| QW-482 SUGGESTED FORMAT FOR WELDING PR (See QW-200.1, Section IX, ASME Boiler 8 | |
|---|---|
| Company Name: XYZ COMPANY | By: JOE BLOW |
| Welding Procedure Spec. No.: <u>GTAW-1</u> Date: <u>2</u> | |
| Revision No.: 0 Date: 2-29-92 | |
| Welding Process(s): Type(s): | MANUAL (Automatic, Manual, Machine, or Semi-Auto) |
| | (Automatic, Manual, Machine, or Semi-Auto) |
| JOINTS (QW-402) | Details |
| Joint Design: ALL Backing: (Yes) X (No) X Backing Material: (Type): CARBON STEEL (Refer to both backing & retainers) | SEE PRODUCTION DRAWINGS |
| XMetal • Nonfusing Metal • Other | |
| Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified. | |
| (At the option of the Mfgr., Sketches may be attached to illustrate joint design, weld layers, and the bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.) | |
| P-No. 4 Group No. 1 to P-No. OR Specification type and grade SA 387 CLI to Specification type and grade SA 387 CLI OR Chem. Analysis and Mech. Prop to Chem. Analysis and Mech. Prop | |
| Thickness range: Base Metal: Groove: 1/16" - 1/2" | Fillet: ALL |
| Pipe Dia. Range: Groove: ALL | Fillet: ALL |
| + FULLED METALS (OM 404) | |
| " PILLEK NICIALS (WVV-4U4) | |
| * FILLER METALS (QW-404) Spec. No. (SFA): SFA 5.29 | |
| Spec. No. (SFA): SFA 5.29 AWS No. (Class): ER 70S2 | |
| Spec. No. (SFA): SFA 5.29 AWS No. (Class): ER 70S2 Filler Metal F-No.: 6 | |
| Spec. No. (SFA): SFA 5.29 AWS No. (Class): ER 70S2 | |
| Spec. No. (SFA): SFA 5.29 AWS No. (Class): ER 70S2 Filler Metal F-No.: 6 Chem. Comp A No.: 3 | |
| Spec. No. (SFA): SFA 5.29 AWS No. (Class): ER 70S2 Filler Metal F-No.: 6 Chem. Comp A No.: 3 Size of Filler Metals: 1/16" - 1/8" Weld Metal Thickness range: Groove: 1/2" MAX. | |
| Spec. No. (SFA): AWS No. (Class): Filler Metal F-No.: Chem. Comp A No.: Size of Filler Metals: Weld Metal Thickness range: Groove: Fillet: ALL | |
| Spec. No. (SFA): AWS No. (Class): Filler Metal F-No.: Chem. Comp A No.: Size of Filler Metals: Weld Metal Thickness range: Groove: Fillet: ALL Electrode-Flux (Class): SFA 5.29 ER 70S2 Electrose 1/16" - 1/8" Electrose SFA 5.29 ER 70S2 ER 70S2 ER 70S2 I/16" - 1/8" ALL Electrose-Flux (Class): N/A | |
| Spec. No. (SFA): AWS No. (Class): Filler Metal F-No.: Chem. Comp A No.: Size of Filler Metals: Weld Metal Thickness range: Groove: Fillet: ALL | |

