

## WELDING PROGRAM

This procedure shall be used for the operation of the welding activities in the Facilities and Engineering Services Group at the Ames Laboratory.

### 1.0 APPROVAL RECORD

- Reviewed by: Document Control Coordinator (Amy Tehan)
- Approved by: AWS Certified Welding Inspector (Paul Berge)
- Approved by: Manager, Facilities & Engineering Services (Mark Grootveld)
- Approved by: Assistant Manager, Facilities & Engineering Services (Terry Herrman)
- Reviewed by: Manager, Environment, Safety, Health & Assurance (Tom Wessels)
- Approved by: Chief Operations Officer (Mark Murphy)

The official approval record for this document is maintained in the Training & Records Management Office, 151 TASF.

### 2.0 REVISION/REVIEW INFORMATION

The revision description for this document is available from and maintained by the author.

### 3.0 PURPOSE AND SCOPE

This procedure shall be used to control all welding performed by personnel under the supervision of Facilities and Engineering Services. It governs welder qualification, design, manufacture and inspection of welds and delineates necessary records and storage means thereof. It is written to be in conformance with the welding design, performance and inspection policy statement included in the ESH&A Program Manual (10200.002).

#### 3.1 Definitions

**ANSI** - American National Standards Institute

**ASME** - American Society of Mechanical Engineers

**ASNT** - American Society for Nondestructive Testing

**AWS** - American Welding Society

**Brazing Procedure Specification (BPS)** - A written brazing procedure to provide direction to the brazer or brazing operator in making production joints.

**Essential Variables** - Welding variables that if changed alter the weldability and require requalification of PQR and WPS.

**Procedure Qualification Record (PQR)** - Record of welding or brazing data and variables recorded during welding of a test coupon. It also contains test results of a tested specimen.

**Requalification Period (RP)** - Time period commencing 30 days before the expiration of a welder's qualification to a WPS.

**Weld(s), welder, welding** shall also mean braze(s), brazing or brazing.

**Welder** - The person performing the welding operation or operating the equipment performing the weld in the case of semi-automatic or automatic welding equipment.

**Welder Certification** - Determining, verifying and attesting in writing to qualifications of a welder to a WPS.

**Welder Qualification** - Series of weld tests given to welders to be qualified for a specific WPS.

**Welder Requalification Test** - A test given to welders when qualification to a given WPS expires.

**Welding Procedure Specification (WPS)** - A written, qualified welding procedure prepared to provide direction in making production welds.

## 4.0 PREREQUISITE ACTIONS & REQUIREMENTS

### 4.1 Certification, Qualification and Training

#### 4.1.1 Design

Welding design shall be done using only qualified weld joints and procedures as defined by AWS and ASME and shall be checked and verified by the responsible Engineer.

#### 4.1.2 Personnel Qualification

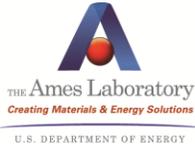
Welding personnel shall be qualified in accordance with AWS and ASME codes. Weld inspection shall be performed by personnel certified by AWS as Certified Welding Inspector. Weld inspections using techniques other than visual, proof or destructive tests shall be performed by personnel qualified by ASNT as Level 2 or above in that technique.

#### 4.1.3 Training

Annual training shall be performed for all personnel involved in the welding process to ensure knowledge of and compliance with this procedure.

### 4.2 Safety

Personnel operating or in close proximity during operation of welding equipment shall be required to abide by the precautions as outlined in ANSI/AWS Z49.1. By its nature, welding equipment involves the use of electrical power sufficient to cause electrocution and temperatures sufficient to cause severe burns. Eye protection sufficient to safeguard personnel from the extremely bright light and concurrent infrared radiation during welding shall be made available to all affected personnel and shall be used as conditions dictate. Many welding operations, particularly those involving shielding fluxes, may generate irritating and/or toxic fumes and smoke. Those operations shall be



|                       |                               |                       |           |
|-----------------------|-------------------------------|-----------------------|-----------|
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performed under conditions with sufficient venting to protect the operator. If any doubt exists, contact the Ames Laboratory Environment, Safety, Health, and Assurance Group for assistance in determining safe operating conditions.

