

## **Welding Technology (A50420)**

Craven Community College's Welding Program introduces students to shielded metal arc, Tungsten Inert Gas (TIG), and Metal Inert Gas (MIG) welding. Instruction includes consumable and non-consumable electrode welding and cutting processes. Additional coursework emphasizes math, blueprint reading, metallurgy, welding inspection, and destructive and non-destructive testing.

This welding degree curriculum provides the student with industry-standard skills through classroom training and principle application. Students are provided instruction pertaining to safety while working in welding and cutting environments, interpreting welding symbols, determining the quality of welds, implementing a safe and correct operation of welding equipment, improving metal fabrication skills, and learning how to weld various metals in a variety of challenging positions.

According to the Bureau of Labor Statistics (BLS), welders are needed in all types of industries. In the next few years, welders will be needed to shore up the aging infrastructure across the country, work on oil and gas pipelines, as well as build new energy extraction facilities, among others. Although few companies may hire an inexperienced welder, the BLS reports that most employers look for welders who have been trained and certified.

Craven's Workforce Development Welding Technology short certificate program allows students to earn industry-recognized welding certificates issued through the National Construction Center for Education & Research (NCCER). NCCER's curriculum correlates to the American Welding Society (AWS) SENSE (Schools Excelling through National Skills Education) standards and guidelines for Entry-Level Welders. Upon successful completion, students will obtain NCCER Level I Credentialing. The Short-Term Certificate in Welding Technology includes for welding courses and three program-required courses.

## **Welder Certifications**

Welding certification is offered by several different welding organizations. The three largest are the [American Welding Society](#) (AWS), which focuses on structural codes associated with the construction of buildings and bridges; the [American Society of Mechanical Engineers](#) (ASME), which deals with boiler and pressure vessel codes; and the [American Petroleum Institute](#) (API), which oversees codes for welding pipelines for the gas and oil industries.

Different certifications are offered depending on what type of work and welding career an individual pursues. In addition to verifying that a welder can work with certain codes and contracts, certifications can also attest to a welder's ability to work with specific metal thicknesses, certain types of welds, and other specific welding considerations.

## **Employer Certification**

Welders can be certified by their employer through a hands-on-test to confirm that a welder is competent in a specific process on a certain type of weld. However, employer certification is specific to one welding process – that the individual has demonstrated their skills in one welding process, position, metal, and thickness range – usually the welding process and specifications required for the job. If any of these variables changes, you might need a new certification. Every employer's certification requirements are unique, so it could be helpful

to know what they will be testing you on beforehand. The most common processes welders are testing and certified in are Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (GMAW), Flux Cored Arc Welding (FCAW), and Gas Tungsten Arc Gas Welding (GTAW). A new certification is necessary for each process.

Individuals can also be certified in a process on one metal such as steel, aluminum, stainless steel, or titanium. If you are certified in GTAW on aluminum, the you'd need to retest to be certified in the same process on a different metal. Th thickness of the base metal used on the test will determine the range of thickness of base metal you are certified to work with. Moreover, if you test on one classification and size of filler metal, you might need to recertify for one with different specifications. Certifications also cover processes with shielding gases (based on the type of shielding gas); welding positions (flat, horizontal, vertical, and overhead as well as fixed horizontal or a 45-degree fixed position); joint design (groove or fillet), and welding currents (AC, DC, pulsed power, or high frequency).

## **American Welding Society (AWS) Certification**

AWS certification is gaining widespread acceptance in the welding industry because it is a standardized way of verifying a welder's skills. This certification allows you to test on AWS Standard Welding Procedures, company-issued, non-code welding specifications, or industry-standard specifications. Some employers used AWS certification instead of their own tests.

The AWS offers several pathways to welding certification depending on the specific job, goal, or education of the welder desiring the certification. For instance, a professional welder needs a different certification than a welding inspector. The AWS partners with the [Ironworkers Union](#) and the [Sheet Metal Institute](#) to provide welding certification and testing centers to certify applicants.

AWS' general Certified Welder certificate includes a written section on practical knowledge and safety; welders must score a 75% on the practical knowledge section and a 90% on the safety section. It also includes a hands-on practical test, with the welder choosing the correct materials, and preparing the welding machine and joints to be welded in adherence with standard safety protocols and the relevant QC7 standards. Other certifications are available for Robotic Arc Welding, welding engineers, welding inspectors, welding educators, welding supervisors, welding sales representatives, and welding fabricators.

