



**Oklahoma DOT
Materials & Testing**

December 5, 2003 (Updated to Reference 2009 Specifications 11/26/2012)
(Revised Materials Division address on Page 2 in Welding of Test Plate Assemblies section 06/17/2020)

Publication: FWELDR

Supersedes: Field Welder Certification Test Procedure Revised February 25, 2002 and Drawing WOQ - Standard Weld Test Operator Qualification Test Plate Details Revised December 1, 1995.

QUALIFICATION TESTING OF FIELD WELDERS

STATEMENT OF INTENT

The intent of this Publication is to clarify the qualification testing process for Field Welders and limit the testing to only those who can be reasonably expected to have a need to field weld to Oklahoma Department of Transportation specifications.

ROLES AND RESPONSIBILITIES

In accordance with Section 724.03 B(1) of the Oklahoma Department of Transportation 2009 Standard Specifications for Highway Construction, test plates for field welder qualification testing will be furnished by the Materials Division (Laboratory).

Additionally, the Materials Division provides the site for qualification testing, assistance in initial fit-up and positioning of test assemblies, oversight of qualification welding and laboratory testing of the test specimens.

Applicants are responsible for any and all other equipment, costs and work associated with the qualification process. That includes work and/or costs involved by the required cutting and machining test specimens from plate assemblies.

Applicants must arrive on time of scheduled qualification testing appointment. Applicants arriving late will not be tested until qualification testing is rescheduled.

FIELD WELDER DESCRIPTION

Field welding occurs other than in a monitored or inspected fabrication shop but must still be accomplished in accordance with Oklahoma Department of Transportation specifications.

“Field Welder” as used herein refers to a unit consisting of the welder, the welding machine, a class or group of shielded metal arc (SMAW) electrodes typically suitable for welding structural grades of steel and supporting tools and devices typically required to satisfactorily perform field welding.

As a minimum, the equipment that must be in an applicant’s possession for qualification testing is the minimum equipment they would need to perform field welding and includes:

- Portable DC welding machine with all necessary accessories
- Rod oven
- Sealed container(s) of new E7018 electrodes
- Fillet weld gage
- Hand wire brush
- Hand chipping hammer
- Clamps for adequately holding test plates
- Scrap metal for setting machine and practice welds if desired
- Gas heating torch for driving off moisture, acquiring preheat and maintaining interpass temperatures

- Tape Measure
- Soap Stone
- Square

All Field Welders are required to be qualified by the Oklahoma Department of Transportation – Materials Division before being permitted to field weld on any structural steel components. That includes not only the pay item Structural Steel and specific bridge applications, but many other field welding processes performed on steel products that are applicable due to specification reference.

FIELD WELDER QUALIFICATION

The qualification of Field Welders shall conform to this Publication, the Bridge Welding Code ANSI/AASHTO/AWS D1.5 (current edition) and Oklahoma Department of Transportation Standard Specifications.

Applicants satisfactorily completing all required tests and meeting qualifications herein specified will be issued a “Welder Operator Certification” card (welder card) by the testing authority. On the reverse side of the card is space for a Resident Engineer or his designated representative to document satisfactory field weld information relative to Oklahoma Department of Transportation specification projects. Welders are responsible to request that Resident Engineers or their designated representatives sign the reverse sides of their cards and should do so immediately upon completion of satisfactory welding.

Field Welder Qualifications herein specified will be considered void following any 12 month period after issuance in which the welder has not accomplished satisfactory field welding on an Oklahoma Department of Transportation specification project.

Field Welder re-qualification may be required at any time there is a specific reason to question the Field Welder’s ability to make acceptable welds.

WELDING OF TEST PLATE ASSEMBLIES

Welding of test plate assemblies shall occur under Oklahoma Department of Transportation – Materials Division oversight at the following location:

Oklahoma Department of Transportation
Materials Division
5201 N.E. 122nd Street, Building 4011
Edmond, OK 73013-8306
Office: (405) 521-2677
Fax: (405) 522-0552

Applicants or their employer should either mail or fax a request to take the welding test on company letterhead to the previously noted address. The welders’ name and contact information must be included.