## 5.0 PERFORMANCE

### 5.1 Exemption from Inspection

Welding jobs performed by Facilities & Engineering Services personnel shall be inspected except in those cases designated by the Design Engineer. Jobs not requiring inspection must carry the signature of the responsible Design Engineer eliminating inspection and shall be exempted from the remainder of this procedure.

### 5.2 Welding Procedure Specifications (See Attachment 1)

#### 5.2.1 Development

The Welding Procedure Specifications and Brazing Procedure Specifications shall be developed, written and revised by the Welding Inspector according to AWS and ASME codes. If a WPS does not exist for the job to be done the Welding Inspector shall be contacted for the development of an applicable WPS.

#### 5.2.2 Availability

The WPS shall be made available for the welder to read by his supervisor.

#### 5.2.3 Essential Variable Changes

When changes are made to the essential variables of a WPS (as defined by AWS and/or ASME) it shall be requalified and reissued with new revision number.

#### 5.2.4 Non-Essential Variables Changes

When changes are made in non-essential variables the WPS is changed and reissued with a new revision number.

#### 5.2.5 Revision Indication

Revisions in procedures will be marked with the letter R in the margin. Descriptions of revisions will be transmitted with revised procedures.

#### 5.2.6 Distribution

Distribution of WPS's and revisions will be directed by the Welding Inspector.

### 5.3 Procedure Qualification Record (PQR)

#### 5.3.1 Governing Codes

Qualification and certification of all PRQ(s) shall be in accordance with requirements of ASME, Section IX and/or AWS codes.

#### 5.3.2 Qualification

Each WPS shall be qualified by welding of test coupons and testing of specimens.

#### 5.3.3 Recording of Data and Results

|                       |                               |                       |           |
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Welding and brazing data and test results shall be recorded on the appropriate Procedure Qualification Record (PQR) form. Attachments 2 and 3 are typical of the PQR forms used for welding and brazing, respectively.

#### 5.3.4 Record-keeping

The PQR(s) are certified and filed under direction of the Welding Inspector.

#### 5.3.5 Essential Variable Changes

Changes made to essential variables of a WPS require that the PQR be requalified by steps 4.3.1, 4.3.2, and 4.3.3.

#### 5.3.6 Issuance

After qualification and certification of the PQR, the WPS may be issued for use.

### 5.4 **Welder Qualification**

#### 5.4.1 Governing Codes

All welding qualification tests shall be conducted in accordance with ASME, Section IX and/or AWS codes.

#### 5.4.2 Necessity of Testing

A Welder Qualification Test is necessary when a job requires welding to a WPS that the welder has not qualified under. This test shall require the welder to weld test coupons as specified by the ASME and/or AWS codes.

#### 5.4.3 Testing

Weld test coupons will be subjected to visual examination by the Welding Inspector. Weld coupons that pass visual examination will be tested by destructive methods in accordance with ASME, Section IX and/or AWS codes. In lieu of destructive testing, weld test coupons for welder qualification may be examined by 100% radiographic inspection. Welders whose coupons fail examination will be given further training before retesting or will be required to make two (2) good retest coupons. Retest coupons will be reexamined using the same inspection techniques that failed the previous coupon.

#### 5.4.4 Record Maintenance

Records will be maintained by the Welding Inspector for successful tests on form Record of Welder or Welding Operator Qualification Test (Attachment 4). For brazing, the Brazing Performance Qualification Record (Attachment 5) will be used. The completed form is signed by the Welding Inspector, certifying the results of the test.

#### 5.4.5 Certification Responsibility

Welders and their supervisors are responsible for keeping certification current.

