Jobs) | Annual Openings (New + Replacement Jobs) |
|--------------------------------------|-----------|-----------|-------------|---------------|--|--|
| Riverside-San Bernardino-Ontario MSA | 4,725     | 4,922     | 197         | 4%            | 860                                    | 172                                      |
| California                           | 42,567    | 43,670    | 1,103       | 3%            | 7,255                                  | 1,451                                    |



Secondary welding occupations have a strong need for welding skills, but may not necessarily perform welding duties on a daily basis. In 2016, there were nearly 283,600 secondary welding related occupational jobs in California. About 12% or almost 27,900 of these job opportunities were located in the Riverside-San Bernardino-Ontario MSA. Across the local region, employment related to the secondary welding occupational group is expected to increase 9% through 2021, slightly faster than the state overall at 8% growth. Employers in the Riverside-San Bernardino-Ontario MSA will need to hire more than 5,700 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 are found in Appendix B.

*Exhibit 2: Five-year projections for the secondary welding occupational group in the Riverside-San Bernardino-Ontario MSA and California*

| Region                               | 2016 Jobs | 2021 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Openings (New + Replacement Jobs) | Annual Openings (New + Replacement Jobs) |
|--------------------------------------|-----------|-----------|-------------|---------------|--|--|
| Riverside-San Bernardino-Ontario MSA | 27,867    | 30,532    | 2,635       | 9%            | 5,712                                  | 1,142                                    |
| California                           | 283,579   | 305,014   | 21,435      | 8%            | 52,943                                 | 10,589                                   |

### Earnings

The combined average entry-level wage for the primary welding occupational group is \$11.37, below the MIT Living Wage estimate of \$12.10 per hour for a single adult living in the Riverside-San Bernardino-Ontario MSA. The average annual earnings for this occupational group in the region is \$35,200 per year, assuming full-time employment. The combined average entry-level hourly wage in California is \$11.94 per hour. Hourly wages and annual average earnings for each detailed occupation in this group can be found in Appendix A.

*Exhibit 3: Earnings for the primary welding occupational group in the Riverside-San Bernardino-Ontario MSA and California*

| Region                               | Entry to Experienced Hourly Earnings Range* | Avg. Annual Earnings |
|--------------------------------------|---|----------------------|
| Riverside-San Bernardino-Ontario MSA | \$11.37 to \$22.84                          | \$35,200             |
| California                           | \$11.94 to \$30.59                          | \$41,600             |

\*Entry hourly earnings is 10th percentile wage, experienced hourly earnings is 90th percentile wage.

The combined average entry-level wage for the secondary welding occupational group is \$12.64, above the MIT Living Wage estimate of \$12.10 per hour for a single adult living in the Riverside-San Bernardino-Ontario MSA. The average annual earnings for this occupational group in the region is \$47,400 per year, assuming full-time employment. The combined average entry-level hourly wage in California is \$13.09 per hour. Hourly wages and annual average earnings for each detailed occupation in this group can be found in Appendix B.

*Exhibit 4: Earnings for the secondary welding occupational group in the Riverside-San Bernardino-Ontario MSA and California*

| Region                               | Entry to Experienced Hourly Earnings Range* | Avg. Annual Earnings |
|--------------------------------------|---|----------------------|
| Riverside-San Bernardino-Ontario MSA | \$12.64 to \$35.09                          | \$47,400             |
| California                           | \$13.09 to \$38.11                          | \$50,300             |

\*Entry hourly earnings is 10th percentile wage, experienced hourly earnings is 90th percentile wage.

### **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 (June 2016 to May 2017) there were 414 job advertisements (ads) for occupations in the primary and secondary welding occupational groups in the Riverside-San Bernardino-Ontario MSA. In the full-year 2016 there were 482 job ads; up from 442 job ads in 2015, and up from 346 job ads in 2014.

