

**North Carolina Department of
Transportation
Materials & Tests Unit (Metals Section)**



Field Welder Test Program

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Revision # 10

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1.0 Scope

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.

2.0 Minimum Requirements

Welders working on NCDOT projects must be a minimum of 18 years of age.

3.0 Weld Test Specifications and Reference Standards

NCDOT Standard Specifications for Roads and Structures January 2018
AASHTO/AWS D1.5M/D1.5:2020 Bridge Welding Code
AWS D1.1/D1.1M:2020 Structural Welding Code - Steel

These codes document the fit up, positioning, and acceptance criteria for the test coupons. The weld test will be administered to these specifications. Shielded Metal Arc Welding [SMAW] is currently the only welding process in which a contract field welder may be certified.

4.0 Weld Test Scheduling

The first step in the weld test process is to apply. Below is the link to the application:

<https://connect.ncdot.gov/resources/Materials/Pages/Materials-Tests-Unit-Field-Lab-Schools.aspx>

Click the green link that says: [Materials and Tests Unit Training Schools](#). Now click on the Register Now button at the top of the screen. Fill out the required information, then click next. Scroll through the classes and select the Field Welder Test Classifications that meets your job scope. Welder Test Classifications are explained in section 8 of this program.

Submit the completed application. Online credit card payments are the only form of payment accepted. Once your payment has been processed you will receive an email.

The weld test proctor will contact you, by email, once they receive notification of the accepted application. All weld tests are by appointment only. The test proctor will let you know the earliest available days for testing. If the options given do not work with your schedule, let the test proctor know. The test day must be confirmed, within 48 hours, or the day may no longer be available. Welders should not show up without confirming a test day.

5.0 NCDOT Welder Testing Facility

The weld test is conducted in our shop. We have for use; two Lincoln Electric welding machines, stands for holding the weld test coupons, several welding screens, and a work bench. We supply the plate coupons with backing bars and pipe coupons with backing rings. The plate and pipe coupons are pre-beveled.

For companies wanting to qualify multiple welders at one time, the space is limited, we typically only test 2 welders at a time.

Note: We do not have vending machines. You will need to bring your own drinks and food with you. *Smoking is permitted only in designated areas.*

Physical address

NCDOT, Division of Highways (Annex Building)
Materials and Tests Unit
490 Ward Blvd.
Wilson, NC 27893

Enter at the red arrow and drive around to the building in the red circle.



6.0 Identification, Tools, Equipment and Supplies Required for the Weld Test

- A. US state issued Driver's License or US state issued photo ID. **No other form of ID will be accepted. The ID must be official, photocopies are not allowed unless certified by the issuing agency.**
- B. Welding Machine - must have adequate power range to produce the amperage necessary to satisfy the WPS requirements. We have two Lincoln Electric welding machines that can be used, if needed.
- C. Metal hermetically sealed container of E7018 electrodes (3/32" or 1/8") – The department requires all electrodes used on NCDOT projects to be made in the USA and purchased in a metal hermetically sealed container.
- D. Electrode Oven – only required if you are using rods in which the container has been opened before arrival to the test facility.
- E. Welding helmets, gloves, safety glasses and any other PPE needed.
- F. Hand Wire Brush
- G. Chipping Hammer
- H. Clamps- used as an aid when tacking the coupons together.
- I. Gas Torch - used for preheating coupons to 50 °F prior to welding.
- J. Electric grinder with grinding discs and wire wheels - Grinders may be used for cleaning coupons prior to welding. Cleaning between root or intermediate weld passes shall be limited to hand chipping and hand brushing, or power wire brushing. **The use of power tools to perform chipping, grinding with a disc, or cutting on root or intermediate weld passes is not permitted during the welding test.**

7.0 Weld Test Fee

SIP Welder - \$250.00

Bridge Welder [Limited] - \$500.00

Bridge welder -\$500.00

All applicants must register on the [Materials and Tests Unit Training Schools](#) web page, as explained in section 4. Credit card payments are the only form of payment accepted. **Payments must be accepted and approved before a test date will be scheduled.**

Note: Once the payment has been processed, no refunds will be given.

8.0 Field Welder Test Classifications

A. SIP Welder

SMAW 1G - This test requires the technician to apply weld to a set of pre-beveled 3/8" thick x 3" x 7" plates that are joined to a 3/8" x 1" backing bar. The test coupon shall be in a fixed flat position. Rotating or moving the coupon is not permitted during testing.

