

INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

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Mitchell E. Daniels, Jr., Governor
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July 9, 2012

CONSTRUCTION MEMORANDUM 12-08

TO: District Deputy Commissioners
District Construction Directors
District Testing Engineers
District Area Engineers
District LPA Coordinators
Field Engineers
Technical Services Directors
Project Engineers/Supervisors
Office of Materials Management

FROM: Mark A. Miller, Director 
Division of Construction Management

SUBJECT: Welder Certifications

It has become apparent that there is considerable confusion regarding the certifications or qualifications required for those persons performing field welding. *Standard Specification 711.32* requires that welders, welder operators, and tack welders (hereinafter referred to as welders) are qualified in accordance with the AWS D1.5 Bridge Welding Code. These qualification tests are intended to document the ability of a welder to make sound welds by following a weld procedure specification provided by the contractor. Welder qualification tests are only intended to measure the skills that are necessary to produce weld soundness. The AWS D1.5 also provides recommendations regarding the period of effectiveness that the welder's qualification should be considered valid. AWS D1.5 states that so long as the welders engage in the given process of welding for which the welder has qualified at least once every six months, the welder's qualification remains in effect indefinitely. The Department does not share this line of reasoning and instead requires that the date provided on the welder's certification or qualification test record be current to within the past 5 years. If the date on the certification or qualification test record is more than 5 years old, the Department requires the welder to be re-qualified or re-certified in accordance with the AWS D1.5.

In order to determine if the welder is certified or qualified to perform the required welding on a contract, the following steps should be performed.

1. The PE/S should determine the type of welding that will be performed (fillet welding, groove welding, or both). Some welders are only certified for fillet welding. Certified groove welders

can perform both fillet welding and groove welding. The welds a welder is certified to perform will be determined by the letter following the welding position number. (F = fillet, G = groove)

2. Welding is done in one of four different positions. The PE/S should review the plans to determine in what position the weld will be performed. Fillet welds or groove welds can be made in each of these positions. For plates, position describes the orientation of the axis of the weld. For pipes, position describes the orientation of the axis of the pipe. The position affects the flow of molten filler metal into the joint and the difficulty of making a successful weld. Figure 1 (attached) shows the various positions used in plate and pipe welding. The positions are listed below.

- 1F or 1G (Flat) position – For plates, the plates and the axis of the weld joining the plates being welded are both horizontal. For pipes, the axis of the pipe is horizontal and the pipe can be turned or rolled while welding.
- 2F or 2G (Horizontal) position – For plates, the plate that is being welded is vertical and the weld is horizontal. For pipes, the axis of the pipe is vertical, but the resulting weld is horizontal. **The welds for pipe pile and H-pile splicing are most commonly performed in this position.**
- 3F or 3G (Vertical) position – For plates, both plates being welded are vertical and the weld is uphill vertical (start at the bottom and continue up). There is no 3G position for pipes.
- 4F or 4G (Overhead) position – For plates, both plates being welded are horizontal and above the welding equipment. There is no 4G position for pipes.
- 5G position – For pipes only, both pipes are horizontal. The pipe cannot be turned or rolled while welding.
- 6G position – For pipes only, both pipes are on an inclined axis ($45^{\circ}\pm 5^{\circ}$) and the pipes cannot be turned or rolled.

The certifications or qualifications are for each position number and those positions below (for example, an individual certified in position number 2 is certified for both positions 2 and 1; an individual certified for position number 4 is certified for positions 4, 3, 2, and 1.)

3. The next step is to check the **welder's qualifications** and that they are valid. There are many different kinds.
- a. The most widely accepted is the AWS certification. An AWS-certified welder will have an AWS certification wallet card. You can verify an AWS certification online at <http://www.aws.org/w/a/certification/index.html> by entering the welder's AWS number (i.e. 1010002W-see Figure 2). The AWS website will indicate if the welder is still certified and for what positions. The AWS website also had a list of the abbreviations that appear on the AWS Certified Welder cards. Welders who have an AWS certification are generally employed at fabrication facilities where it is easier for them to document their work experience to AWS and thus maintain their certification.

- b. The PE/S may receive a union wallet card that lists they are a certified welder. These should have a date listed.

All certified welders meeting 3a or 3b must document their performance by submitting a form to AWS at least once every six months. This must be done every six month period. If any of the information provided to you is older than six months, then the welder has not kept current on their certification and according to AWS certified welder program they are no longer certified.

If a welder does not have an AWS card, there are other means a welder can prove that they are qualified to perform the work.

