



# REFERENCE SYLLABUS

FOR

## CLASS "A" PRESSURE WELDER CERTIFICATE OF QUALIFICATION EXAMINATION





## **INTRODUCTION**

To obtain a Class “A” Pressure Welder Certificate of Qualification an applicant must successfully pass a welding examination. The welding examination is a performance qualification test complying with Section 41 of the Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation. This syllabus details the requirements and standards for the performance qualification test which an applicant for a Class “A” Pressure Welder Certificate of Qualification must pass.

## **ELIGIBILITY**

In this section “ITA” means the Industry Training Authority established under the Industry Training Authority Act:

An applicant for a Class “A” Pressure Welder Certificate of Qualification must hold one of the following:

- a) a Welder Certificate of Qualification with a Red Seal Endorsement issued by ITA,
- b) a Welder Level B Certificate of Qualification issued by ITA with or without a Red Seal Endorsement,
- c) a Welder Level A Certificate of Qualification issued by ITA with or without a Red Seal Endorsement,
- d) a Welder trade qualification with or without a Red Seal Endorsement issued by an apprenticeship authority in another jurisdiction of Canada,
- e) a Canadian credential authorizing the holder to perform pressure welding in another Canadian jurisdiction, that is equivalent to the regulated work the holder of a pressure welder’s certificate of qualification is authorized to perform under the Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation.

An applicant for a Class “A” Pressure Welder Certificate of Qualification must complete and pass the performance qualification test outlined in this syllabus.

## **EXAMINATION ADMINISTRATION**

The Class “A” Pressure Welder Certificate of Qualification performance qualification test shall be carried out at a Recognized Test Administrator location accepted by Technical Safety BC. The testing shall be conducted and administered by a Safety Officer who will complete the examination record and enter the test results in the ITA Welder’s Log book upon successful completion of the test.

Note: A list of the Recognized Test Administrators locations is posted on the Technical Safety BC web site. All equipment used for testing must be of known calibration and a



bend test jig in accordance with ASME Section IX must be available. All equipment must be acceptable to the Safety Officer administering the test.

## **APPLICATION TO UNDERTAKE EXAMINATION**

A candidate for examination shall, at least twenty one days before the examination date, submit a completed application form (FRM-1694) to Technical Safety BC, proof that they meet the eligibility requirements for a Class “A” Pressure Welder Certificate of Qualification performance qualification test and pay the specified fee.

After acceptance of the application by Technical Safety BC the candidate shall take the test at the specified Recognized Test Administrator location.

Candidates must show government issued photo identification to the Safety Officer before starting the test.

## **CLASS “A” PRESSURE WELDER CERTIFICATE OF QUALIFICATION EXAMINATION**

The following procedure outlines the manner in which the performance qualification test will be administered by a Safety Officer for the Class “A” Pressure Welder Certificate of Qualification examination.

### **Test Coupon**

The test coupon will be a 6 inch diameter schedule 80 carbon steel (P1 material) seamless pipe and prepared with a 32 degree bevel to a feather edge.

### **Test positions**

One-quarter (1/4) of the coupon circumference will be welded in the 2G position and the remaining portion in the 5G position.

### **Electrodes**

The electrodes used for the test shall be E-6010 ( 1/8” diameter ) for the root pass and E-7018 ( 3/32” & 1/8” diameters ) for the hot pass, fill and cap passes using the SMAW process.

Alternatively, the test coupon can be welded with an ER70S-2 (3/32” or 1/8” diameter) filler metal using the GTAW process with an SFA 5.12 classified tungsten electrode (3/32” or 1/8” diameter), 100% Argon shielding gas and no backing gas for the root pass. An E-7018 ( 3/32” & 1/8” diameters ) electrode using the SMAW process shall be used for the hot pass, fill and cap passes.



## **Examination Time**

Candidates will have 3.5 hours to prepare, tack and weld the test coupons and one (1) hour to prepare the bend specimens.

The performance test may be terminated at any stage of review, if it becomes apparent that the candidate does not have the required skill to produce satisfactory results or is taking an excessive length of time to complete any phase of the test.

