

October 2021

Labor Market Analysis

Pipe Welding

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Prepared by the Central Valley/Mother Lode Center of Excellence

Table of Contents

- Summary 2
- Key Findings: 2
- Introduction..... 3
- Occupational Demand 4
- Wages 4
- Job Postings 5
- Salaries..... 5
- Education..... 5
- Baseline and Specialized Skills..... 6
- Software Skills..... 6
- Certifications..... 7
- Education, Work Experience & Training 7
- Supply 8
- Student Outcomes 9
- Conclusion..... 9
- Recommendation 10
- Appendix A: Methodology & Data Sources 11

COVID-19 Statement: This report includes employment projection data by Emsi. Emsi’s projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy during the projection period will be at approximately full employment or potential output. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, they may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Other measures such as unemployment rates and monthly industry employment estimates will reflect the most recent information on employment and jobs in the state and, in combination with input from local employers, may help validate current and future employment needs as depicted here.

If for any reason this document is not accessible or if you have specific needs for readability, please contact us and we will do our utmost to accommodate you with a modified version. To make a request, contact Nora Seronello by phone at (209) 575-6894 or by email seronellon@mjc.edu.

Summary

Please note the COVID-19 statement on page 2 when considering this report's findings.

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for pipe welding. Three occupations related to pipe welding were identified for Merced College:

- 47-2152, Plumbers, Pipefitters, and Steamfitters
- 51-4121, Welders, Cutters, Solderers, and Brazers
- 51-4122, Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders

Key Findings:

- **Occupational demand** — More than 3,200 workers were employed in jobs related to pipe welding in 2020 in the North Central Valley/Northern Mother Lode (NCV/NML) subregion. The largest occupation is welders, cutters, solders, and brazers, with 1,918 workers in 2020, a projected growth rate of 5% over the next five years, and 204 annual openings.
- **Wages** — Plumbers, pipefitters, and steamfitters, earn the highest entry-level wage, \$21.68/hour in the subregion.
- **Employers** — Employers with the most job postings in the subregion are Human Bees, Siemens, and Acara Solutions.
- **Occupational titles** — The most common occupational title in job postings in the subregion is welders, cutters, and welder fitters. The most common job title is welder.
- **Skills and certifications** — The top baseline skill is physical abilities, the top specialized skill is welding, and the top software skill is Microsoft Excel. The most in-demand certification is welding.
- **Education** — A high school diploma or equivalent is typically required for all three occupations for pipe welding.
- **Supply** — Analysis of postsecondary completions in the region shows that on average 399 awards were conferred in the Central Valley/Mother Lode region each year.

Based on a comparison of occupational demand and supply, there is an undersupply of 168 trained workers in the subregion and 611 workers in the region. The Center of Excellence recommends that Merced College work with the regional directors, the college's advisory board, and local industry in the expansion of programs to address the shortage of pipe welding workers in the region.

Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Merced College to provide labor market information for pipe welding. The geographical focus for this report is the North Central Valley/Northern Mother Lode (NCV/NML) subregion, but regional demand and supply data has been included for broader applicability and use. The average living wage for a single adult in the NCV/NML subregion is \$12.65/hour.¹ Analysis of the program and occupational data related to pipe welding resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

- 47-2152, Plumbers, Pipefitters, and Steamfitters
- 51-4121, Welders, Cutters, Solderers, and Brazers
- 51-4122, Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders

The occupational titles, job descriptions, and knowledge and skills from the Bureau of Labor Statistics and O*NET OnLine are shown below.

Plumbers, Pipefitters, and Steamfitters

Job Description: 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.

Knowledge: Mechanical, Building and Construction, Design, Mathematics, English Language

Skills: Critical Thinking, Active Listening, Judgement and Decision Making, Speaking, Complex Problem Solving

Welders, Cutters, Solderers, and Brazers

Job Description: 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.

Knowledge: Production and Processing

Skills: No skills met the minimum score

Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders

Job Description: 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.

Knowledge: Mathematics

Skills: Operations Monitoring, Active Listening, Critical Thinking, Operation and Control, Speaking

¹ The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: <https://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

Occupational Demand

The North Central Valley/Northern Mother Lode subregion employed 3,233 workers in pipe welding occupations in 2020 (Exhibit 1). The largest occupation is welders, cutters, solderers, and brazers, with 1,918 workers in 2020. This occupation is projected to grow by 5% over the next five years and has the greatest number of projected annual openings, 204.