| | | | QW- | 482 (Back) | WDS | No · GTAW- | 1_Rev. No.: | 0 | |
|-------------------------|--|--|--|-------------------|---------------------------|---------------|---------------------------------------|---------------|--|
| | | | | | | | | | |
| POSITIONS | • | | | | STWELD HEA | | | 407) | |
| Position(s) | of Groove: | ALL | Down | | nperature Ran ne Range | 1 HR PFR | RINCH | | |
| | of Fillet | X | Down | '''' | le Range | T THIN I LIV | C III OII | | |
| | | | | <u> </u> | S ((QW-408) | | | | |
| PREHEAT (| • | O DEC | | | cent Composi | tion | | | |
| | np. Min.: <u>6</u> | 650 DEG MA | <u> </u> | | • | | (Mixture) | Flow Rate | |
| | | NE | | _{Shi} | elding: ARG | | | | |
| rielicat ivial | 140 | /N | | Ŭ | railing:N// | | | | |
| | | ·········· | | Ba | acking: N | /A | | | |
| (Continu | ous or special heating | where applicable shou | id be recorded.) | | | | | | |
| | | CTERISTICS DC P | | /ERSE | | | | | |
| | | 160 Volts (F | | | | | | | |
| position, | nd volts range sho and thickness, et orm similar to that | ould be recorded for c. This information shown below.) | or each electrode n may be listed i | e size, n a | | | | | |
| Tungstei | n Electrode S | ize and Type | | N/A | | | | | |
| | | | | (Pure 1 | ungsten, 2% Tho | riated, etc.) | | | |
| Mode of | metal Transfe | er for GMAW | | N/A_ | | | | | |
| | | | | (Spray | arc, short circuitin | g arc, etc.) | | | |
| Electrode | e Wire feed s | peed range | | <u>N/A</u> | | | | | |
| TECHNIQ | UE (QW-410) |) | | | | | | | |
| String or | Weave Beac | BOT | <u>H</u> | · | | | · · · · · · · · · · · · · · · · · · · | _ | |
| Orifice o Initial an | r Gas Cup Si d Interpass C | ze <u>1/2'</u> leaning (Brusl | ning, Grindin | g, etc.) <u>B</u> | RUSHING AN | D GRINDI | NG | | |
| Method | of Back Goug | ing NON | F | | | | | ********* | |
| | on <u>Baok Godg</u> on | | | | | | | | |
| Contact | Tube to Work | Distance | 1/2" | | | | | | |
| Multiple | or Single Pas | s (per side)_ | MULTIF | PASS | | | | | |
| Multiple | or Single Elec | ctrodes | SINGLE | | | | | | |
| | peed (Range) | | IPM | | | | | | |
| Peening | | NONE | | | | | | | |
| Other | | | | | | | | | |
| - ,, | | | | | | | <u>-</u> | | |
| | | | Filler | Metal | Cu | rrent | | | |
| | | | | | | | | Other | |
| Weld Layer(s) | Process | Class | Dia. | Type Polar. | Amp Range | Volt Range | Trave Speec Range | 1 Addition, | |
| ALL | GTAW | | 3/32" | DCRP | 110-160 | 12-17 | 20-30 | , | |
| | | | | | | | | | |
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| QW-483 SUGGESTED FORMAT FOR PROCED (See QW-200.2, Section IX, ASME Boi Record Actual Conditions Use | ler and Pressure vessel Code) |
|---|--|
| Company Name: XYZ COMPANY | |
| Procedure Qualification Record No.: <u>GTAW-2</u> WPS No.: <u>GTAW-1</u> | Date: <u>2-29-92</u> |
| Welding Process(s) GTAW | |
| Types (Manual, Automatic, Semi-Auto.): MANUA | <u>AL</u> |
| JOINTS (QW-402) | |
| SEE PRODUCTION DR | AWINGS |
| | |
| | |
| | |
| | |
| | |
| Groove Design of Tes (For combination qualifications, the deposited weld metal thickness | |
| | |
| BASE METALS (QW-403) | POSTWELD HEAT TREATMENT (QW-407) |
| Material Spec.: SA-387 GR 11 | Temperature: 1100 DEG |
| Type or Grade: <u>CL1</u> P-No.: <u>4</u> to P-No.: <u>4</u> | Time: 1HR |
| Thickness of Test Coupon: 1/4" | Other: |
| Diameter of Test Coupon: N/A PLATE | |
| Other: | |
| | GAS (QW-408) |
| FILLER METALS (QW-404) | Percent Composition |
| SFA Specification: SFA 5.9 | Gas(es) (Mixture) Flow Rate |
| AWS Classification: ER 70S-2 | Shielding: ARGON/CO2 75/25 20-30CFH |
| Filler Metal F No.: F-6 | Trailing: N/A |
| Weld metal Analysis No.:A-1 | Backing: ARGON 99.9% 10-15CFH |
| Size of Filler metal:1/16" | ELECTRICAL CHARACTERISTICS (QW-409) |
| Other: | Current: DC |
| W. 1.184 (1.78) | Polarity: STRAIGHT |
| Weld Metal Thickness:1/4" | Amps.: 100 Volts: 15 |
| DOSITION (OM 405) | Tungsten Electrode Size: 1/8" |
| POSITION (QW-405) | Other: |
| Position of Groove: 1 G | TEOLINIOLIE (OM 440) |
| Weld Progression (Uphill, Downhill): N/A | TECHNIQUE (QW-410) |
| Other: | Travel Speed: 10 IPM |
| DREUEAT (OM ACC) | String or Weave BOTH |
| PREHEAT (QW-406) | Oscillation: N/A |
| Preheat Temp.: 250 DEG | Multipass or Single Pass(perside) MULTIPLE |
| Interpass temp.: N/A | Single or Multiple Electrodes: MULTIPLE |
| Other: | Other: |
| | |