## **Preparation and Tacking**

When preparing test coupons for tacking, the size of the root face (land) and the width of the root gap (spacing) shall be at the candidates' discretion. Four tack welds are to be made using the SMAW process with an E-6010 electrode or the GTAW process using an ER70S-2 filler metal and should be approximately  $\frac{1}{2}$ " to  $\frac{3}{4}$ " in length. All tack welds shall be of good quality, as they are considered part of the weld. After tacking the coupon, candidates may feather the tack.

## **Welding**

After the candidate completes tacking of the coupon, they will present it to the Safety Officer for evaluation. The Safety Officer will evaluate the quality of the tack welds and then mark the portion of the coupon that is to be welded in the 2G (horizontal) position with the remainder to be used for the 5G position weld.

After the Safety Officer's examination the coupon is positioned for welding in the 2G position. The candidate will then weld the horizontal (2G) root pass, using the SMAW process with an E-6010 electrode or the GTAW process using an ER70S-2 filler metal with the pipe axis in the vertical plane. When the candidate completes the 2G root pass, the coupon shall remain in the positioner and the weld shall be visually inspected by the Safety Officer. The root pass shall be of uniform width and the penetration shall be at least flush with a maximum reinforcement not exceeding  $\frac{1}{8}$ " and free of any undercut, grapes, lack of fusion or porosity.

Providing the 2G root pass is acceptable, the coupon shall then be placed in the 5G position (pipe axis in the horizontal plane) with one end of the completed 2G root placed at the top (12:00). The Safety Officer will mark the position and height of the coupon. Once the coupon is positioned for welding, the marked coupon and positioner shall not be moved. The candidate will then weld the 5G portion of the root pass using the SMAW process with an E-6010 electrode with an upward progression or the GTAW process using an ER70S-2 filler metal with an upward progression. The coupon shall remain in the positioner and the weld shall be visually inspected by the Safety Officer upon completion of the 5G root pass. The root pass shall be of uniform width and the penetration shall be at least flush with a maximum reinforcement not exceeding  $\frac{1}{8}$ " and free of any undercut, grapes, lack of fusion or porosity.



If the root pass is acceptable to the Safety Officer, the candidate shall complete the hot pass, fill and cap passes of the 5G weld using the SMAW process with an E-7018 electrode with an upward progression and weave method. The coupon shall remain in the positioner and the weld shall be visually inspected by the Safety Officer upon completion of the 5G hot pass, fill and cap passes. The cap shall be of uniform width, at least flush with a maximum reinforcement not exceeding 1/8" and free of any undercut, grapes, lack of fusion, porosity or arc strikes.

If the 5G hot pass, fill and cap passes are acceptable to the Safety Officer, the coupon will then be repositioned (axis in vertical plane) to complete the 2G position hot pass, fill and cap using an E-7018 electrode using a stringer bead method. The coupon shall remain in the positioner and the weld shall be visually inspected by the Safety Officer upon completion of the 2G hot pass, fill and cap passes. The cap shall be of uniform width, at least flush with a maximum reinforcement not exceeding 1/8" and free of any undercut, grapes, lack of fusion, porosity or arc strikes.

