

**PART I: To be Completed by the LANL FWO Welding Program Administrator**

**A. Code Edition and Addenda:**

ASME Section IX: Edition: \_\_\_\_\_ Addenda: \_\_\_\_\_

AWS D1.1: Edition: \_\_\_\_\_ Addenda: \_\_\_\_\_

Other Applicable Documents: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**B. Base Metal:**

1. Material Spec., Type & Grade: \_\_\_\_\_ to \_\_\_\_\_

2. ASME P-No. and Group: \_\_\_\_\_ to \_\_\_\_\_

3. Carbon Equivalent: \_\_\_\_\_ to \_\_\_\_\_

4. Thickness of Weld Test Coupons: \_\_\_\_\_ to \_\_\_\_\_

5. Diameter (if applicable): \_\_\_\_\_ to \_\_\_\_\_

6. Type of Backing: \_\_\_\_\_

7. Other Requirements: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**C. Weld Filler Metal:**

1. ASME Specification: Root \_\_\_\_\_ Fill \_\_\_\_\_

2. AWS Classification: Root \_\_\_\_\_ Fill \_\_\_\_\_

3. ASME Weld Metal Analysis A No.: Root \_\_\_\_\_ Fill \_\_\_\_\_

4. ASME Filler Metal Group F No.: Root \_\_\_\_\_ Fill \_\_\_\_\_

5. Filler Metal Size: Root \_\_\_\_\_ Fill \_\_\_\_\_

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**D. Welding Process and Welding Parameters:**

1. Process:

Root: \_\_\_\_\_ Number of Passes Over Root: \_\_\_\_\_

Fill: \_\_\_\_\_

2. Shielding Gas: \_\_\_\_\_ at \_\_\_\_\_ CFH

3. Back Purge Gas: \_\_\_\_\_ at \_\_\_\_\_ CFH

For Number of Passes \_\_\_\_\_

O<sub>2</sub> Content of Purge Gas Before Welding \_\_\_\_\_ CO<sub>2</sub>

4. Preheat Minimum: \_\_\_\_\_ °F

5. Interpass Temperature: \_\_\_\_\_ °F maximum (achieve for at least one pass)

6. Electrical Characteristics: (List By Welding Process)

Process \_\_\_\_\_ Current \_\_\_\_\_ Polarity \_\_\_\_\_ Transfer Mode \_\_\_\_\_

Process \_\_\_\_\_ Current \_\_\_\_\_ Polarity \_\_\_\_\_ Transfer Mode \_\_\_\_\_

7. Bead Placement Technique: \_\_\_\_\_

8. Single Pass or Multipass Technique: \_\_\_\_\_

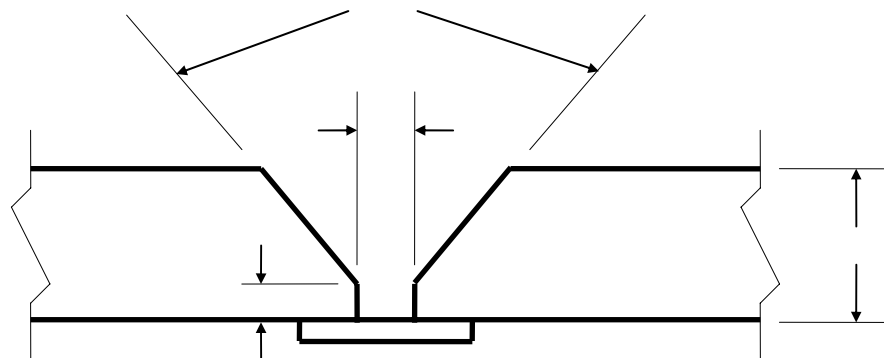
9. Welding Position to be Tested: \_\_\_\_\_

Type of Progression: \_\_\_\_\_

10. Amperage, Voltage and Travel Speed (per Welding Process and Filler Wire Diameter)

Process	Pass	Filler Metal Diameter	Amps (If Pulsed, Give All Parameters)	Volts	Travel Speed (IPM)	Shield Purge/Gas	Cup Size