- c. The PE/S may receive a Welder, Welding Operator, or Tack Welder Qualification Test Record (see Figures 3 and 4), hereinafter referred to as a qualification test record. This may or may not be on the AWS form that is contained in the AWS D1.5 Bridge Welding Code. (It is not required to be on the AWS form.) The qualification test record will have the positions listed as 1F, 2F, 3F, 4F or 1G, 2G, 3G, 4G, 5G, or 6G. The PE/S will need to check that the inspector who signed the certification is a CWI (certified welding inspector) approved by AWS which can be also verified online at <http://www.aws.org/w/a/certification/index.html>. At a minimum, the qualification test record has a CWI stamp certifying the qualification test record. Often the CWI stamp is accompanied by a signature.
- d. The PE/S may also receive a Certified Weld Instructor Certification (see Figures 5 and 6). If so, it can be reviewed using the same guidelines as for a qualification test record (given above).

The qualifications described in 3c or 3d are obtained by the welder performing a welding procedure specification (WPS) and having the test specimen pass various tests. The certification date on the Welder, Welding Operator, or Tack Welder Qualification Test Record or Certified Weld Instructor Certification (see 3c or 3d) must be within the past five years otherwise the individual needs to be re-tested.

The following five sample AWS Certified Welder card and welding certifications are attached to this memo.

- Certified Welder Card shown in Figure 2: Per the information on the back of the individual's card, this individual can weld in all positions, fillet and groove, because the position is listed as 6G. From checking the AWS website, it shows that the individual's certification expired April 27, 2012. Therefore this individual is not qualified to weld on your contract.
- Welding certification shown in Figure 3: This individual can weld in positions 1 (flat) and 2 (horizontal). Since the position number is followed by the letter "F", this individual can only weld fillets-no groove welding can be performed. This certification was performed 9/19/11 and thus should be considered current because September 19, 2011 is within the past five years.
- Welding certification shown in Figure 4: This individual can weld both fillet and groove welds in positions 1 (flat), 2 (horizontal), and 3 (vertical) since the position number is followed by the letter "G". This certification was performed 7/30/10 and thus should be considered current because July 30, 2010 is within the past five years..

- Welding certification shown in Figure 5: This individual can weld both fillet and groove welds but only in position 1 (flat). Therefore, no welding on piles that have already been driven. This certification was performed on 3/30/09 and thus should be considered current because March 30, 2009 is within the past five years..
- Welding certification shown in Figure 6: This individual can weld in positions 1 thru 4 and can weld both fillet and groove welds. This certification was performed on 1/19/12 and should be considered current because January 19, 2012 is within the past five years..

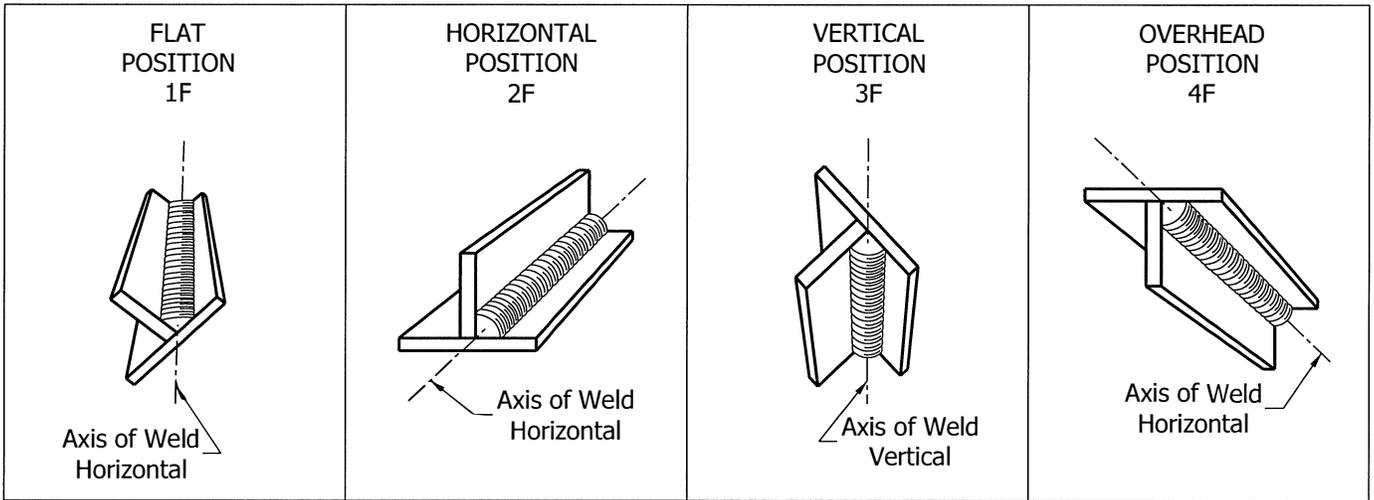
Please consult the Division of Construction Management field engineer assigned to your district for any assistance with this item.

