

# "Welder Certification"

## What it is-What it isn't

The purpose of this presentation is to introduce you to the various aspects of welder certification. This is not intended to cover all of the requirements for certification but only introduce you to some of the basic concepts and misconceptions.

# Topics to Be Covered

- **Certified-What Does it Mean-What doesn't it mean**
- **Specifications, Codes and Standards**
- **Welder Performance Qualification Tests**
- **Forms**
- **3rd Party "Certification"**
- **AWS Certified**
- **YOUR quality program**

# Certified- What does it Mean

This is from the American Welding Societies Document “Standard Welding Terms and Definition”.

**Welder certification**-Written verification that a welder has produced welds meeting a prescribed standard of welder performance.

**Welder performance qualification**-The demonstration of a welders or Welding Operators to produce welds meeting prescribed standards

# Certified- What does it Mean Continued

**Welder certification**–Written verification that a welder has produced welds meeting a prescribed standard of welder performance.

The words to pay attention to in the above definition are “written verification” and “prescribed standard”.

## ASME Statement

We certify that the statements in this record are correct and that the test coupons were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME BOILER AND PRESSURE VESSEL CODE.

# Certified- What does it Mean Continued

**Welder certification**–Written verification that a welder has produced welds meeting a prescribed standard of welder performance.

The words to pay attention to in the above definition are “written verification” and “prescribed standard”.

## AWS D1.1 Statement

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of section 4 of AWS D1.1, ( 2010) Structural Welding Code-Steel.

# Certified- What does it Mean Continued

Welder certification—Written verification that a welder has produced welds meeting a prescribed standard of welder performance.

The words to pay attention to in the above definition are “written verification” and “prescribed standard”.

AWS “CERTIFIED Welder” form for AWS ATF: We certify that the statements in this record are correct and the test welds were prepared, welded and tested in accordance with the requirements of: AWS D1.1- , AWS B2.1- Other:

# Certified- What does it Mean Continued

A welder who is considered to be or previously had been “certified” would be supported by some type of written documentation. This documentation would support having met some “prescribed standard”. This standard could be an industry recognized code or standard, a company document, or a combination of those. The content of the record should meet the requirements of the “prescribed standard”.

# **Certified- What does it Mean** Continued

Just because someone provides a document certifying they have completed a welding test does not mean they are qualified to perform welding on a specific item.



# Certification- What does it Mean

## Continued

**Welder performance qualification**-The demonstration of a welders or Welding Operators to produce welds meeting prescribed standards

The words to pay attention to in the above definition are “demonstration” and “prescribed standard”.

A welder who has performed “Welder Performance Qualification” is not “Certified” until the written documentation is provided. If the supporting documentation is not available, then there is no record of certification.

# Certification- What does it Mean

## Continued

**Welder performance qualification**-The demonstration of a welders or Welding Operators to produce welds meeting prescribed standards

The Welder Performance Qualification should be administered, witnessed, documented, inspected and tested in accordance with the applicable standard. Welding performed by the “certified welder” does not meet the requirements of the applicable code if all of the requirements for the welding are not met. Materials, inspections, welding procedures, acceptance criteria etc.

# Certification- What does it Mean

## Continued

Welder performance qualification-The demonstration of a welders or Welding Operators to produce welds meeting prescribed standards

**There is more to performing compliant welding than testing and certifying the welder.**

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# Certification- What does it Mean

## Continued

The term “Certified Welder” is one of the most misunderstood terms used in reference to the welding industry. It can refer to an individual who can spot weld two pieces of sheet metal together or someone who welds on nuclear power plant components. The requirement for a welder to be “certified” can be driven by government regulations, purchasing documents, customer specifications, internal quality requirements, design drawings etc...

# Certification- What it does NOT Mean

The term certified does NOT mean

- A certified welder has more skill than one without certification. His or her skill is documented but may or may not match the skill of the one who is not certified.

# Certification- What it does NOT Mean

The term certified does NOT mean

- A certified welder will be a better employee than one without certification. It just means the certified welder passed a test and someone signed verifying the test..

# Certification- What it does NOT Mean

The term certified does NOT mean

- A certified welder has more knowledge about welding than a non-certified welder. Almost all codes (With the exception of some Military Standards) have no requirement for formal training.

# Certification- What it does NOT Mean

The term certified does NOT mean

- Once a welder is certified, he/she can weld on anything. Each specific code or standard has specific ranges of qualification for the testing parameters used during testing.