Those with field experience can also seek certification through the API or ASME.

## **American Petroleum Institute (API) Certification**

API's Individual Certification Programs (ICP) are designed to meet the real-world challenges faced by the natural gas and oil, petrochemical and chemical industries with specific certifications for critical roles. ICP Certifications can be obtained in a broad range of specialties.

## **American Society of Mechanical Engineers (ASME) Certification**

ASME offers certification for those working with boiler and vessel codes. For more information about ASME's certification and continuing education programs, please see <https://www.asme.org/certification-accreditation/personnel-certification>

## License for Welders

Although the majority of states do not license welders, some states do have licensing requirements for welders in addition to certification. For example, New York requires welders to be certified by the AWS or the N.Y. State Department of Transportation. They then must apply to the state for a license. Some cities have their own certification and licensing processes in order for welders to be employed by the governmental entity. Welders who want to work for a local, state, or federal government project need to check with their employer or anticipated employer for specific welding certification or licensing requirements.

Welder qualifications/certification is typically performed according to AWS D1.1, ASME Section IX, and API 1104 standards, which are also used in some other countries. Some states have their own Welder Qualifications that supersede AWS Qualifications but most defer to AWS, ASME, or API.

North Carolina's Department of Transportation (NCDOT) offers a Field Welder Certification Program that certifies both contract welders and NCDOT employee welders to perform welding on NCDOT Bridge Projects. For more information on this program, please see

<https://connect.ncdot.gov/resources/Materials/Pages/FieldWelderCertificationProgram.aspx>

## State Contact Information

### **Alabama**

Alabama accepts the American Welding Society Certification. Alabama does not require a state certification.

<https://www.aws.org/about/page/contact>

### **Alaska**

Alabama accepts the American Welding Society Certification. Alabama does not require a state certification.

<https://www.aws.org/about/page/contact>

### **Arizona**

Arizona accepts the American Welding Society Certification. Arizona does not require a state certification.

<https://www.aws.org/about/page/contact>

### **Arkansas**

Arkansas accepts the American Welding Society Certification. Arkansas does not require a state certification.

<https://www.aws.org/about/page/contact>

### **California**

California accepts the American Welding Society Certification. California does not require a state certification.

<https://www.aws.org/about/page/contact>

\*Additional Information: The City of Los Angeles requires its own written and practical exam.

## **Colorado**

Colorado accepts the American Welding Society Certification. Colorado does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **Connecticut**

Connecticut accepts the American Welding Society Certification. Connecticut does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **Delaware**

Delaware accepts the American Welding Society Certification. Delaware does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **District of Columbia**

Washington, D.C. Department of Licensing & Consumer Protection  
<https://dlcp.dc.gov/>  
202-671-4500  
[dlcp@dc.gov](mailto:dlcp@dc.gov)  
Department of Licensing & Consumer Protection  
1100 4<sup>th</sup> St. SW  
Washington, DC 20024

\*Additional Information: While the District of Columbia accepts the American Welding Society Certification, it also requires that anyone welding on a Boiler or unfired pressure vessel under construction, installation, repair, or alteration must hold a valid DC Welding Certification card. The safe operation of boiler plants and heavy construction equipment is ensured and enforced by DC Licensed Steam and Operating Engineers. DC Welder and Boiler Insurance Company Inspectors renew licenses every two (2) years.  
<https://www.aws.org/about/page/contact>

## **Florida**

Florida accepts the American Welding Society Certification. Florida does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **Georgia**

Georgia accepts the American Welding Society Certification. Georgia does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **Guam**

No standards found, whatsoever for welding in Guam.

**Hawai'i**

Hawaii accepts the American Welding Society Certification. Hawaii does not require a state certification.  
<https://www.aws.org/about/page/contact>

**Idaho**

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**Illinois**

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<https://www.aws.org/about/page/contact>

**Indiana**

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<https://www.aws.org/about/page/contact>

**Iowa**

Iowa accepts the American Welding Society Certification. Iowa does not require a state certification.  
<https://www.aws.org/about/page/contact>

**Kansas**

Kansas accepts the American Welding Society Certification. Kansas does not require a state certification.  
<https://www.aws.org/about/page/contact>

**Kentucky**

Kentucky accepts the American Welding Society Certification. Kentucky does not require a state certification.  
<https://www.aws.org/about/page/contact>

**Louisiana**

Louisiana accepts the American Welding Society Certification. Louisiana does not require a state certification.  
<https://www.aws.org/about/page/contact>

**Maine**

Maine accepts the American Welding Society Certification. Maine does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **Maryland**

Maryland accepts the American Welding Society Certification. Maryland does not require a state certification.  
<https://www.aws.org/about/page/contact>

\*Additional Information: Welders needing certification for bridge welding must contact an ATF center and request to be tested in accordance with D1.5 Bridge Welding. This certification will be accepted by the following States Department of Transportation (DOT): Maryland, Delaware, Virginia, West Virginia, Washington D.C. and Pennsylvania.