*Exhibit 5: Number of job ads by welding occupation in the Riverside-San Bernardino-Ontario MSA and California over the last 12 months (June 2016 to May 2017)*

| Occupation  | Job Postings |
|---|--------------|
| Maintenance and Repair Workers, General                       | 277          |
| Welders, Cutters, Solderers, and Brazers                      | 96           |
| First-Line Supervisors of Production and Operating Workers    | 19           |
| Plumbers, Pipefitters, and Steamfitters                       | 12           |
| Structural Metal Fabricators and Fitters                      | 5            |
| Sheet Metal Workers   | 3            |
| Aircraft Structure, Surfaces, Rigging, and Systems Assemblers | 2            |

The top employers posting jobs for occupations that require welding skills were: Staples (Distribution/Warehousing/ Transportation in Ontario), Walmart/Sam’s (Distribution Centers – Chino and Apple Valley, and Cbre. The top worksite cities in the region were Riverside, Ontario, San Bernardino, Chino, Rancho Cucamonga, and Fontana.

## Student Completions and Outcomes

Exhibits 6 show the annual average regional community college awards (associate degrees and certificates) conferred during the three academic years between 2013 and 2016, as well as other awards granted outside the California Community Colleges from 2012-2015, with the relevant TOP 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 6: Annual average community college student completions for aeronautical and aviation technology programs in the Riverside-San Bernardino-Ontario MSA*

| <b>0950.00 – Aeronautical and Aviation Technology</b> | <b>CC Headcount (2014-2015)</b> | <b>CC Annual Avg. Awards (2013-16)</b> |
|---|---------------------------------|--|
| <b>Chaffey</b>  | 64                              |  |
| Certificate 60+ semester units                        |                                 | 2                                      |
| <b>San Bernardino</b>                                 | 37                              |  |
| Associate degree                                      |                                 | 2                                      |
| Certificate 30 to < 60 semester units                 |                                 | 5                                      |
| <b>Victor Valley</b>                                  | 59                              |  |
| Certificate 6 to < 18 semester units                  |                                 | 7                                      |
| <b>Total annual average community college awards</b>  |                                 | <b>16</b>                              |

**0950.00 Aeronautical and aviation technology program outcomes in the Riverside-San Bernardino-Ontario MSA in academic year 2013-14:**

- The median annual wage after program completion is \$25,389.
- 58% of students are earning a living wage.
- Course completers reported a wage increase of 109%.
- 74% of students are employed within six months after completing a program.

Exhibit 7: Annual average community college student completions for aviation airframe mechanics programs in the Riverside-San Bernardino-Ontario MSA

| 0950.10 – Aviation Airframe Mechanics                | Annual Avg. CC Headcount (2014-2015) | CC Annual Avg. Awards (2013-16) | Annual Avg. Certificates or Other Credit Awards (2012-15) |
|--|--------------------------------------|---------------------------------|---|
| <b>Chaffey</b>                                       | 67                                   |                                 |   |
| Associate degree                                     |                                      | 5                               |   |
| Certificate 30 to < 60 semester units                |                                      | 21                              |   |
| <b>San Bernardino</b>                                | 21                                   |                                 |   |
| Certificate 30 to < 60 semester units                |                                      | 10                              |   |
| <b>Victor Valley</b>                                 | 48                                   |                                 |   |
| Certificate 18 to < 30 semester units                |                                      | 11                              |   |
| <b>Total annual average community college awards</b> |                                      | <b>47</b>                       |   |

**0950.10 Aviation airframe mechanics program outcomes in the Riverside-San Bernardino-Ontario MSA in academic year 2013-14:**

- The median annual wage after program completion is \$32,146.
- 67% of students are earning a living wage.
- Course completers reported a wage increase of 144%.
- 66% of students are employed within six months after completing a program.

*Exhibit 8: Annual average community college student completions for aviation powerplant mechanics programs in the Riverside-San Bernardino-Ontario MSA*

| <b>0950.20 – Aviation Powerplant Mechanics</b>       | <b>Annual Avg. CC Headcount (2014-2015)</b> | <b>CC Annual Avg. Awards (2013-16)</b> | <b>Annual Avg. Certificates or Other Credit Awards (2012-15)</b> |
|--|---|--|--|
| <b>Chaffey</b>                                       | 71  |  |  |
| Associate degree                                     |   | 4                                      |  |
| Certificate 30 to < 60 semester units                |   | 27                                     |  |
| <b>San Bernardino</b>                                | 21  |  |  |
| Certificate 30 to < 60 semester units                |   | 10                                     |  |
| <b>Victor Valley</b>                                 | 23  |  |  |
| Certificate 18 to < 30 semester units                |   | 12                                     |  |
| <b>Total annual average other awards</b>             |   |  | -  |
| <b>Total annual average community college awards</b> |   | <b>52</b>                              |  |

**0950.20 Aviation powerplant mechanics program outcomes in the Riverside-San Bernardino-Ontario MSA in academic year 2013-14:**

- The median annual wage after program completion is \$25,887.
- 58% of students are earning a living wage.
- Course completers reported a wage increase of 132%.
- 69% of students are employed within six months after completing a program.