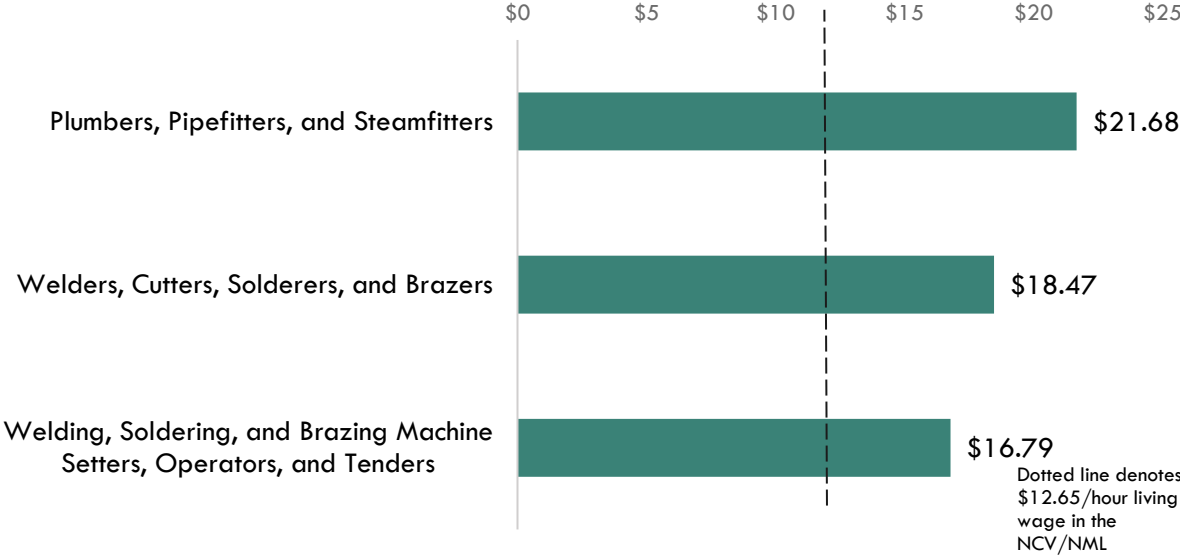
Exhibit 1. Pipe welding employment and occupational projections in the NCV/NML subregion

Occupation	2020 Jobs	2025 Jobs	5-Year Change	5-Year % Change	Annual Openings
Welders, Cutters, Solderers, and Brazers	1,918	2,006	88	5%	204
Plumbers, Pipefitters, and Steamfitters	1,267	1,367	100	8%	145
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	48	52	4	9%	6
TOTAL	3,233	3,425	193	6%	355

Wages

Exhibit 2 shows the entry-level hourly wages of pipe welding occupations. Plumbers, pipefitters, and steamfitters, earn the highest entry-level wage, \$21.68/hour in the subregion. Entry-level wages are derived from the 25th percentile.

Exhibit 2. Pipe welding entry-level wages in the NCV/NML subregion



Job Postings

There were 170 job postings for the three occupations in the NCV/NML subregion from April 2021 to September 2021.² The employers with the most job postings are listed in Exhibit 3.

Exhibit 3. Top employers of pipe welding workers by number of job postings

Employer	Job Postings	% Job Postings
Human Bees	7	9%
Siemens	4	5%
Acara Solutions	3	4%
Schuff Steel Company	3	4%
West Coast Cryogenic Services	3	4%
Bambacigno Steel Company	2	3%
Industrial Piping Company	2	3%
Lionudakis Orchard Removal	2	3%
Nucor Corporation	2	3%
Schuff Steel	2	3%

Exhibit 4 shows how job postings for the targeted occupations in the NCV/NML subregion are distributed across 2 O*NET OnLine occupations. The occupational title welders, cutters, and welder fitters is listed in 165 job postings. Note how this occupational title dominates the job posting results. Common job titles in postings include Welder in 49 job postings, Welder/Fabricator in 13 job postings, and Welders in 11 job postings.