# Certification- What it does NOT Mean

The term certified does NOT mean

- A welder knows technical details about what he or she is doing. They have only been documented to have met the requirements of some code/specification. There is more to having welding performed correctly than having a certified welder. A welder who has not been certified may know what needs to be done.

# Certification- What it does NOT Mean

The term certified does NOT mean

- The welding done by an organization complies with a specific code, standard, or jurisdictional requirement.

# Specification, Codes, and Standards

Various types of documents refer to the requirements for the Qualification Testing of welders. There are numerous codes and specifications that are prepared by various industry organizations. The organizations include but are not limited to

- AWS-American Welding Society
- AWWA-American Water Works Association
- ASME- American Society of Mechanical Engineers
- API-American Petroleum Institute

# Specification, Codes, and Standards

- The requirements for qualification testing of a welder and the subsequent documentation may not be called out in an individual document but may be required by reference. An example would be a statement in a project specification that says “All welding shall be in accordance with AWS D1.1 Structural Welding Code 2006 or Later”. The above mentioned code requires welders to be tested and properly documented. In addition, all other requirements of the referenced code would apply. Not just testing and certification of welders.

# Specification, Codes, and Standards

- Specifications are often written for a product or service by a purchaser or are internal to a company. Often, these specifications will refer to existing codes and standards or may add to the requirements of the referenced documents.

# Specification, Codes, and Standards

- Codes and Standards are published by numerous organizations. These include but are not limited to
  - ASME-American Society of Mechanical Engineers
  - AWS-American Welding Society
  - AWWA-American Water Works Association
  - API-American Petroleum Institute
  - OSHA-Occupation Safety and Health Administration

Each of the previously mentioned organizations may have numerous codes or standards related to welding. Some may refer to other codes or specifications for welder testing and certification requirements.

# Specification, Codes, and Standards

## ASME-American Society of Mechanical Engineers

ASME has codes and standards related to various products. The most common is the ASME Boiler and Pressure Vessel Code (BPVC).

The Boiler and Pressure Vessel code along with the B31 piping codes have been adopted as law in most states. Sec IX – Welding and Brazing Qualifications addresses the requirements of both procedure and performance qualification however various other codes developed by ASME may modify the requirements for procedure and performance qualification.

If you are performing work in accordance with a specific ASME code, assure that ALL requirements are met, not just welder qualification and certifications.

# Specification, Codes, and Standards

## ASME-American Society of Mechanical Engineers

### ASME BPVC -Partial List

<b>BPVC Section I-Rules for Construction of Power Boilers</b>	<b>BPVC Section IV-Rules for Construction of Heating Boilers</b>
<b>BPVC Section III-Nuclear Facility w/ various subsections.</b>	<b>BPVC Section VIII-Rules for Construction of Pressure Vessels Division 1 and Division 2</b>
<b>BPVC Section IX-Welding, Brazing, and Fusing Qualifications</b>	<b>BPVC Section XII-Rules for Construction and Continued Service of Transport Tanks</b>

[List of Boiler and Pressure Vessel Codes from ASME](#)



# Specification, Codes, and Standards

## ASME-American Society of Mechanical Engineers

### ASME B31 Codes-Partial List

<b>B31.1 - 2012 - Power Piping</b>	<b>B31.8 - 2012 - Gas Transmission and Distribution Piping Systems</b>
<b>B31.3 - 2012 - Process Piping</b>	<b>B31.9 - 2011 - Building Services Piping</b>
<b>B31.4 - 2012 - Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids</b>	<b>B31.11 - 2002 - Slurry Transportation Piping Systems</b>
<b>B31.5 - 2013 - Refrigeration Piping and Heat Transfer Components</b>	<b>B31.12 - 2011 - Hydrogen Piping and Pipelines</b>

[List of B31 codes-Engineering Toolbox](#)

# Specification, Codes, and Standards

## AWS-American Welding Society

The American Welding Society has welding codes and specifications for various industries and product types. Many of these documents are referred to by other industry codes or standards. The code often referred to in many industries is AWS D1.1 “Structural Welding Code”. The D1.1 code is only one of many developed by the American Welding Society for welding. Another key code related to Qualification Testing is AWS B2.1 *SPECIFICATION FOR WELDING PROCEDURE AND PERFORMANCE QUALIFICATION*. The B2.1 specification is referred to by various codes and standards and has a similar layout to ASME Sec IX in some aspects.