ASME SECTION IX PRACTICE QUESTIONS - T. SCHINDLER

COPYRIGHT 1996 - T. SCHINDLER AND CODEWEST - ALL RIGHTS RESERVED - DO NOT COPY OR DISTRIBUTE QW-483 (Back) PQR No.: __GTAW-1__ Tensile Test (QW-150) Type of Ultimate Ultimate Specimen Total Load **Unit Stress** Failure & Location Width Thickness Area Lb. psi No. DF/HAZ .505 .200 14,200 71,000 T-1 N/A DF/HAZ 76,666 T-2 N/A .480 .180 13,800 **Guided Bend Tests (QW-160)** Result Type and Figure No. **ACCEPTABLE** S'DE #1 SIDE #2 1/4 " LINEAR INDICATION ACCEPT **ACCEPT** SIDE #3 **Toughness Tests (QW-170)** Impact Values Specimen Specimen Notch Test **Drop Weight Break** Ft. Lbs. % Shear Mils No. Location Size Temp. (Y/N) Comments: Fillet Weld Test (QW-180) Result — Satisfactory: Yes: _____ No: ____ Penetration Into Parent Metal: Yes: ____ No: ____ Macro --- Results: _____ Other Tests Type of Test: ____ Deposit Analysis: Other: Welder's Name: _____ Stamp No.: _____ Stamp No.: _____ Tests conducted by: XYZ LAB Laboratory Test No.: _1234___ We 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 IX of the ASME Code. Manufacturer: BILL'S TANK SHOP___ 2-29-92 By: _____ Date:

WPS # GMAW-1, REV. 0 AND PQR #GMAW-1

- 1. The base material thickness range shown on the WPS:
 - a. should be 3/16" 4" maximum
 - b. should be 3/16" 2" maximum
 - c. is proper as shown
 - d. should be 3/16" 8" maximum
- 2. The deposited weld metal thickness range shown on the WPS:
 - a. is acceptable as shown
 - b. is beyond the range allowed by the Code
 - c. is acceptable if impact tests are performed
 - d. none of the above
- The filler metal shown on the WPS:
 - a. is acceptable as shown
 - b. is unacceptable because ER 70S-2 was qualified, and ER 70S-7 is shown on the WPS
 - c. is incorrect for the SFA # correlating to the AWS Classification
 - d. cannot be used with the GMAW process
- 4. The mode of transfer shown on the WPS:
 - a. is unacceptable for that qualified on the PQR
 - b. is acceptable as shown
 - c. should be "pulsed" on the WPS
 - d. none of the above
- 5. The gas shielding shown on the WPS is:
 - a. acceptable as shown
 - b. unacceptable, because the composition has changed
 - c. not required because GMAW can be run without gas
 - d. none of the above
- 6. The 3G position of the test coupon indicates that the plate:
 - a. was tested in the horizontal position
 - b. was tested in the overhead position
 - c. was tested in the 45° fixed position
 - d. none of the above
- 7. The tension test results shown on the PQR are:
 - a. acceptable as shown
 - b. unacceptable because of insufficient strength
 - c. unacceptable because an insufficient number of tests were taken for the thickness welded
 - d. unacceptable because of errors in mathematical calculations
- 8. The bend test results shown on the PQR are:
 - a. acceptable as shown
 - b. unacceptable because of incorrect type of specimens tested
 - c. unacceptable because results do not meet the Code
 - d. unacceptable because not enough bend tests were taken