Exhibit 4. Top occupational titles in job postings for pipe welding occupations

Occupational Title	Job Postings	% of Job Postings
Welders, Cutters, and Welder Fitters	165	97%
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	5	3%

Salaries

Exhibit 5 shows the “Market Salaries” for pipe welding occupations that are calculated by Burning Glass which uses a machine learning model built off of millions of job postings every year, and accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

Exhibit 5. Salaries for pipe welding occupations

Market Salary Percentile	Salary Amount
10th Percentile	\$21,626
25th Percentile	\$31,085
50th Percentile	\$34,405
75th Percentile	\$37,201
90th Percentile	\$41,904

Education

² Other than occupation titles and job titles, the categories below can be counted one or multiple times per job posting, and across several areas in a single posting. For example, a skill can be counted in two different skill types, and an employer can indicate more than one education level.

Of the 170 job postings, 62 listed an education level preferred for the positions being filled. Of those, 100% requested high school or vocational training, and 10% requested an associate degree (Exhibit 6). A job posting can indicate more than one education level. Hence, the percentages shown in the chart below may total more than 100%.

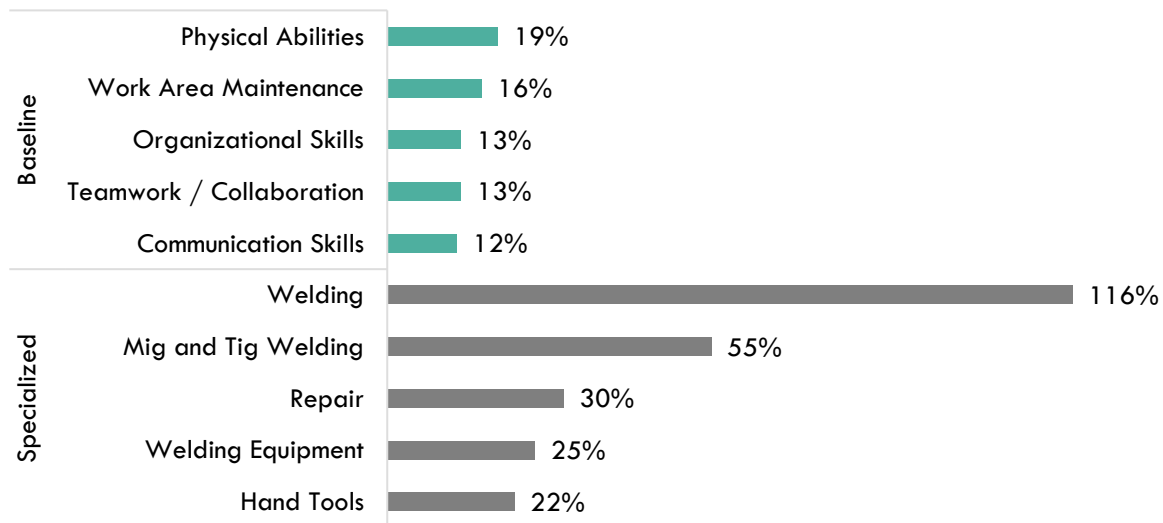
Exhibit 6. Education levels requested in job postings for GIS occupations

Education Level	Job Postings	% of Job Postings
High school or vocational training	62	100%
Associate's degree	6	10%

Baseline and Specialized Skills

Exhibit 7 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are physical abilities, 19% of job postings, work area maintenance, 16%, and organizational skills, 13%. The top three specialized skills are welding, 116% of job postings, mig and tig welding, 55%, and repair, 30%.

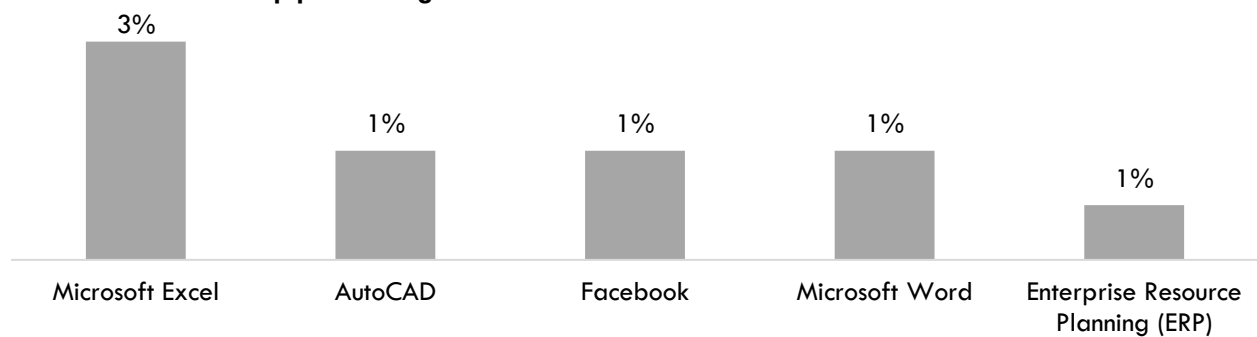
Exhibit 7. In-demand pipe welding baseline and specialized skills