MAM/GGP/jr

All names, identification numbers, and other information contained on Figures 2, 3, 4, 5, and 6 with the exception of the American Welding Society are purely fictitious. Any resemblance to real persons, living or dead, or companies in or out of existence, is purely coincidental. The documents represented in these figures are for illustrative purposes only and intended to educate field personnel and are in no way an attempt to copy a legitimate document.

Welding Positions

FILLET WELDS



GROOVE WELDS

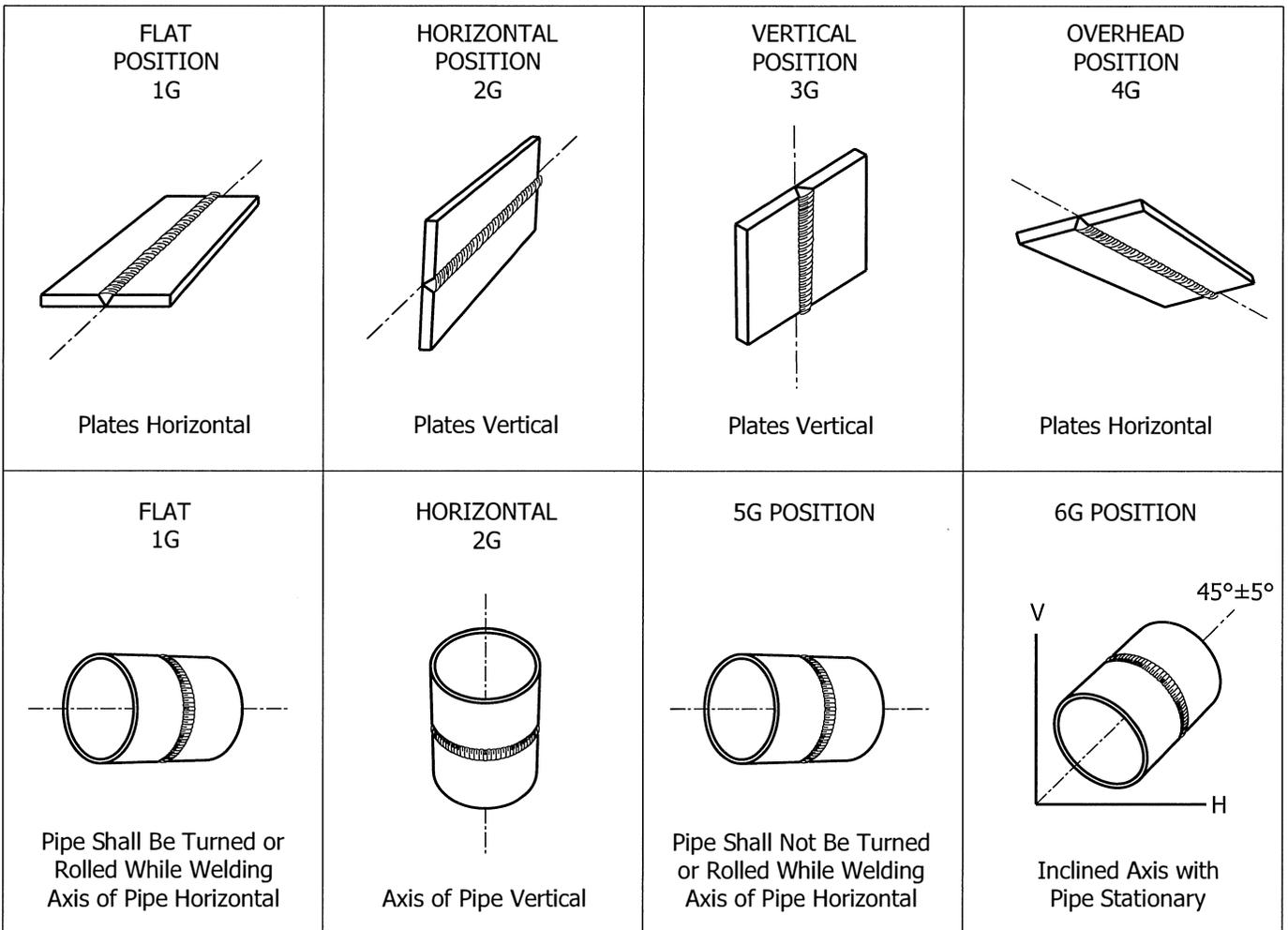


Figure 1

WELDER AND WELDING OPERATOR QUALIFICATION RECORD

Welder or welding operator's name Max Power Identification no. H8026
 Welding process SMAW Manual Semiautomatic _____ Mechanized _____
 Position 1F or 2F
 (Flat, horizontal, overhead or vertical—if vertical, state whether upward or downward)
 In conformance with WPS no. SMAW-2-1-W
 Material specification ASTM A709 Grade 50, 50W, 50W to 70W undermatch
 Thickness range this qualifies 1/4" or greater for Fillet Welds