#### 5.4.6 Performance Qualification

The performance qualifications of a welder or welding operator shall be affected under the following conditions:

- No Work Performed: When the welder has not welded to a procedure during a period of 6 months or more, qualification for that procedure shall be

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expired. When the welder has not welded to any procedure during a period of 6 months, qualification to all procedures shall be expired.

- **Unsatisfactory Work:** When there is a specific reason to question the welder's ability to make welds that meet the specification, the qualification that supports the welding in question shall be considered expired.
- **Extension of Qualification:** The welder's qualification for a specific procedure is extended for an additional 6 months whenever the Welding Inspector inspects a job that demonstrates the welder's ability to meet that welding procedure specification.

#### 5.4.7 Renewal of Qualification

Renewal of qualification for conditions identified in 4.4.6.1 or 4.4.6.2 above, may be made by performing a Welder Requalification Test. The test shall include a joint (plate or pipe) on any thickness, position or material within the limits of the procedure to reestablish the welder's or welding operator's qualification for any thickness, position or material for the procedure for which he/she was previously qualified.

#### 5.4.8 Determination of Appropriate WPS

The supervisor-in-charge (SIC) determines which WPS the welder will need for the work to be done. The SIC will contact the Welding Inspector to schedule the welder for Qualification/Certification Tests if additional WPS are required.

#### 5.4.9 Record Maintenance

Records of jobs will be maintained by clerical staff of the Facilities & Engineering Services Group under the direction of the Welding Inspector.

### 5.5 **Welding Inspection**

#### 5.5.1 Notification of Need

The Welding Inspector shall be notified by the SIC or Engineer responsible for the work that is to be done during the planning stages. This will ensure time for verification of base materials, gathering of material certifications, obtaining proper weld filler materials and qualification of the welder.

#### 5.5.2 Availability of Design Materials

The Engineer will provide a complete set of drawings, material certifications or other documentation for items purchased from outside vendors and specifications which shall be made available to the Welding Inspector at a reasonable time before the job begins.

#### 5.5.3 Examination of Materials

The Welding Inspector shall examine base and weld filler materials to determine that they meet the job requirements, proper bevel, cleanliness, purge and setup.

#### 5.5.4 Inspection Type

|                       |                               |                       |           |
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The Welding Inspector shall examine welds as specified on design drawings: visual, proof, dye-penetrant, radiography, etc. Inspections involving techniques other than visual or proof will be performed by personnel certified by ASNT as Level 2 or above for that technique.

#### 5.5.5 Reporting

The Welding Inspector will indicate on the job record the acceptance of the weld and the job record (e.g., the engineered drawing) will be maintained by Facilities & Engineering Services.

#### 5.5.6 Work Scheduling

The SIC will be responsible to inform the Welding Inspector of the work schedule and that work will stop at hold points designated by the Welding Inspector when required.

## 6.0 ADDITIONAL INFORMATION

### 6.1 References

ANSI/AWS D1.1/D1.1M:2006, Structural Welding Code-Steel  
ANSI/AWS D1.2/D1.2M:2003, Structural Welding Code-Aluminum  
ANSI/AWS D1.6/D1.6M:2007, Structural Welding Code-Stainless Steel  
ANSI/AWS Z49.1, Safety in Welding and Cutting  
ASME Pressure Vessel Code Section VIII-Pressure Vessels  
ASNT SNT-TC-1A Recommended Practice for Nondestructive Testing  
ASME Pressure Vessel Code Section IX-Welding and Brazing Qualifications

### 6.2 Attachments

Attachment 1 - Welding Procedure Specification  
Attachment 2 - Procedure Qualification Record (welding)  
Attachment 3 - Procedure Qualification Record (brazing)  
Attachment 4 - Record of Welder or Welding Operator Qualification Test  
Attachment 5 - Brazing Performance Qualification Record

**AMES LABORATORY-USDOE  
WELDING PROCEDURE SPECIFICATION**

|         |        |
|---------|--------|
| WPS No. | SAMPLE |
| Page    | 1 of 2 |