## **Massachusetts**

Massachusetts accepts the American Welding Society Certification. Massachusetts does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **Michigan**

Michigan accepts the American Welding Society Certification. Michigan does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **Minnesota**

Minnesota accepts the American Welding Society Certification. Minnesota does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **Mississippi**

Mississippi accepts the American Welding Society Certification. Mississippi does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **Missouri**

Missouri accepts the American Welding Society Certification. Missouri does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **Montana**

Montana accepts the American Welding Society Certification. Montana does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **Nebraska**

Nebraska accepts the American Welding Society Certification. Nebraska does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **Nevada**

Nevada accepts the American Welding Society Certification. Nevada does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **New Hampshire**

New Hampshire accepts the American Welding Society Certification. New Hampshire does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **New Jersey**

New Jersey accepts the American Welding Society Certification. New Jersey does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **New Mexico**

New Mexico accepts the American Welding Society Certification. New Mexico does not require a state certification.  
<https://www.aws.org/about/page/contact>

## **New York**

New York City Department of Buildings  
<https://www.nyc.gov/site/buildings/industry/welder-faq.page>  
212-566-5000  
[Licensingdob@buildings.nyc.gov](mailto:Licensingdob@buildings.nyc.gov)  
New York City Department of Buildings  
280 Broadway 3rd Fl  
New York, NY 10007

\*Additional Information: In addition to an AWS Certification, an NYC Welder License is required to perform structural welding work in New York City. This license is issued by the Department of Buildings.  
<https://www.aws.org/about/page/contact>

## **North Carolina**

North Carolina accepts the American Welding Society Certification. North Carolina does not require a state certification.

\*Additional Information: The Field Welder Certification Program is conducted by the Metals Section of the Materials & Tests Unit. The program is maintained to ensure qualified personnel are performing the welding operations on NCDOT projects. This program applies to all welding, whether the welding is temporary or permanent. <https://www.aws.org/about/page/contact>

## **North Dakota**

North Dakota accepts the American Welding Society Certification. North Dakota does not require a state certification.

<https://www.aws.org/about/page/contact>

## **Northern Mariana Islands**

No standards found, whatsoever for welding in the Northern Mariana Islands.

## **Ohio**

Ohio accepts the American Welding Society Certification. Ohio does not require a state certification.

<https://www.aws.org/about/page/contact>

## **Oklahoma**

Oklahoma Department of Labor  
<https://oklahoma.gov/labor.html>  
405-521-6100  
[labor.info@labor.ok.gov](mailto:labor.info@labor.ok.gov)

or

Oklahoma Department of Transportation  
<https://oklahoma.gov/odot.html>  
405-522-8000  
[ODOT-material@odot.org](mailto:ODOT-material@odot.org)

Oklahoma Department of Labor  
Oklahoma State Capital  
409 Northeast 28<sup>th</sup> St., 3<sup>rd</sup> Floor  
Oklahoma City, OK 73105

Oklahoma Department of Transportation  
200 N.E. 21<sup>st</sup> St.  
Oklahoma City, OK 73105

\*Additional Information: In order to work as a welder in Oklahoma, one needs to pass a test and then submit the test results, ID and a \$25.00 fee, as well as a completed application form, to the Oklahoma Department of Labor. This license does not permit welders to work on boilers and pressure vessels without the supervision of an employer that is certified by the American Society of Mechanical Engineers or the National Board of Boiler and Pressure Vessel Inspectors. To work as a field welder, one will need to obtain field welder certification from the Oklahoma Department of Transportation (ODOT).