11. Joint Design to Use



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12. Post Weld Heat Treatment: (PWHT)  Yes  No  
Temperature: \_\_\_\_\_ °F  
Time At Temperature: \_\_\_\_\_ hr  
PWHT Procedure To Be Used: \_\_\_\_\_ Rev. \_\_\_\_\_

**E. Tests to be Performed:**

1. Mechanical Test:

- a. Tensile Tests (QW-150):  Yes  No  
Number of Specimens: \_\_\_\_\_ Type: \_\_\_\_\_ Per Fig.: \_\_\_\_\_  
Location of Specimens: \_\_\_\_\_  
Acceptance Per: \_\_\_\_\_ psi
- b. Bend Tests (QW-160):  Yes  No  
Number of Side Bend Specimens: \_\_\_\_\_ Per Fig.: \_\_\_\_\_  
Number of Face and Root Bend Specimens: \_\_\_\_\_ Per Fig.: \_\_\_\_\_  
Location of Specimens: \_\_\_\_\_  
Acceptance Per: \_\_\_\_\_
- c. Toughness Tests (QW-170):  
(Charpy V-Notch)  Yes  No  
Test Temperature: \_\_\_\_\_ °F  
Number of Specimens: Base Metal: \_\_\_\_\_ Weld Metal: \_\_\_\_\_ HAZ: \_\_\_\_\_  
Location of Specimens: \_\_\_\_\_  
Per Figure: \_\_\_\_\_  
Minimum Acceptance: \_\_\_\_\_ Ft-Lbs \_\_\_\_\_ Mils Lateral Expansion

2. Metallographic Tests

- a. Macro Etch Section Tests:  Yes  No  
Number of Specimens: \_\_\_\_\_  
Inspected at: \_\_\_\_\_ % magnification  
Acceptance Per: \_\_\_\_\_
- b. Hardness Transverse Tests:  Yes  No  
Number of Specimens: \_\_\_\_\_

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c. Magnetic Verification of Delta-Ferrite Tests:  Yes  No

Number of Specimens: \_\_\_\_\_

In-Process-50% Weld Level

Completion

Acceptance Per: \_\_\_\_\_

d. Sensitization Tests:  Yes  No

No. of Specimens \_\_\_\_\_

Acceptance Per: \_\_\_\_\_

3. Nondestructive Tests:  Yes  No

Radiographic: \_\_\_\_\_

Acceptance Per: \_\_\_\_\_

4. Other Required Tests: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**LANL Welding Program Administrator**

\_\_\_\_\_

**DATE**

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**PART II: To be Completed by the LANL Welding Program Administrator**

**A. Welder Assigned:** \_\_\_\_\_

**B. Start of Welding Date:** \_\_\_\_\_

**C. Test Facility:** \_\_\_\_\_

**D. Pre-Test Inspection:**

1. Material Verification:

	Specification	Manufacturer (Trade Name)	Heat/Lot No.	Carbon Equivalent
Base Metal				
Base Metal				
Insert Metal				
Backing Strap Material				
Purge Gas				
Shielding Gas				AWS Class
Filler Metal (Root)				
Filler Metal (Remainder)				
Tungsten Electrode				
Flux				

2. Type of Coupon:  Pipe  Plate

3. Pipe OD: \_\_\_\_\_ Schedule: \_\_\_\_\_ Thickness: \_\_\_\_\_

4. Test Position (QW-461):  1G  2G  3G  
 4G  5G  6G

5. Joints (QW-402):

Type: \_\_\_\_\_ Root Opening: \_\_\_\_\_

Included Angle: \_\_\_\_\_ Root Face: \_\_\_\_\_

6. Instrumentation

	Oxygen Analyzer	Amp Meter	Volt Meter	Shield Gas Flow meter	Purge Gas Flow meter
Serial No.					