WPS No. \_\_\_\_\_ By \_\_\_\_\_ Date \_\_\_\_\_  
 Authorized By \_\_\_\_\_ Date \_\_\_\_\_ Revision \_\_\_\_\_  
 Welding Process(es) \_\_\_\_\_ Type:  Manual  Machine  Semi-Auto  Automatic  
 Supporting PQR No(s) \_\_\_\_\_

**JOINTS**  
 Type \_\_\_\_\_  
 Single Weld  Double Weld   
 Backing \_\_\_\_\_  
 Backing Material \_\_\_\_\_  
 Root Opening \_\_\_\_\_  
 Root Face Dimension \_\_\_\_\_  
 Groove Angle \_\_\_\_\_ Radius(J-U) \_\_\_\_\_  
 Back Gouging \_\_\_\_\_

\_\_\_\_\_

**BASE METALS**  
 Specifications \_\_\_\_\_  
 Type or Grade \_\_\_\_\_  
 Thickness \_\_\_\_\_  
 Groove \_\_\_\_\_ - \_\_\_\_\_  
 Fillet \_\_\_\_\_ - \_\_\_\_\_

**POSITION**  
 Groove \_\_\_\_\_ Fillet \_\_\_\_\_  
 Vertical Progression  Up  Down

**FILLER METALS**  
 AWS Spec \_\_\_\_\_  
 Class. \_\_\_\_\_

**ELECTRICAL CHARACTERISTICS**  
 Transfer Mode (GMAW)  Short-Circuiting  
 Globular  Spray  
 Current  AC  DCEP

**SHIELDING**  
 Flux \_\_\_\_\_  
 Electrode-Flux Class \_\_\_\_\_  
 Gas \_\_\_\_\_  
 Composition \_\_\_\_\_  
 Flow Rate \_\_\_\_\_  
 Gas Cup Size \_\_\_\_\_

**TECHNIQUE**  
 Stringer or Weave Bead \_\_\_\_\_  
 Multi or Single Pass (per side) \_\_\_\_\_  
 Number of Electrodes \_\_\_\_\_  
 Electrode Spacing  
 Longitudinal \_\_\_\_\_  
 Lateral \_\_\_\_\_  
 Angle \_\_\_\_\_  
 Contact Tube to Work Dis. \_\_\_\_\_  
 Peening \_\_\_\_\_

**PREHEAT**  
 Preheat Temp., Min. \_\_\_\_\_  
 Interpass Temp., Min \_\_\_\_\_ Max \_\_\_\_\_  
 Preheat Note  
 \_\_\_\_\_  
 \_\_\_\_\_

**POSTWELD HEAT TREATMENT**  
 PWHT Required \_\_\_\_\_  
 Temperature \_\_\_\_\_ Time \_\_\_\_\_





## AMES LABORATORY - USDOE PROCEDURE QUALIFICATION RECORD

|         |        |
|---------|--------|
| PQR No. | SAMPLE |
| Page    | 2 of 3 |