[Codes](#)

[Specification](#)

[Qualifications Documents](#)

[All Document](#)

# Specification, Codes, and Standards

## AWWA-American Water Works Association

The Water Works Association has codes and standards related to the storage and transfer of water in municipal systems. Often times the references to these codes are contained within engineering documents of municipalities. There are requirements for welding on both piping and storage tanks. Within those documents, reference may be made to other governing documents.

# Specification, Codes, and Standards

## API

The American Petroleum Institute has many codes related to petroleum facilities and pipelines. The often referred to specification from API is API 1104 which is related to pipelines however other documents exist for storage tanks, pressure vessels, and machinery. Some of these codes may refer to other industry codes or specifications. An example is API-620-DESIGN AND CONSTRUCTION OF LARGE WELDED, LOW-PRESSURE STORAGE TANKS reference to ASME Sec IX for qualification of welders and procedures.

# Specification, Codes, and Standards

## OSHA-Occupational Safety and Health Administration

OSHA and references to welding are often thought of in the context of safety during the welding operations. However there are OSHA standards that refer to industry codes and standards that may require qualification and certification of welders. Some examples where OSHA may refer to welding codes that may require welder qualification and certification are:

- 1) Aerial Lifts, Cranes and Derricks, elevating and rotating work platforms etc..
- 2) 1910-Walking-Working Surfaces-Fixed ladders
- 3) 1910-Flammable Liquids
- 4) 1910-Ammonia
- 5) 1926-Lift Slab Operations

# Welder Performance Tests

Welder Certification requires a welder to take some type of test. Each individual code or standard has individual rules for how the test is to be performed, tested, and subsequent range of qualifications.

Some of the variables that affect what a welder is qualified to are process, position welded, base material thickness, weld type (fillet or groove), filler metal, backing, purging, pipe diameter (if pipe), and others depending upon the process.

The rules within each code may have ranges that are completely different from another code.

# Welder Performance Tests

A test setup sometimes used for boiler tube welders. This is NOT what the code requires. But it may be a good idea. An organization has the right to assure individuals have the skills needed for their specific needs.



# Welder Performance Tests (cont)

A typical test setup for welder qualifying to weld on plate in the vertical position. However in real life, some welders are not making welds with this type of accessibility.





# Welder Performance Tests (cont)

Both of these welders are probably “Certified” but what they are doing is WORLDS apart from each other and also the tests they took to get the job..



# Welder Performance Tests (cont)

## Tests Required

The type and number of tests required by a specific code or standard are governed by the ranges to be welded during actual production welding. Therefore, to assure a welder is qualified for the welds to be made, someone in an organization should be aware of

- 1) The applicable code for fabrication, manufacture or construction.
- 2) Materials, Processes, Positions, Thicknesses, Joint Types, Filler Metals, Gases, and other variables to be used during production.
- 3) Ranges of qualification for all welding related variables.

# Welder Performance Tests (cont)

## Tests Required (cont)

After reviewing all of the variables related to a welder qualification and verifying the ranges are suitable, it is time to select a suitable test. Some codes such as AWS D1.1 give specific dimensions for test specimens, other codes such as ASME Sec IX or AWS B2.1 allow a wide range of specimen thicknesses, joint configurations, and diameters (pipe/tube).

# Welder Performance Tests (cont)

## Tests Required (cont)

After selecting the suitable tests to be administered, an organization must verify that a suitable welding procedure specification is available for use during testing. The WPS may be used by the welder both for testing and production welds however keep in mind that a welder may test with a specific WPS and not be qualified to use the WPS within all of the ranges that the WPS is qualified for. Or on the other hand, a welder may test using a specific WPS but may be qualified for using numerous WPS's provided his/her range of qualification is within the limits needed for the production weld and the WPS is also suitable for the ranges to be used during production welding.

# Welder Performance Tests (cont)

## Tests Required (cont)

Note that some codes and standards specifically require the organization responsible for welding to supervise and administer the tests. Be aware of the requirements contained within the code/standard you are working in accordance with. In most cases, this does not prohibit an organization from subcontracting inspection and testing services. Check the code!