FILLER METAL

Specification no. AWS A5.5 Classification E8018-C1-H4R F no. _____
 Describe filler metal (if not covered by AWS specification) _____
 Is backing used? No
 Filler metal diameter and trade name 5/32" Flux for SAW or gas for GMAW or FCAW-G
Excalibur 8018-C1 MR

VISUAL INSPECTION (6.26.1)

Appearance Satisfactory Undercut None Pinning porosity None

Guided Bend Test Results

Type	Result	Type	Result
NA	NA	NA	NA

Test conducted by NA Laboratory test no. NA
 per NA Test date NA

Fillet Test Results

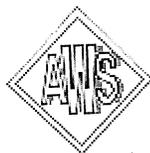
Appearance Acceptable Fillet size 0.312" x 0.312
 Fracture test root penetration Acceptable Macroetch Acceptable
 (Describe the location, nature, and size of any crack or tearing of the specimen.)
 Test conducted by John A. Doe Laboratory test no. H8043 job no 2112
 per _____ Test date September 19, 2011

RADIOGRAPHIC TEST RESULTS

Film Identification	Results	Remarks	Film Identification	Results	Remarks
NA	NA	NA	NA	NA	NA

Test witnessed by NA Test no. NA
 per NA

We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in conformance with the requirements of AASHTO/AWS D1.5M/D1.5, (2010) Bridge Welding Code.
 (year)



JANE P. DOE
 CWI 01234569
 QC1 EXP. 11/01/11

Manufacturer or Contractor Blacksheep
 Authorized By _____
 Date September 19, 2011

Form N-5

Form N-5—Welder and Welding Operator Qualification Record

Figure 3

John Q. Doe
AWS QC1 Certified Welding Inspector
123 Main Street -- Springfield, AA 10010 (503) 555-1212

Welding Operator's Name: Max Power
Date: 3-30-09 ID Number: U-1234-5678
Process: SMAW Position: 1G
Material: A36 Procedure No.: B-U2a
Dia. & Wall thickness (if pipe) otherwise joint thickness: 0.375 in. Grooved Plate
Is backing strip used? Yes Filler Metal: 1/8 - 7018
Maximum Thickness Qualification: 0.750 in. Position - 1G ; Unlimited Fillet 1F

Visual Inspection (AWS D1.5, 5.27)

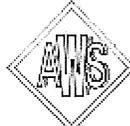
Appearance: Good Excessive Reinforcement: None
Undercut: None Lack of Fusion: None
Porosity: None

Bend Test Results (AWS D1.5, 5.27)

Face: Conforms Root: Conforms
Side: Not Applicable

I, the undersigned, certify that the results of this record are correct and that the welds were prepared in accordance with the requirements of the AWS D1.5 Bridge Welding Code.

Signed John Q. Doe Date 3/30/09
John Q. Doe
AWS Certification No. - 98765432
Certification Expiration Date - 11/01/2014



JOHN Q. DOE
CWI 98765432
QC1 EXP. 11/01/14

For verification of any American Welding Society (AWS) certified instructor, you may call 1-800-443-9353 and enter the AWS Certification Number listed above.

Figure 5

Jane S. Doe
AWS QC1 Certified Welding Inspector
1987 Smith Blvd -- Sydney, AA 10010 (800) 555-1212

Welding Operator's Name: Paco Gonzales

Date: 1/19/12 ID Number: 9876-5432

Process: SMAW Position: 4G

Material: A 36 Procedure No.: B-U2a

Dia. & Wall thickness (if pipe) otherwise joint thickness: 0.375 in. Grooved Plate

Is backing strip used? Yes Filler Metal: 1/8 in. 7018

Maximum Thickness Qualification: 0.750 in.-Flat, Overhead Groove, Unlimited
Flat, Horizontal, Overhead Fillet

Visual Inspection (AWS D1.5, 5.27)

Appearance: Good Excessive Reinforcement: None

Undercut: None Lack of Fusion: None

Porosity: None

Penet Test Results (AWS D1.5, 5.27)

Face: Conforms Root: Conforms

Side: N/A

I, the undersigned, certify that the results of this record are correct and that the welds were prepared in accordance with the requirements of the AWS D1.5 Bridge Welding Code.

Signed Jane S. Doe Date 1/19/12

Jane S. Doe
AWS Certification No. - 01234567
Certification Expiration Date - 9/01/2012



For verification of any American Welding Society (AWS) certified instructor, you may call 1-800-443-9353 and enter the AWS Certification Number listed above.

Figure 6