Software Skills

Analysis also included the software skills most in demand by employers. Microsoft Excel and AutoCAD were the top two software skills identified in job postings (Exhibit 8).

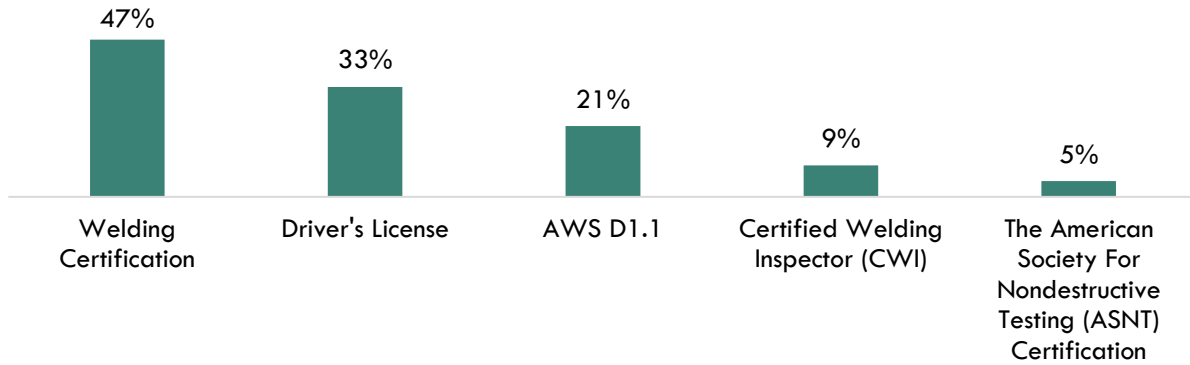
Exhibit 8. In-demand pipe welding software skills



Certifications

Of the 170 job postings, 43 contained certification data. Among those, 47% indicated a need for a welding certification. The next top certifications are driver's license and AWS D1.1 (Exhibit 9). (Due to the low number of job postings with certifications listed, the chart below may not be representative of the full sample.)

Exhibit 9. Top pipe welding requested in job postings



Education, Work Experience & Training

A high school diploma or equivalent is typically required for all three occupations for pipe welding. (Exhibit 10).

Exhibit 10. Education, work experience, training, and Current Population Survey results for pipe welding occupations³

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Welders, Cutters, Solderers, and Brazers	High school diploma or equivalent	None	Moderate-term	32.2%
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	High school diploma or equivalent	None	Moderate-term	32.2%
Plumbers, Pipefitters, and Steamfitters	High school diploma or equivalent	None	Apprenticeship	32.9%

³ "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, <https://www.bls.gov/cps/>.