| TESTS   |           |           |         |                          |                            |                                 |
|---|-----------|-----------|---------|--------------------------|----------------------------|---------------------------------|
| <b>TENSILE TESTS</b>  |           |           |         |                          |                            |                                 |
| Specimen No.  | Width     | Thickness | Area    | Ultimate Total Load (lb) | Ultimate Unit Stress (psi) | Character of Failure & Location |
| _____   | _____     | _____     | _____   | _____                    | _____                      | _____                           |
| _____   | _____     | _____     | _____   | _____                    | _____                      | _____                           |
| _____   | _____     | _____     | _____   | _____                    | _____                      | _____                           |
| _____   | _____     | _____     | _____   | _____                    | _____                      | _____                           |
| _____   | _____     | _____     | _____   | _____                    | _____                      | _____                           |
| _____   | _____     | _____     | _____   | _____                    | _____                      | _____                           |
| <b>GUIDED-BEND TESTS</b>  |           |           |         |                          |                            |                                 |
| Specimen No.  | Bend Type | Result    | Remarks |                          |                            |                                 |
| _____   | _____     | _____     | _____   |                          |                            |                                 |
| _____   | _____     | _____     | _____   |                          |                            |                                 |
| _____   | _____     | _____     | _____   |                          |                            |                                 |
| _____   | _____     | _____     | _____   |                          |                            |                                 |
| _____   | _____     | _____     | _____   |                          |                            |                                 |
| <b>VISUAL INSPECTION</b>  |           |           |         |                          |                            |                                 |
| Appearance _____  |           |           |         |                          |                            |                                 |
| Undercut _____  |           |           |         |                          |                            |                                 |
| Piping Porosity _____   |           |           |         |                          |                            |                                 |
| Convexity _____   |           |           |         |                          |                            |                                 |
| Test Date _____   |           |           |         |                          |                            |                                 |
| Witnessed By _____  |           |           |         |                          |                            |                                 |
| <b>OTHER TESTS</b>  |           |           |         |                          |                            |                                 |
| _____   |           |           |         |                          |                            |                                 |
| _____   |           |           |         |                          |                            |                                 |
| _____   |           |           |         |                          |                            |                                 |
| _____   |           |           |         |                          |                            |                                 |
| _____   |           |           |         |                          |                            |                                 |
| <b>RADIOGRAPHIC-ULTRASONIC EXAM</b>   |           |           |         |                          |                            |                                 |
| RT - Report No. _____ Result _____  |           |           |         |                          |                            |                                 |
| UT - Report No. _____ Result _____  |           |           |         |                          |                            |                                 |
| <b>FILLET WELD TEST RESULTS</b>   |           |           |         |                          |                            |                                 |
| Min. Size Multiple Pass Macroetch   |           |           |         |                          |                            |                                 |
| 1. _____ 2. _____ 3. _____  |           |           |         |                          |                            |                                 |
| Max. Size Multiple Pass Macroetch   |           |           |         |                          |                            |                                 |
| 1. _____ 2. _____ 3. _____  |           |           |         |                          |                            |                                 |
| <b>ALL-WELD-METAL TENSION TEST</b>  |           |           |         |                          |                            |                                 |
| Tensile Strength (psi) _____  |           |           |         |                          |                            |                                 |
| Yield Point/Strength (psi) _____  |           |           |         |                          |                            |                                 |
| Pct Elongation in 2 in. _____   |           |           |         |                          |                            |                                 |
| Laboratory Test No. _____   |           |           |         |                          |                            |                                 |
| Welder's Name _____ Clock # _____ Stamp # _____   |           |           |         |                          |                            |                                 |
| Tests Conducted By _____ Laboratory _____   |           |           |         |                          |                            |                                 |
| Test Number _____ Per _____ Code Date _____   |           |           |         |                          |                            |                                 |
| 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 5, Part B of ANSI/AWS D1.1 - Structure Welding Code - Steel |           |           |         |                          |                            |                                 |
| Signed _____ Date _____   |           |           |         |                          |                            |                                 |
| Title _____   |           |           |         |                          |                            |                                 |

**AMES LABORATORY - USDOE  
PROCEDURE QUALIFICATION RECORD**

|         |        |
|---------|--------|
| PQR No. | SAMPLE |
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**GENERAL NOTES**

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**REMARK**

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**DRAWING**

PROCEDURE QUALIFICATION RECORD (Brazing)

BPQR No \_\_\_\_\_ Date \_\_\_\_\_ BPS No \_\_\_\_\_

Company \_\_\_\_\_

Brazers' Name and ID \_\_\_\_\_

Brazing Process \_\_\_\_\_ Manual \_\_\_\_\_ Mechanized \_\_\_\_\_ Automatic \_\_\_\_\_

Brazing Equipment \_\_\_\_\_

BRAZING CONDITIONS

BASE METAL:

Identification \_\_\_\_\_ BM No \_\_\_\_\_

Thickness \_\_\_\_\_ Preparation \_\_\_\_\_

Other \_\_\_\_\_

FILLER METAL:

FM No \_\_\_\_\_ AWS Classification \_\_\_\_\_

Form \_\_\_\_\_ Method of Application \_\_\_\_\_

FLUX: AWS Type \_\_\_\_\_ Other \_\_\_\_\_

ATMOSPHERE: AWS Type \_\_\_\_\_ Other \_\_\_\_\_

TEMPERATURE \_\_\_\_\_ TEST POSITION \_\_\_\_\_

TIME \_\_\_\_\_ CURRENT \_\_\_\_\_

FUEL GAS \_\_\_\_\_ TIP SIZE \_\_\_\_\_

POSTBRAZE CLEANING \_\_\_\_\_

POSTBRAZE HEAT TREATMENT \_\_\_\_\_

OTHER \_\_\_\_\_

JOINT: (Sketch on following page)

Type \_\_\_\_\_

Clearance \_\_\_\_\_

Other \_\_\_\_\_

\_\_\_\_\_

**TEST RESULTS**

BPQR No \_\_\_\_\_ Date \_\_\_\_\_

| VISUAL | Pass  | Fail  |
|--------|-------|-------|
| _____  | _____ | _____ |
| _____  | _____ | _____ |
| _____  | _____ | _____ |

| TENSION     |           |         | Pass  | Fail  |
|-------------|-----------|---------|-------|-------|
| Specimen No | UTS (psi) | Remarks |       |       |
| _____       | _____     | _____   | _____ | _____ |
| _____       | _____     | _____   | _____ | _____ |
| _____       | _____     | _____   | _____ | _____ |

| BEND        |         | Pass  | Fail  |
|-------------|---------|-------|-------|
| Specimen No | Remarks |       |       |
| _____       | _____   | _____ | _____ |
| _____       | _____   | _____ | _____ |
| _____       | _____   | _____ | _____ |

| MACROETCH   |         | Pass  | Fail  |
|-------------|---------|-------|-------|
| Specimen No | Remarks |       |       |
| _____       | _____   | _____ | _____ |
| _____       | _____   | _____ | _____ |
| _____       | _____   | _____ | _____ |

| PEEL        |         | Pass  | Fail  |
|-------------|---------|-------|-------|
| Specimen No | Remarks |       |       |
| _____       | _____   | _____ | _____ |
| _____       | _____   | _____ | _____ |
| _____       | _____   | _____ | _____ |

We certify that the information in this record is correct and that the test brazements were prepared, brazed, and tested in accordance with the requirements of the American Welding Society Standard for Brazing Procedure and Performance Qualification, ANSI/AWS B2.2-91 and with the requirements of the American Society of Mechanical Engineers, Section IX, Part QB.

Approved By \_\_\_\_\_

\_\_\_\_\_  
Qualifier

## RECORD OF WELDER OR WELDING OPERATOR QUALIFICATION TESTS IN ACCORDANCE WITH QW-484 SUGGESTED FORMAT

Welder's Name: \_\_\_\_\_ Employee Number: \_\_\_\_\_  
 Welding Process(es) used \_\_\_\_\_ Type: \_\_\_\_\_  
 Identification of WPS followed by welder during welding of test coupon: \_\_\_\_\_  
 Base material(s) welded: \_\_\_\_\_ Thickness: \_\_\_\_\_