Afterwards the applicants can call to schedule a welding test and to ask any questions. All welding tests will be performed outdoors. Testing personnel reserve the right to delay or reschedule welding tests due to rain or other inclement weather. Applicants are responsible to clean weld area of all spent rods, slag and other deposited trash after testing. Cutting out and preparation of test specimens will not be allowed on the property.

In making up test welds, the applicant should restrain the warping of assemblies as much as possible by using their clamps. Assemblies shall not be stress relieved or straightened after welding.

Cleaning between weld passes shall be limited to hand chipping and hand wire brushing. Power chippers or

grinders can only be used prior to the test in order to clean the assemblies (if desired). They shall not be used during the qualification test. Weld cleaning shall be done with the test weld in the same position as the qualification test position.

All vertical welds for groove and fillet weld assemblies shall be made with the progression for all passes in the upward direction.

Each assembly will be visually examined by the testing authority prior to welding, during welding and upon completion prior to removal from test position. Should welds or assemblies be found not in compliance with requirements, the qualification test will be stopped and the applicant informed of their options.

After completing the welding, all assemblies will be marked and returned to the tester. A separate time will be scheduled to return the test specimens.

NOTIFICATION OF LABORATORY TEST RESULTS

Testing personnel will evaluate the test specimens and inform the tester of the results. If test specimens are returned during non-scheduled times, the test results will be available within 5 working days. The welder must still return in order to receive a welder card. No welder cards will be mailed.

SUCCESSFUL COMPLETION OF QUALIFICATION

Applicants successfully completing the entire test as described herein will be required to sign the:

[Field Welder Agreement](#) and then they will be issued their "Welder Operator Certification" card. An example Field Welder Agreement is at the end of this document.

FAILURE OF QUALIFICATION TEST

An applicant failing one or more of the qualification test position/types (3F, 4F, 2G, 3G or 4G) fails to become qualified as a Field Welder.

An applicant failing only one of the position/types must retest within one month by welding two assemblies of the one position/type which they failed. Both retests must pass. Failure to retest within one month shall be considered as failure of the retest.

An applicant failing two or more of the position/types or an applicant failing one of the position/types and then failing one or both of the retests on the position/types may not retest again for 90 days. At this time a new welding test must be requested. No credits will be given for previously passed sections. If the welder fails this test a second time they must wait 180 days to take the test again. All subsequent tests to the first retest will be at 180 day intervals.

REVOCAION OF FIELD WELDER CERTIFICATION OF QUALIFICATION

Failure to comply with the Field Welder Agreement may result in the immediate revocation of the Field Welder's "Welder Operator Certification" card by the Materials Division Engineer or his designated representative. This revocation will be for a minimum of one year. The Field Welder will then be required to re-qualify before the revocation is lifted. Two or more revocations or any improper welding which results in loss of life or serious injury may result in permanent revocation. All appeals of revocation should be addressed to the Oklahoma DOT Materials Division Engineer.

QUALIFICATION WELD TESTS

Tests described herein are the required **group** to determine the applicant's ability to produce sound welds and specific size fillet welds having acceptable profiles as defined by the code.

The qualification test consists of 4 sets of plate assemblies:

Assembly 1: Fillet Weld Test (3F & 4F)

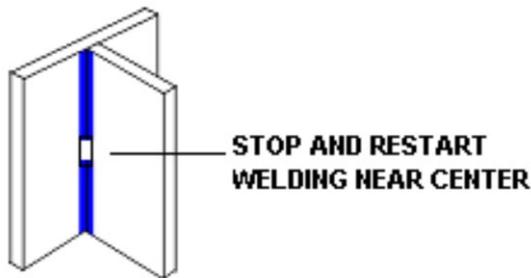
Joint Detail: ½ in. plates "T"

Welds: 5/16 in. fillet welds, both sides of same assembly

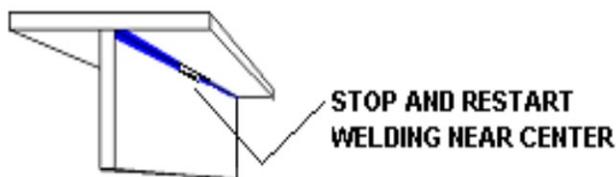
SMAW Electrode: E7018

Minimum preheat and interpass temperature 50 deg. F (10 deg. C)