Exhibit 9: Annual average community college student completions for welding technology programs in the Riverside-San Bernardino-Ontario MSA

| <b>0956.50 – Welding Technology</b>                  | <b>Annual Avg. CC Headcount (2014-2015)</b> | <b>CC Annual Avg. Awards (2013-16)</b> | <b>Annual Avg. Certificates or Other Credit Awards (2012-15)</b> |
|--|---|--|--|
| <b>CET-San Bernardino</b>                            |   |  |  |
| Award 1 < 2 academic years                           |   |  | 80   |
| <b>Riverside County Office of Education</b>          |   |  |  |
| Award < 1 academic year                              |   |  | 40   |
| <b>Summit College</b>                                |   |  |  |
| Award < 1 academic year                              |   |  | 83   |
| <b>Fab School</b>                                    |   |  |  |
| Award < 1 academic year                              |   |  | 90   |
| <b>Barstow</b>                                       | 149   |  |  |
| Associate degree                                     |   | 4                                      |  |
| Certificate 18 to < 30 semester units                |   | 3                                      |  |
| <b>San Bernardino</b>                                | 170   |  |  |
| Associate degree                                     |   | 1                                      |  |
| Certificate 18 to < 30 semester units                |   | 1                                      |  |
| Certificate 6 to < 18 semester units                 |   | 3                                      |  |
| <b>Palo Verde</b>                                    | 204   |  |  |
| Associate degree                                     |   | 2                                      |  |
| Certificate 30 to < 60 semester units                |   | 0                                      |  |
| Certificate 18 to < 30 semester units                |   | 13                                     |  |
| Certificate 6 to < 18 semester units                 |   | 1                                      |  |
| <b>Riverside</b>                                     | 311   |  |  |
| Associate degree                                     |   | 3                                      |  |
| Certificate 30 to < 60 semester units                |   | 4                                      |  |
| Certificate 6 to < 18 semester units                 |   | 16                                     |  |
| <b>Victor Valley</b>                                 | 260   |  |  |
| Associate degree                                     |   | 3                                      |  |
| Certificate 18 to < 30 semester units                |   | 5                                      |  |
| <b>Total annual average other awards</b>             |   |  | <b>293</b>   |
| <b>Total annual average community college awards</b> |   | <b>59</b>                              |  |
| <b>TOTAL AWARDS</b>                                  |   | <b>352</b>                             |  |





## 0956.50 Welding technology program outcomes in the Riverside-San Bernardino-Ontario MSA in academic year 2013-14:

- The median annual wage after program completion is \$17,725.
- 50% of students are earning a living wage.
- Course completers reported a wage increase of 70%.
- 55% of students are employed within six months after completing a program.

### Summary

Occupations requiring welding skills are showing projected job growth over the next five years. 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 an award that may be obtained at a community college. All of the primary welding occupations and three out of the nine secondary welding occupations have a starting hourly wage less than the living wage (\$12.10 per hour), with experience many of these occupations will lead to a living wage. The total program completions do not appear to be oversupply the regional demand for occupational openings in the region. [(Aviation TOP 0950.00 = 16 awards; TOP 0950.10 = 47 awards; TOP 0950.20 = 52 awards; Aviation TOTAL = 115)+(0956.50 – Welding Technology = 352 awards) = **467 TOTAL competitions**] [(primary welding occupations = 172 Annual job openings) + (secondary welding occupations = 1,142 annual job openings) = **1,314 TOTAL annual job openings**]. Nearly 470 total competitions versus over 1,300 total annual job openings.