Cleaning between root or intermediate weld passes shall be limited to hand chipping and hand brushing, or power wire brushing. The use of power tools to perform chipping, grinding with a disc, or cutting on root or intermediate weld passes is not permitted during the welding test.

Passing this test qualifies the technician to apply groove welds in the flat position on material that is 1/8" to 3/4" thick and fillet welds in the flat and horizontal positions on material that is 1/8" to unlimited thickness with backing, back gouging or both. *(This test is typically only used for welders working on the decking crew and/or related materials.)*

B. SIP Welder RETEST only

This is the same test as the SIP Welder test. This test is for welders that failed the SIP Welder test and would like to retest. Please review section 11.0 Failure of Qualification Test for more information on retesting.

C. Bridge Welder [Limited]

SMAW 3G/4G - This test requires the technician to apply weld to two sets of pre-beveled 3/8" thick x 3" x 7" plates that are joined to a 3/8" x 1" backing bar. The test coupons shall be in a fixed vertical and overhead positions. Rotating or moving the coupons is not permitted during testing. The technician must pass the vertical and overhead positions to receive a qualified status.

Cleaning between root or intermediate weld passes shall be limited to hand chipping and hand brushing, or power wire brushing. The use of power tools to perform chipping, grinding with a disc, or cutting on root or intermediate weld passes is not permitted during the welding test.

Passing this set of tests qualifies the technician to apply fillet welds on material that is 1/8" to unlimited thickness and groove welds on material that is 1/8" to 3/4" thick (including pipe that is 24" or greater in diameter) in any position with backing, back gouging, or both.

D. Bridge Welder [Limited] RETEST only

This is the same test as the Bridge Welder [Limited] test. This test is for welders that failed the Bridge Welder [Limited] test and would like to retest. Please review section 11.0 Failure of Qualification Test for more information on retesting.

E. Bridge Welder

SMAW 6G - This test requires the technician to apply weld to a set of pre-beveled 6" diameter schedule 80 pipes that are joined by a pre-fabricated backing ring. The test coupon is mounted on a 45° angle and shall be in the fixed position during the weld test. Rotating or moving the coupon is not permitted during testing.

Cleaning between root or intermediate weld passes shall be limited to hand chipping and hand brushing, or power wire brushing. The use of power tools to perform chipping, grinding with a disc, or cutting on root or intermediate weld passes is not permitted during the welding test.

Passing this test qualifies the technician to apply fillet and groove welds on pipe or plate in any position on material that is 3/16" to unlimited thickness (including pipe that is 4" to unlimited diameter) with backing, back gouging, or both.

F. Bridge Welder RETEST only

This is the same test as the Bridge Welder test. This test is for welders that failed the Bridge Welder test and would like to retest. Please review section 11.0 Failure of Qualification Test for more information on retesting.

Note: All weld tests classifications must be completed within the 4-hour time frame.

9.0 Testing and Acceptance

It is important to keep in mind, this is a test. The test proctor will assist with basic guidance related to coupon fit up and positioning, beyond that, it is entirely up to the welder to complete the test. It is recommended the welder study and practice, prior to testing, as needed.

Weld testing begins at 8:00 AM and ends at 12:00 Noon.

Each coupon will be visually inspected in accordance with the applicable AWS D1.5 Bridge Welding Code or AWS D1.1 Structural Welding Code; during the welding operation and after the welding operation is complete. The welder should carefully inspect the coupon and assure the welds are satisfactory and confirm the test is complete, no guidance will be given. Once the welder confirms the weld test is complete, the final visual inspection will be performed. No further welding will be allowed on the coupon. Should the welds not meet the code requirements, during the welding operation or after the welding operation is complete, the welder will be informed of their options at the test proctor's discretion.

The visually accepted test coupons will be destructive tested by guided bend testing or non-destructive tested by radiographic testing. Acceptance is based on criteria of the applicable AWS D1.5 or AWS D1.1 welding code. The welder will be notified, by email, of the test results once available. **Due to our work load this process can take several days.**

10.0 Successful Completion of the Qualification Test

A Technician Certification Card issued by the NCDOT Materials and Tests Unit will be mailed to the welder's personal address. This card contains a 2D barcode which can be scanned by a smartphone or computer barcode reader to instantly display the current certifications. The welder must have this card and a US state issued photo ID with them anytime they are welding on an NCDOT project. Verification of the technician's certification is required on all NCDOT projects.

Below is a link you can use to verify certifications. Enter the technician's name or NCDOT technician number and click search. Then click on the welder's name to see the details of the certification.

<https://apps.ncdot.gov/vendor/approvedproducts/Technician.aspx>

Field Welder Certification is valid for 5 years, assuming compliance with applicable specifications is maintained.