Position for side 1: **3F - Plates vertical and axis of weld vertical



Position for side 2: **4F** - Overhead, one plate horizontal and one plate vertical, axis of weld horizontal



3F & 4F Combined Test Specimen: 1 macroetch specimen (etching both faces of interior cut section)

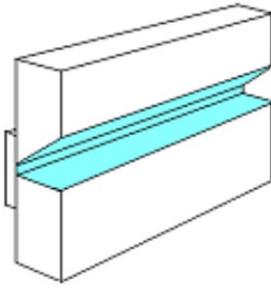
**This is typically the first qualification weld. It may not be undersize. It may be oversize by not greater than 1/16 in. Profile must meet code requirements. Upon visual inspection by the Materials Division, applicant will be instructed on how to proceed.

Note: The fillet weld break test is not conducted on the test specimen as described by the code since the overall test is not for fillet welds only, fusion is determined by macroetch and the balance of required tests are deemed adequate to qualify an applicant to perform fillet welds.

Assembly 2: Horizontal Groove Weld Test (2G)

Joint Detail: 1 in. plates, single-V-groove, 45 degree included angle, 1/4 in. root opening with backing
Weld: Single-V-Groove
SMAW Electrode: E7018
Minimum preheat and interpass temperature 70 deg. F (20 deg. C)

Position: **2G** - Plates vertical and axis of weld horizontal (90 deg. side of joint below the 45 deg. Side)

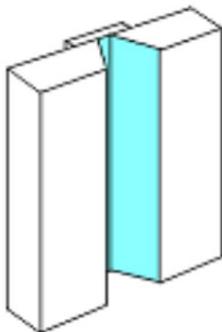


2G Test Specimens: 2 side-bend Specimens

Assembly 3: Vertical Groove Weld Test (3G)

Joint Detail: 1 in. plates, double-V-groove, 45 degree combined angle, 1/4 in. root opening with backing
Weld: Double-V-Groove
SMAW Electrode: E7018
Minimum preheat and interpass temperature 70 deg. F (20 deg. C)

Position: **3G** - Plates vertical and axis of weld vertical



3G Test Specimens: 2 side-bend specimens

Assembly 4: Overhead Groove Weld Test (4G)

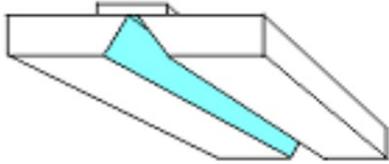
Joint Detail: 1 in. plates, double-V-groove, 45 degree combined angle, 1/4 in. root opening with backing