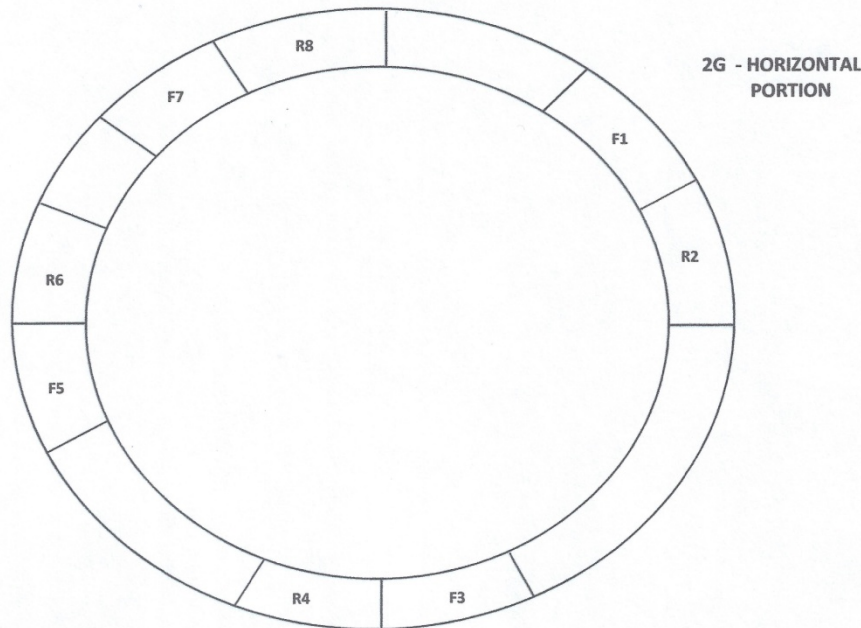
### **Bend Testing Specimens**

Four face bend and four root bend test specimens are required for this combined position. Test specimens will be marked on the coupon by the Safety Officer as per the following sketch. The specimens should be approximately 1.5" in width and ground flush on both sides with edges de-burred. Candidates may radius the corners of the specimens to 1/8" maximum.

Excessive grinding that reduces the thickness of the specimens below the nominal thickness (on either side) shall result in the test being considered as a failure.



## Bend Specimens Locations



- F1=Face Bend (Horizontal)
- R2=Root Bend (Horizontal)
- F3=Face Bend (Overhead)
- R4=Root Bend (Overhead)
- F5=Face Bend (Vertical)
- R6=Root Bend (Vertical)
- F7=Face Bend (Flat)
- R8=Root Bend (Flat)

Each bend test specimen shall be die stamped by the Safety Officer for positive identification of the bend test specimen removal location in accordance with the above diagram. In addition, the Safety Officer shall stamp each bend test specimen with a “Test identification” number identifying the welder who welded the test coupon.

### Standards for the Evaluation of Bend Test Specimens

The guided bend tests shall have no open discontinuity in the weld or heat affected zone exceeding 1/8” measured in any direction on the convex surface of the specimen. Open defects occurring on the corners of the specimen during bending shall not be considered unless there is evidence that they result from slag inclusions, lack of fusion, or other internal defects.

The failure of any bend specimen shall be considered as a complete failure of the test. Candidates who successfully complete the examination shall be issued a Pressure Welder Certificate of Qualification.



## **Candidates Failing the Examination**

A candidate failing to pass the examination for a Class “A” Pressure Welder Certificate of Qualification on their initial attempt may not take the examination again until 30 days after the previous examination.

If a candidate fails to pass the examination on their second attempt, or any subsequent attempt the candidate may not take the examination again until 60 days after the previous examination.

## **Candidates Passing the Examination**

The Safety Officer shall complete and certify the Examination Record (FRM-1703) for each candidate passing the examination.

The Safety Officer shall record the results in the ITA Welder’s Log Book as follows: date of examination, WPQT number, welding processes, Class “A” PW C of Q Exam-Pass followed by the Safety Officers name, identification number and signature.

The Safety Officer shall submit a copy of the completed Examination Record to Technical Safety BC who will issue a Class “A” Pressure Welder’s Certificate of Qualification wallet card to the successful candidate. A Class “A” Pressure Welder’s Certificate of Qualification is valid for three years.

The holder of the Certificate of Qualification must successfully complete a re-qualification performance qualification test to renew the certificate.

The Safety Officer shall retain a copy of the completed and certified Examination Record and provide the candidate with the original Examination Record as interim proof of passing the examination so they may proceed to complete other performance qualification tests.

## **Performance Qualification Testing**

The Class “A” Pressure Welder Certificate of Qualification performance qualification test shall not be used for production pressure welding.

When the Candidate has received their Class “A” Pressure Welder Certificate of Qualification Examination Record from the Safety Officer they will be eligible to complete additional performance qualification tests following any Welding Procedure Specification registered with Technical Safety BC for any welding process.

All performance qualification tests shall be administered by a Recognized Test Administrator. All performance qualification tests require a QW-484 form certified by the Examiner who will enter the performance qualification test into the Welders Log Book issued by Industry Training Authority.



There is no requirement to submit the QW-484, application form or registration fees to Technical Safety BC for additional performance qualification tests. A copy of the QW-484 shall be retained by the Recognized Test Administrator and Licensed Contractor.

A current Class “A” Pressure Welder Certificate of Qualification must be available at the job site where pressure welding is being performed in addition to the Welders Log Book. The continuity section of the Welders Log Book must be current in accordance with the requirements of ASME Section IX for the applicable welding process.