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- 7. Fit-up:  Satisfactory  Unsatisfactory
- 8. Pre-test Cleaning:  Satisfactory  Unsatisfactory

Verified By: \_\_\_\_\_ Date \_\_\_\_\_

**E. In-process Inspection:**

- 1. Purge: Oxygen Analyzer Reading: \_\_\_\_\_
- 2. Preheat Temp.: \_\_\_\_\_
- 3. Welding Progression:  Uphill  Downhill
- 4. Current Type and Polarity
  - SMAW  DCRP  DCSP  AC
  - GTAW  DCRP  DCSP  AC
  - GMAW  DCRP  DCSP  AC Transfer Mode: \_\_\_\_\_
  - FCAW  DCRP  DCSP  AC Transfer Mode: \_\_\_\_\_
  - Other: \_\_\_\_\_  DCRP  DCSP  AC
- 5. Wire Feed Rate for GMAW \_\_\_\_\_
- 6. Type of Welding:  Manual  Semi-automatic  Automatic
- 7. Verify:
  - a. All passes were less than 1/2 in. Thick:  Yes  No
  - b. Supplemental filler metals used:  Yes  No
  - c. Supplementary powdered filler metals used:  Yes  No
  - d. Root retainers used:  Yes  No
  - e. Trailing shielding gas used:  Yes  No
  - f. In-process weld peening used:  Yes  No
  - g. Rolling direction to weld:  Parallel  Perpendicular
- 8. Initial and interpass cleaning method: \_\_\_\_\_
- 9. Backgouging performed:  Yes  No  
 Method of backgouging: \_\_\_\_\_

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10. Document weld parameters (for each pass): See Weld Parameter Sheet, Pages 8 and 9
- a. Record on the weld parameter sheet for each pass the welding current information, travel speed, shielding gas information, interpass temperature, and bead placement technique (stringer or weave).
  - b. Prepare a sketch on the weld parameter sheet showing the weld joint configuration. Identify each weld pass location and sequence on the sketch.
11. Record the maximum interpass temperature: \_\_\_\_\_  
At least one pass was completed at the maximum interpass temperature:  Yes  No
12. Post Weld Cleaning:  Satisfactory  Unsatisfactory

Verified By: \_\_\_\_\_

Date \_\_\_\_\_

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**F. Final Inspection:**

Visual Inspection:  Satisfactory  Unsatisfactory

Verified By: \_\_\_\_\_ Date: \_\_\_\_\_

**G. Post Weld Heat Treatment Time-Temperature: (Attach Recording Chart)**

Satisfactory  Unsatisfactory  N/A

Temperature: \_\_\_\_\_ °F Duration: \_\_\_\_\_ hours

Verified By: \_\_\_\_\_ Date: \_\_\_\_\_

**H. Test Specimen Preparation:**

Verify the number of test specimens, specimen geometry, size, location, and orientation are documented for the following:

Tensile Tests:  Satisfactory  Unsatisfactory  N/A  
 Guided Bend Tests:  Satisfactory  Unsatisfactory  N/A  
 Toughness Tests: (Charpy V-Notch)  Satisfactory  Unsatisfactory  N/A  
 Macro Etch Section Tests:  Satisfactory  Unsatisfactory  N/A  
 Other: \_\_\_\_\_  Satisfactory  Unsatisfactory  N/A

Verified By: \_\_\_\_\_ Date: \_\_\_\_\_

**I. Mechanical Test Results:**

1. Tensile Tests (QW-150):

Specimen No.	Dimensions		Area (sq. in.)	Ultimate Total Load (lbs.)	Ultimate Tensile Strength (ksi)	Location and Type of Failure
	Width	Thickness				

2. Guided Bend Tests (QW-160):

Type and Figure No.	Results

3. Toughness Tests (QW-170):

Specimen No.	Notch Location	Specimen Size	Test. Temp.	Impact Values		
				(Ft.-Lbs.)	% Shear	Mils

**J. Metallographic Test Results:**

1. Macro Etch Section Test Results:

Inspection Magnification: \_\_\_\_\_

Findings: \_\_\_\_\_

2. Hardness Traverse Test Results:

Location	Base Metal	HAZ	Weld Metal	HAZ	Base Metal
Root					
Mid Weld					
Crown					

3. Magnetic Verification of Delta-Ferrite Tests Results:

50% Weld Level: \_\_\_\_\_

Completed Weld: \_\_\_\_\_

4. Sensitization Test Results:

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**K. Nondestructive Tests:**

Radiography:       Accepted       Rejected

Film Interpreted by: \_\_\_\_\_

If Rejected, explain problem: \_\_\_\_\_

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**L. Other Required Tests:**

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**M. Laboratory Test Data and Results Certified Correct:**

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**LANL Welding Program Administrator**

**DATE**