### 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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June 2017

## **Appendix A: Occupation definitions, five-year projections, and earnings for the primary welding occupational group**

### **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 on-the-job training*

*Percentage with Community College Award or Some Postsecondary Coursework: 35%*

#### **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 on-the-job training*

*Percentage with Community College Award or Some Postsecondary Coursework: 28%*

#### **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 on-the-job training*

*Percentage with Community College Award or Some Postsecondary Coursework: 28%*



Table 1. Job growth and wages for the primary welding occupational group, Riverside-San Bernardino-Ontario MSA

| Primary Welding Occupations (SOC code)  | 2016 Jobs    | 5-Yr Openings to 2021 (New + Replacement Jobs) | Annual Openings to 2021 | Entry to Experienced Hourly Earnings Range* | Avg. Annual Earnings |
|---|--------------|--|-------------------------|---|----------------------|
| Welders, Cutters, Solderers, and Brazers (51-4121)                                | 3,637        | 713  | 143                     | \$11.68 to \$23.39                          | \$36,100             |
| Structural Metal Fabricators and Fitters (51-2041)                                | 868          | 113  | 23                      | \$10.13 to \$20.25                          | \$31,800             |
| Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders (51-4122) | 220          | 33   | 7                       | \$11.08 to \$23.86                          | \$35,100             |
| <b>Total</b>  | <b>4,725</b> | <b>860</b>                                     | <b>172</b>              | <b>\$11.37 to \$22.84</b>                   | <b>\$35,200</b>      |



## 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 Award or Some Postsecondary Coursework: 38%*

#### **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 sprinklerfitters.

*Entry-Level Educational Requirement: High school diploma*

*Training Requirement: Apprenticeship*

*Percentage with Community College Award or Some Postsecondary Coursework: 31%*

#### **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 Award or Some Postsecondary Coursework: 20%*



### **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 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.*

*Entry-Level Educational Requirement: High school diploma*

*Training Requirement: Apprenticeship*

*Percentage with Community College Award or Some Postsecondary Coursework: 31%*

### **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: More than 12 months on-the-job-training*

*Percentage with Community College Award or Some Postsecondary Coursework: 38%*



### **Commercial Divers (49-9092)**

Work below 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 award*

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

*Percentage with Community College Award or Some Postsecondary Coursework: 35%*

### **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 Award 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 on-the-job training*

*Percentage with Community College Award or Some Postsecondary Coursework: 46%*

Table 2. Job growth and wages for the secondary welding occupational group, Riverside-San Bernardino-Ontario MSA

| Secondary Welding Occupations (SOC code)                                | 2016 Jobs     | 5-Yr Openings to 2021 (New + Replacement Jobs) | Annual Openings to 2021 | Entry to Experienced Hourly Earnings Range* | Avg. Annual Earnings |
|---|---------------|--|-------------------------|---|----------------------|
| Maintenance and Repair Workers, General (49-9071)                       | 13,118        | 3,167  | 633                     | \$10.76 to \$29.47                          | \$40,200             |
| First-Line Supervisors of Production and Operating Workers (51-1011)    | 5,706         | 628  | 126                     | \$15.50 to \$45.09                          | \$57,200             |
| Plumbers, Pipefitters, and Steamfitters (47-2152)                       | 5,262         | 1,183  | 237                     | \$13.00 to \$34.00                          | \$47,200             |
| Sheet Metal Workers (47-2211)   | 1,355         | 345  | 69                      | \$11.98 to \$41.24                          | \$52,600             |
| Structural Iron and Steel Workers (47-2221)                             | 1,176         | 127  | 25                      | \$17.61 to \$42.84                          | \$67,000             |
| Reinforcing Iron and Rebar Workers (47-2171)                            | 1,012         | 177  | 35                      | \$12.93 to \$38.35                          | \$56,100             |
| Aircraft Structure, Surfaces, Rigging, and Systems Assemblers (51-2011) | 187           | 63   | 13                      | \$15.71 to \$37.96                          | \$51,900             |
| Boilermakers (47-2011)  | 60            | 19   | 4                       | \$21.74 to \$48.43                          | \$73,700             |
| Commercial Divers (49-9092)   | 20            | <10  | N/A                     | \$16.17 to \$29.49                          | \$45,800             |
| <b>Total</b>  | <b>27,897</b> | <b>5,712</b>                                   | <b>1,142</b>            | <b>\$12.64 to \$35.09</b>                   | <b>\$47,400</b>      |