<https://www.aws.org/about/page/contact>



## **Oregon**

State of Oregon Department of Consumer and Business Services

<https://www.oregon.gov/dcbs/Pages/index.aspx>

503-378-4133 -- Building Codes Division

[bcd.info@oregon.gov](mailto:bcd.info@oregon.gov)

State of Oregon Department of Consumer and Business Services

Building Codes Division

P.O. Box 14470

Salem, OR 97309-0404

\*Additional Information: In addition to AWS certification, Oregon requires state welding certification for any persons installing, altering or repairing boilers and pressure vessels.

<https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=227201>

## **Pennsylvania**

Pennsylvania Department of Labor & Industry

<https://www.dli.pa.gov/Pages/default.aspx>

717-787-5279

<https://paebrprod.powerappsportals.us/EBR/DLI/general-inquiry/>

Pennsylvania Department of Labor & Industry

1700 Labor & Industry Building

Harrisburg, PA 17120

\*Additional Information: The state of Pennsylvania requires welders to have certification before they can start their practice. There are four major certifications programs for welders working in Pennsylvania: Certified Welder, Certified Welding Inspector (CWI), Certified Welding Educator (CWE), Certified Welding Sales Representative (CWSR). In addition, aspiring welders in Pennsylvania must sit for this test in an examination center certified by the American Welding Society (AWS).

## **Puerto Rico**

Puerto Rico accepts the American Welding Society Certification. Puerto Rico does not require a state certification.

<https://www.aws.org/about/page/contact>

## **Rhode Island**

Rhode Island accepts the American Welding Society Certification. Rhode Island does not require a state certification.

<https://www.aws.org/about/page/contact>

## **South Carolina**

South Carolina accepts the American Welding Society Certification. South Carolina does not require a state certification.

<https://www.aws.org/about/page/contact>

## **South Dakota**

South Dakota accepts the American Welding Society Certification. South Dakota does not require a state certification.

<https://www.aws.org/about/page/contact>

## **Tennessee**

Tennessee accepts the American Welding Society Certification. Tennessee does not require a state certification.

<https://www.aws.org/about/page/contact>

## **Texas**

Texas Department of Transportation

<http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/bridge-e.htm>

800-558-9368

<https://www.txdot.gov/inside-txdot/contact-us/contact-us/askAGeneralQuestion.html>

Texas Department of Transportation

125 East 11th Street

Austin, Texas 78701

\*Additional Information: The state of Texas requires all welders to be certified by the American Welding Society. The Texas Department of Transportation uses the AWS Bridge Welding standards as the basis for its steel structures certification. This certification is required to work on beams, girders and other load-bearing structural connections in the state of Texas.

## **U.S. Virgin Islands**

The Virgin Islands accepts the American Welding Society Certification. The Virgin Islands does not require a state certification.

<https://www.aws.org/about/page/contact>

## **Utah**

Utah accepts the American Welding Society Certification. Utah does not require a state certification.

<https://www.aws.org/about/page/contact>

## **Vermont**

Vermont accepts the American Welding Society Certification. Vermont does not require a state certification.

<https://www.aws.org/about/page/contact>

## **Virginia**

Virginia accepts the American Welding Society Certification. Virginia does not require a state certification.

<https://www.aws.org/about/page/contact>

## **Washington**

Washington accepts the American Welding Society Certification. Washington does not require a state certification.

<https://www.aws.org/about/page/contact>

## **West Virginia**

West Virginia accepts the American Welding Society Certification. West Virginia does not require a state certification.

<https://www.aws.org/about/page/contact>

## **Wisconsin**

State of Wisconsin Department of Safety and Professional Services

<https://dsps.wi.gov/Pages/Programs/Welding/Default.aspx>

608-266-2112

[DSPSSBoilerTech@Wi.gov](mailto:DSPSSBoilerTech@Wi.gov) or [DSPSCREDTrades@wisconsin.gov](mailto:DSPSCREDTrades@wisconsin.gov)

State of Wisconsin Department of Safety and Professional Services

Division of Industry Services

4822 Madison Yards Way

Madison, WI 53705

\*Additional Information: The State of Wisconsin requires that a welder that is performing work for the state (any work that is being paid for with tax dollars) be certified to an AWS structural welding code (such as AWS D1.1 or AWS D1,3 etc.) and then recorded on a registry held by the state. You must be registered with the state of Wisconsin as a Welder, but no further certification is necessary. Welder certification must be renewed every 4 years.

## **Wyoming**

Wyoming accepts the American Welding Society Certification. Wyoming does not require a state certification.

<https://www.aws.org/about/page/contact>