11.0 Failure of Qualification Test

Note: The normal weld test fee rate applies for each retest.

A welder who fails the SIP welder test plate, both Bridge Welder [Limited] test plates, or the Bridge Welder pipe test can retest in accordance with one of the two options below:

- A. An immediate retest may be made consisting of two test welds of each position failed. Both test welds must pass.
- B. A complete retest of only the position failed shall be made provided there is evidence that the welder has had further training or practice.

A welder who fails only one of the Bridge Welder [Limited] test positions is required to retest within one month in accordance with options above. Not retesting in one month is considered a complete test failure and both test weld positions will need to be completed during the retest.

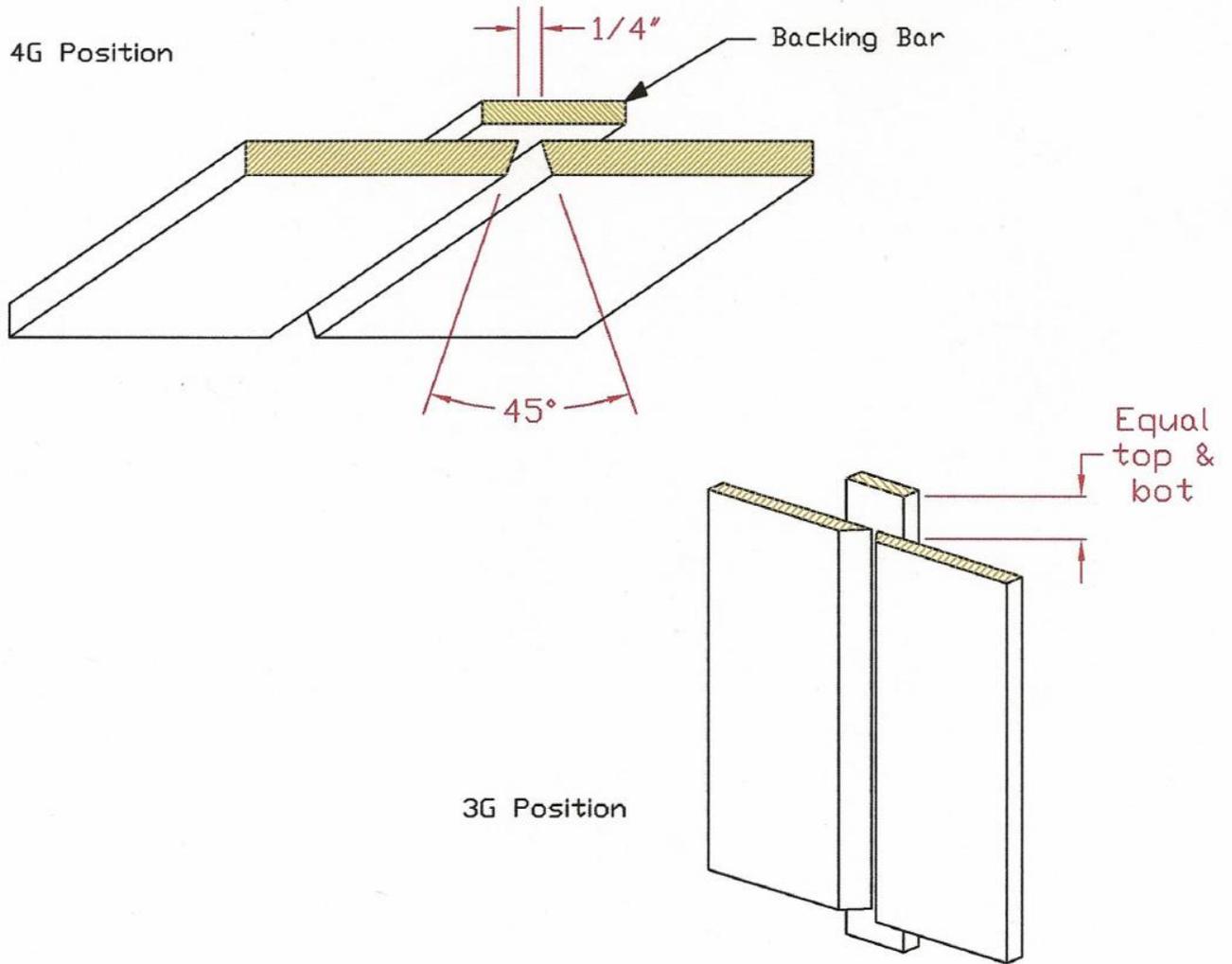
If the welder fails a retest, another weld test will not be scheduled for 90 days. If a welder fails this retest, another weld test will not be scheduled for 180 days. For the Bridge Welder [Limited] classification, at the 90 days or 180 days intervals, welders shall test in the vertical and overhead positions, regardless of the positions failed.

