

STEM	Welders / Cutters / Solderers / Blazers
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TEA Industry Cluster	STEM
SOC Code	51-4121
Identified by	Tech Prep Occupations
Projected Growth (2018)	0 %
BISD Magnet School Available	No

Source: Demand Occupations by Cluster, updated *June 27, 2012*

Description

What Welders, Cutters, Solderers, and Brazers Do

Welders, cutters, solderers, and brazers weld or join metal parts. They also fill holes, indentions, or seams of metal products, using hand-held welding equipment.

Duties

Welders, cutters, solderers, and brazers typically do the following:

- Study blueprints, sketches, or specifications
- Calculate dimensions to be welded
- Inspect structures or materials to be welded
- Ignite torches or start power supplies
- Monitor the welding process to avoid overheating
- Smooth and polish all surfaces
- Maintain equipment and machinery

Welding is the most common way of permanently joining metal parts. In this process, heat is applied to metal pieces, melting and fusing them to form a permanent bond. Because of its strength, welding is used in shipbuilding, automobile manufacturing and repair, aerospace applications, and thousands of other manufacturing activities. Welding also is used to join beams in the construction of buildings, bridges, and other structures and to join pipes in pipelines, power plants, and refineries.

Welders work in a wide variety of industries, from car racing to manufacturing. The work that welders do and the equipment they use vary, depending on the industry. The most common and simplest type of welding today, arc welding, uses electrical currents to create heat and bond metals together—but there are more than 100 different processes that a welder can use. The type of weld is normally determined by the types of metals being joined and the conditions under which the welding is to take place.

Cutters use heat to cut and trim metal objects to specific dimensions. The work of **arc**, **plasma**, and **oxy-gas cutters** is closely related to that of welders. However, instead of joining metals, cutters use the heat from an electric arc, a stream of ionized gas called plasma, or burning gases to cut and trim metal objects to specific dimensions. Cutters also dismantle large objects, such as ships, railroad cars, automobiles, buildings, or aircraft. Some operate and monitor cutting machines similar to those used by welding machine operators.

Solderers and **brazers** also use heat to join two or more metal items together. Soldering and brazing are similar, except the temperature used to melt the filler metal is lower in soldering. Soldering uses metals with a melting point below 840 degrees Fahrenheit. Brazing uses metals with a higher melting point.

Soldering and brazing workers use molten metal to join two pieces of metal. However, the metal added during the soldering and brazing process has a melting point lower than that of the piece, so only the added metal is melted, not the piece. Therefore, these processes normally do not create the distortions or weaknesses in the pieces that can occur with welding.

Soldering commonly is used to make electrical and electronic circuit boards, such as computer chips. Soldering workers tend to work with small pieces that must be precisely positioned.

Brazing often is used to connect copper plumbing pipes and thinner metals that the higher temperatures of welding would warp. Brazing also can be used to apply coatings to parts to reduce wear and protect against corrosion.

Training Opportunities Linked to Those Jobs

(Degree Types and Colleges/Universities)

How to Become a Welder, Cutter, Solderer, and Brazer

Training for welding, cutting, soldering, and brazing workers ranges from a few weeks of school or on-the-job training for low-skilled positions to several years of combined school and on-the-job training for highly skilled jobs.

Education

Formal training is available in high school technical education courses and in postsecondary institutions, such as vocational-technical institutes, community colleges, and private welding, soldering, and brazing schools. The U.S. Armed Forces also operate welding and soldering schools.

Some employers are willing to hire inexperienced entry-level workers and train them on the job, but many prefer to hire workers who have been through formal training programs. Courses in blueprint reading, shop mathematics, mechanical drawing, physics, chemistry, and metallurgy are helpful.

An understanding of electricity also is helpful, and knowledge of computers is gaining importance as welding, soldering, and brazing machine operators become more responsible for programming robots and other computer-controlled machines.

Because understanding the welding process and inspecting welds is important for both welders and welding machine operators, companies hiring machine operators prefer workers with a background in welding.

Certification

Some welding positions require general certification in welding or certification in specific skills, such as inspection or robotic welding. The [American Welding Society](#) certification courses are offered at many welding schools. Some employers pay training and testing costs for employees.

The [Institute for Printed Circuits](#) offers certification and training in soldering. In industries such as aerospace and defense, which need highly-skilled workers, many employers require these certifications. Certification can show mastery of lead-free soldering techniques, which are important to many employers.

Important Qualities

Detail oriented. Welders, cutters, solderers, and brazers must do precision work, often with straight edges and minimal flaws. Therefore, workers should have a keen eye for detail.

Dexterity. Welders, cutters, solderers, and brazers must have a steady hand to hold a torch in one place. Workers must also have good hand-eye coordination.

Physical strength. Welders, cutters, solderers, and brazers must be in good physical condition. They often must lift heavy pieces of metal and sometimes bend, stoop, or reach while working.

Stamina. The ability to endure long periods of standing or repetitious movements is important for welders, cutters, solderers, and brazers.

Technical skills. Welders, cutters, solderers, and brazers must be able to operate manual or semiautomatic welding equipment to fuse metal segments.

Troubleshooting skills. Welders, cutters, solderers, and brazers must have the ability to detect cracked pieces of metal and be able to repair them.

Visual acuity. The ability to see details and characteristics of the joint and detect changes in molten metal flows requires good eyesight.

Texas Southmost College	South Texas College	Texas State Technical College	The University of Texas at Brownsville	The University of Texas - Pan American
	Combination Welding (CERT)	Welding Technology (CERT)		
	Structural Welding (CERT)	Welding Technology (AAS)		

Local Employers

A-1 Towing & Recovery	LA Feria	LA Feria Contractors Inc	LA Feria
Alamo Iron Works	Brownsville	Morris Construction	Harlingen
Amfels Inc	Brownsville	Royal Metal Building Component	San Benito
C S Construction Specialties	Brownsville	Sperry Marine Systems Inc	Brownsville
Hino Gas	Brownsville	Webb Saw & Tool Inc	Harlingen

Career Options (Specific Job Types)

- Welder
- Welder-Fitter
- Fabricator
- Maintenance Welder
- Mig Welder
- Sub Arc Operator
- Brazer
- Solderer
- Electronic Assembler
- Wirer
- Assembly Line Brazer