**Manual or Semiautomatic Variables for Each Process (QW-350)**

|  | Actual Values | Range Qualified |
|--|---------------|-----------------|
| Backing (metal, weld metal, welded from both sides, flux, etc)(QW-402) | _____         | _____           |
| ASME P-No. _____ to ASME P-No. (QW-403)                                | _____         | _____           |
| ____ Plate ____ Pipe (enter diameter, if pipe)                         | _____         | _____           |
| Filler metal specification (SFA): _____ Classification (QW-404)        | _____         | _____           |
| Fill metal F-No.   | _____         | _____           |
| Consumable Insert for GTAW or PAW                                      | _____         | _____           |
| Weld deposit thickness for each welding process                        | _____         | _____           |
| Welding position (1G, %g, etc)(QW-405)                                 | _____         | _____           |
| Progression (uphill/downhill)  | _____         | _____           |
| Backing gas for GTAW, PAW or GMAW; fuel gas for OFW (QW-408)           | _____         | _____           |
| GMAW transfer mode (QW-409)  | _____         | _____           |
| GTAW welding current type/polarity                                     | _____         | _____           |

**Machine Welding Variables for the Process Used (QW-360)**

|  |       |       |
|--|-------|-------|
| Direct/remote visual control                                   | _____ | _____ |
| Automatic voltage control (GTAW)                               | _____ | _____ |
| Automatic joint tracking                                       | _____ | _____ |
| Welding position (1G, 5G, etc)                                 | _____ | _____ |
| Consumable insert  | _____ | _____ |
| Backing (metal, weld metal, welded from both sides, flux, etc) | _____ | _____ |

### Guided Bend Test Results

Guided Bend Tests Type    QW-462.2 (Side) Results    QW-462.3(a)(Trans. R&F) Type    QW462.3(b)(Long. R&F) Results

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|--|--|--|--|

Radiographic test results (QW-304 and QW-305) \_\_\_\_\_  
 \_\_\_\_\_ (alternative qualification of groove welds by radiography.)

Fillet Weld -- Fracture test \_\_\_\_\_ Length and percent of defects \_\_\_\_\_ in.

Macro test fusion \_\_\_\_\_ Fillet leg size \_\_\_\_\_ in. x \_\_\_\_\_ in. Concavity/convexity \_\_\_\_\_ in.

Welding tests conducted by \_\_\_\_\_

Radiographic tests conducted by \_\_\_\_\_

Laboratory Test No. \_\_\_\_\_

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

Organization \_\_\_\_\_

By \_\_\_\_\_ Date \_\_\_\_\_

BRAZING PERFORMANCE QUALIFICATION RECORD

Name \_\_\_\_\_ Employee Number \_\_\_\_\_

BPS No \_\_\_\_\_ Date \_\_\_\_\_

Brazing Process \_\_\_\_\_ Brazer \_\_\_\_\_ Operator \_\_\_\_\_

TEST BRAZEMENT

Base Metal ID \_\_\_\_\_ BM No \_\_\_\_\_ BM T \_\_\_\_\_

Filler Metal ID \_\_\_\_\_ FM No \_\_\_\_\_ FM Feed \_\_\_\_\_

Test Position \_\_\_\_\_ Joint Type \_\_\_\_\_

TEST RESULTS

| VISUAL | PASS  | FAIL  |
|--------|-------|-------|
| _____  | _____ | _____ |
| _____  | _____ | _____ |
| _____  | _____ | _____ |

MACROETCH OR PEEL

| Specimen No | Remarks | PASS  | FAIL  |
|-------------|---------|-------|-------|
| _____       | _____   | _____ | _____ |
| _____       | _____   | _____ | _____ |
| _____       | _____   | _____ | _____ |

QUALIFIED FOR

Brazing Process \_\_\_\_\_ Position \_\_\_\_\_

BM No \_\_\_\_\_ BM T \_\_\_\_\_

FM No \_\_\_\_\_ FM Feed \_\_\_\_\_

Joint Type \_\_\_\_\_

Other \_\_\_\_\_

The above named individual is qualified in accordance with the American Welding Society Standard for Brazing Procedure and Performance Qualification, ANSI/AWS B2.2-91 and with the American Society of Mechanical Engineers, Section IX, Part QB.

Date \_\_\_\_\_

Signed \_\_\_\_\_

Qualifier