12.0 Revocation of the Field Welder Certification

A welder who fails to comply with the applicable codes and/or specifications on an NCDOT project, may have their certification revoked. This revocation can either be temporary or permanent, based on the severity of the issue or at the discretion of the State Materials Engineer and/or his designated representatives.

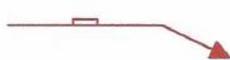
13.0 Test Coupon Drawings

3/8" Test Plate Drawing

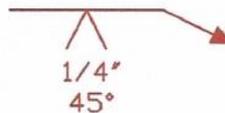


3G-4G GROOVE WELD
JOINT DETAILS

Weld Symbol definitions per AWS A2.4:2007

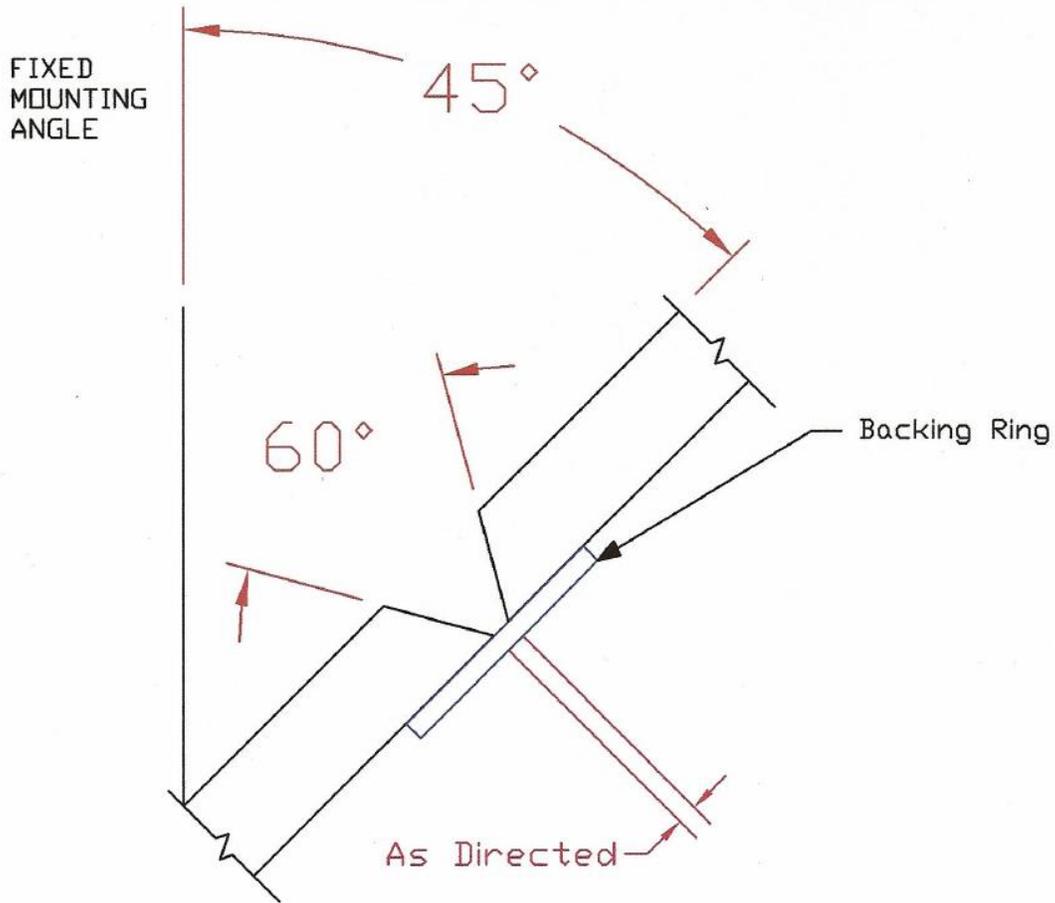


BACKING
BAR



BEVEL WELD, ARROW
SIDE with BEVEL ANGLE
& ROOT OPENING

Pipe Test Drawing



6G PIPE JOINT DETAILS

Weld Symbol definitions per AWS A2.4:2007



BACKING
BAR



WELD ALL
AROUND



BEVEL WELD, ARROW
SIDE with BEVEL
ANGLE