# Welder Performance Tests (cont)

## Inspecting and Testing the finished Welds

The inspection criteria for welder performance qualification testing varies among codes and standards. Do not make assumptions if you work with various codes and standards. Additionally, the acceptance criteria within a specific code may not meet the needs of your organizations level of quality. Here is the visual acceptance criteria from ASME Sec IX-2010 QW-194 *Performance test coupons shall show complete joint penetration with complete fusion of weld metal and base metal.*

Be aware that actual production weld requirements may differ from the requirements for qualification. Incorporate that into your program for testing if needed.

# Welder Performance Tests (cont)

## Inspecting and Testing the finished Welds

Testing methods can usually be non-destructive (RT, UT, PT, MT) or destructive (Guided Bend, Nick Break, Macro, Peel Test etc..) and may sometimes require a combination. In all situations I am aware of, specific certifications are needed for the personnel performing NDE.

For destructive testing, this is usually not a requirements however the organization performing the testing should be familiar with the specific code requirements. There are differences among codes.

# Welder Performance Tests (cont)

## Inspecting and Testing the finished Welds

[ASME Sec IX Side Bend Sketch](#)

[AWS D1.1 Side Bend Sketch](#)

Acceptance criteria is also different. A weld that meets the acceptance criteria for ASME Sec IX may not meet the more restrictive requirements of AWS D1.1



# 3<sup>rd</sup> Party “Certification”

- Most of the codes used by industry for structural steel, pressure vessels and piping do not require a 3<sup>rd</sup> party to perform welder performance qualification and certification. In some cases (ASME Sec IX) it is specifically prohibited.
- Each individual organization may perform their welder performance qualification if desired. Another option when allowed by codes or specification is to or assure that organizations performing the testing be familiar with the organizations requirements.

## 3<sup>rd</sup> Party “Certification” (cont)

- If 3<sup>rd</sup> party performance qualification testing is performed, the manufacturer or organization is still responsible for the welding performed by their organization. It is suggested that any organization performing qualification testing of welders and have a system in place to assure applicable requirements are met.
- REMEMBER Having a “Certified Welder” does NOT mean you are complying with any specific code or standard. This is only a SMALL PART of a welding program.

# “AWS Certified vs. Certified in Accordance With”

The term “AWS Certified Welder” is often used in classified ads, resumes, and sometimes project specifications. This implies a welder who has been certified in accordance with the AWS Certified Welder Program. However, employers are often referring to welders who have documented evidence of prior certification in accordance with a specific AWS Standard. This is usually AWS D1.1.

# “AWS Certified vs. Certified in Accordance With” (cont)

- What “AWS Certified” should mean is a welder who has been tested at an American Welding Society Accredited Test Facility (ATF) . If “AWS Certified” is referred to in project specifications or other documents, you should verify the intent is for the welders to be qualified in accordance with AWS QC-7 Standards.
- A welder who has been tested in accordance with a specific AWS Code or Standard may NOT be an “AWS Certified Welder” but is a welder who “Has been certified in accordance with AWS XXXX”.

# Individual Company Requirements

Each individual company or organization that is dedicated to producing quality welds in a consistent manner should perform some type of welder performance qualification testing. This should normally be done in accordance with some written code or specification.

The method or system followed for performing the testing and certification of welders should be such that it assures consistent results and verifiable compliance with the policies and procedures that support it.

# Records Required

Each individual code or standard will have specific requirements for the documentation required for welder performance qualification testing. The most common requirement is that the records contain all of the variables for the process used and results of tests.

In most cases, there is a “Suggested Format” for welder performance qualification record forms. There are various software programs available for this purpose. Some with built in code checking. Regardless of the method, USE THE CODE to verify everything is correct.

# Records Required

## Sample Forms

[ASME QW-484-Fillable PDF](#)

[AWS D1.1-2015 Form](#)

[TWI Weldoffice Form-Completed](#)

# The Walters State Community College Welder Testing Program

If your organization is interested in learning more about welder qualification and certification or would like to review our quality system used for welder testing please contact:

Gerald Austin

Walters State Community College

(423)798-7991 or Email [gerald.austin@ws.edu](mailto:gerald.austin@ws.edu).



# One Final Thought

Welding is a developed skill that is not for everyone. If you are looking to hire a welder, please take the time and effort to see what they can do ! Do not rely on some piece of paper to let you know what skills they have. The ones that are any count will probably be glad to take a test! Or at least run a few beads for you.

Another thought- The term “Certified Welder” or “Certified” is NOT in AWS D1.1 2010 Edition.