Supply

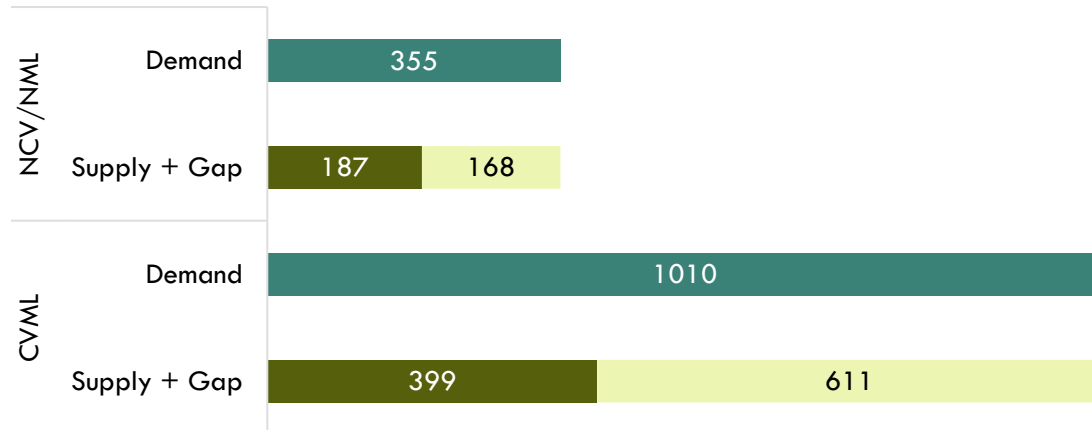
Analysis of program data from the California Community Colleges Chancellor’s Office Data Mart included the TOP and CIP codes and titles: 095230 - Plumbing, Pipefitting and Steamfitting, 095650 - Welding Technology, and 48.0508 - Welding Technology/Welder. Analysis of the last three years of data shows that, on average, 399 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11).

Exhibit 11. Postsecondary supply for pipe welding occupations in the region

TOP/CIP Code- Title	College	Associate Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Subtotal
095230 - Plumbing, Pipefitting and Steamfitting	Bakersfield							7			7
	Bakersfield	8						8	50		67
	Cerro Coso	6				3	14	10			33
	Columbia									1	1
	Fresno City	7			11	6		5			29
	Merced	4					2	5		41	53
	Modesto	4								11	15
095650 - Welding Technology	Porterville									10	10
	Reedley College	4				12	1	14			30
	San Joaquin Delta					2	15	9			26
	Sequoias	8					2	13			23
	Taft	1			3					2	7
	West Hills Coalinga						1	5			6
	48.0508 - Welding Technology/Welder	Advanced Career Institute		89							
Institute of Technology				3							3
Total		43	89	3	14	29	53	52	115	2	399

There is an undersupply of 168 pipe welding workers in the NCV/NML subregion and 611 workers in the region (Exhibit 12).

Exhibit 12. Pipe welding workforce annual demand and supply in the NCV/NML subregion and region



Student Outcomes

Exhibit 13 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP codes related to pipe welding. Of note, there were 102 welding technology students who received a degree or certificate or attained apprenticeship journey status; 19 students transferred; 66% of students obtained a job closely related to their field of study; 33% reported a median change in earnings; and 71% attained a living wage.

Exhibit 13. Regional metrics for the TOP codes related to pipe welding

Metric	095230 - Plumbing, Pipefitting and Steamfitting 095230	Welding Technology 095650
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	10	102
Number of Students Who Transferred	*	19
Job Closely Related to Field of Study	*	66%
Median Change in Earnings	75%	33%
Attained a Living Wage	86%	71%

* denotes data not available.

Conclusion

The entry-level wages of all three occupations exceed the NCV/NML subregion's average living wage. There were 170 job postings in the past six months for occupations related to pipe welding in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is physical abilities, and the top specialized skill is welding.
- The top software skill is Microsoft Excel.

- The top certification is a welding.

There is an undersupply of trained workers, a shortage of 168 in the NCV/NML subregion and 611 in the region.

Recommendation

Based on these findings, it is recommended that Merced College work with the regional directors, the college's advisory board, and local industry in the expansion of programs to address the shortage of pipe welding workers in the region.

Appendix A: Methodology & Data Sources

Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor’s Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (EMSI). EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry: economicmodeling.com .
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: https://www.bls.gov/emp/tables/educational-attainment.htm .
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: labormarketinfo.edd.ca.gov .
Job Posting and Skills Data	Burning Glass: burning-glass.com/ .
Additional Education Requirements/ Employer Preferences	The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: onetonline.org .

Key Terms and Concepts

Annual Job Openings: Annual openings are calculated by dividing the number of years in the projection period by total job openings.

Education Attainment Level: The highest education attainment level of workers age 25 years or older.

Employment Estimate: The total number of workers currently employed.

Employment Projections: Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (EMSI) formula that includes historical employment and economic indicators along with national, state and local trends.

Living Wage: The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

Occupation: An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

Percent Change: Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

Replacements: Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

Total Job Openings (New + Replacements): Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

Typical Education Requirement: represents the typical education level most workers need to enter an occupation.

Typical On-The-Job Training: indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.