Weld: Double-V-Groove

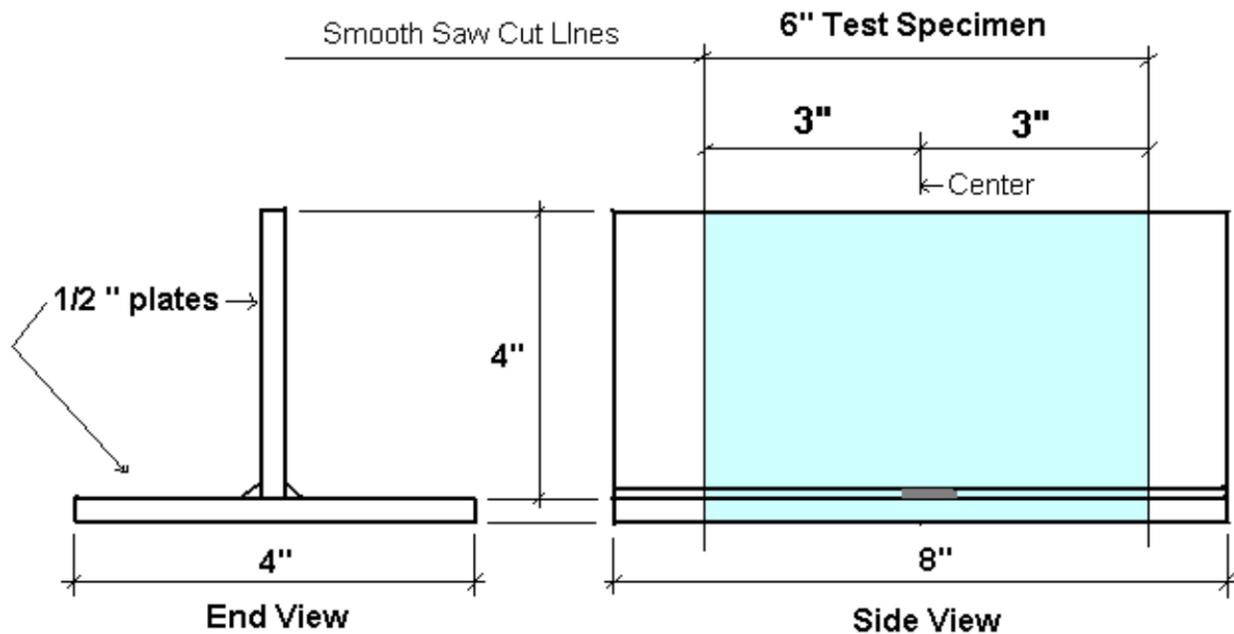
SMAW Electrode: E7018

Minimum preheat and interpass temperature 70 deg. F (20 deg. C)

Position: **4G** - Overhead, plates horizontal and axis of weld horizontal

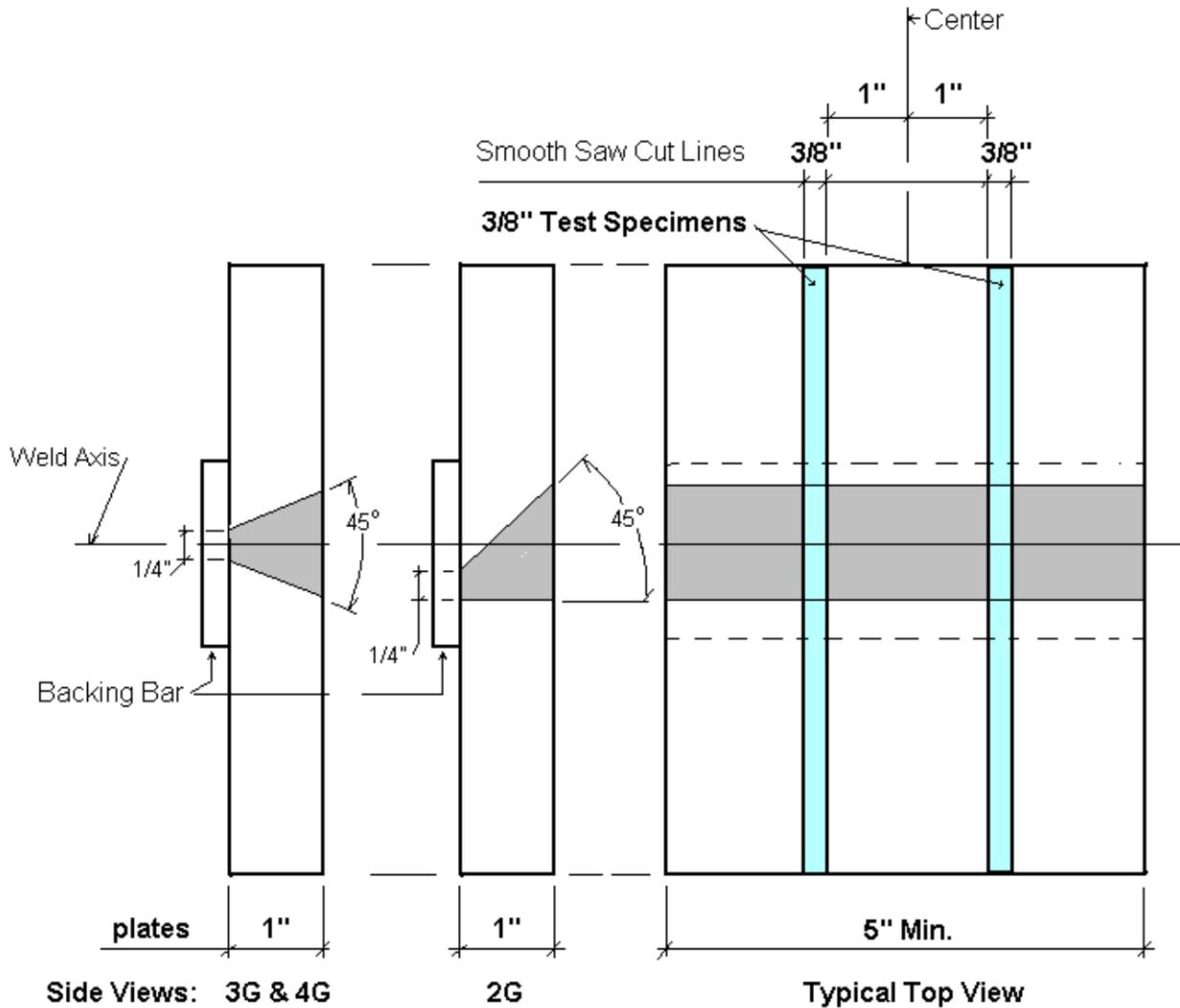


4G Test Specimens: 2 side-bend specimens



Preparation of Test Specimen for Assembly 1 (3F & 4F Tests)

- Notes:
- 1) Preparation of Test Specimen is the responsibility of applicant
 - 2) Cuts shall be made by saw and are to be smooth
 - 3) Grinding or bending will not be allowed
 - 4) Test Specimens with gouge marks or absent of Oklahoma DOT stamp will not be accepted
 - 5) Applicant is to return all pieces of the original assembly to Oklahoma DOT Materials
 - 6) Specimens shall be tested by Oklahoma DOT Materials only
 - 7) Oklahoma DOT Materials maintains the tested specimens and they are not returned to the applicant



Preparation of Test Specimens for Assemblies 2, 3 and 4 (2G, 3G & 4G Tests)

- Notes:
- 1) Preparation of Test Specimens is the responsibility of applicant
 - 2) Cuts shall be made by saw and are to be smooth
 - 3) Grinding or bending will not be allowed
 - 4) Test Specimens with gouge marks or absent of Oklahoma DOT stamp will not be accepted
 - 5) Test Specimens are to be of uniform thickness 3/8" (+0" - 1/16")
 - 6) Backing bar is to be removed from the 3/8" Test Specimens by Oklahoma DOT Materials only
 - 7) Applicant is to return all pieces of the original assembly to Oklahoma DOT Materials
 - 8) Specimens shall be tested by Oklahoma DOT Materials only
 - 9) Oklahoma DOT Materials maintains the tested specimens and they are not returned to applicant



OKLAHOMA DEPARTMENT OF TRANSPORTATION Field Welder Agreement

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When performing work to Oklahoma Department of Transportation specifications, Field Welders are required to follow proper procedures as listed below:

1. Prior to welding, thoroughly clean, remove all paint, rust and loose scale.
2. Use a heating torch to drive off moisture, acquire proper preheat and maintain proper interpass temperatures.
3. Use *only* EXX18 electrodes, where XX designation is understood to mean the 70 series unless an alloy steel of higher strength is to be welded.
4. Have and use a suitable portable electrode oven on site.
5. Remove all slag after welding.
6. Follow proper welding procedures as required by ANSI/AASHTO/AWS D1.5 Bridge Welding Code (Current Edition)
7. Strike arcs within the weld zone. Avoid wayward arc strikes. When they accidentally occur, grind them off appropriately.
8. Do not use shortcuts.

I understand that failure to comply is cause for immediate revocation of the Field Welder certification of qualification issued to me by the Department.

Signature: _____ Date: _____

Printed Name: _____

Witnessed by: _____ Date: _____

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Materials & Testing**



Original will remain in the Materials Division,
Oklahoma Department of Transportation
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