- 9. The PQR is acceptable because:
 - a. It is properly certified
 - b. it does not list toughness tests
 - c. it has the welder's name and lab # listed
 - d. the PQR is unacceptable because it has not been properly certified
- 10. A non-essential variable that has not been addressed on the PQR is:
 - a. peening
 - b. electrode spacing
 - c. gas cup size
 - d. not applicable non-essential variables do not have to be addressed on the PQR
- 11. An essential variable (or variables) that has not been addressed on the PQR is:
 - a. QW 403.9
 - b. QW 404.24 QW 404.27
 - c. QW-402.1
 - d. both a & b above

ASME SECTION IX PRACTICE QUESTIONS - T. SCHINDLER

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| QW-482 SUGGESTED FORMAT FOR WELDING PRO (See QW-200.1, Section IX, ASME Boiler & | OCEDURE SPECIFICATION (WPS) & Pressure Vessel Code) |
|---|--|
| Company Name: XYZ COMPANY | By: JOE BLOW |
| Welding Procedure Spec. No.: GMAW-1 Date: 2- | |
| Revision No.: 0 Date: 2-29-92 | |
| Welding Process(s): GMAW (SHORT ARC) Type(s | |
| ************************************** | (Automatic, Manual, Machine, or Semi-Auto) |
| JOINTS (QW-402) | Details |
| Joint Design: SINGLE VEE GROOVE | |
| Backing: (Yes) (No) X | - |
| Backing Material: (Type): NONE (Refer to both backing & retainers) | |
| Metal Nonfusing Metal | |
| Nonmetalic Other | |
| | |
| Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified. | |
| (At the option of the Mfgr., Sketches may be attached to illustrate joint design, weld layers, and the bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.) | |
| *BASE METALS (QW-403) | |
| P-No1 Group No1 to P-No OR Specification type and gradeSA-36 | 1 Group No. 1 |
| to Specification type and grade <u>SA-36</u> | |
| OR | |
| Chem. Analysis and Mech. Propto Chem. Analysis and Mech. Prop | |
| - | |
| Thickness range: | Fillet: ALL |
| Base Metal: Groove: 3/16" - UNLIMITED Pipe Dia. Range: Groove: ALL | Fillet: ALL |
| Pipe Dia. Ralige: Groove. | Tillet. |
| * FILLER METALS (QW-404) | · · |
| Spec. No. (SFA):SFA 5.18 | |
| AWS No. (Class): ER 70S-7 | |
| Filler Metal F-No.: 6 | |
| Chem. Comp A No.: 1 | |
| Size of Filler Metals: 1/8" - 3/32" | |
| Weld Metal | |
| Thickness range: | |
| Groove: UNLIMITED | |
| Fillet: UNLIMITED | |
| Electrode-Flux (Class): N/A | |
| Flux Trade Name: N/A | |
| Consumable Insert: N/A | |
| Outsumable meet | |
| Other: | |

| | | | QW-48 | 2 (Back) | | | | | |
|---|---|----------------------|--|--------------|------------------|----------------|-------|--------------|--------------------------|
| | | | | • | | | | v. No.: | |
| POSITIONS | | | | | TWELD H | | | | |
| Position(s) | Position(s) of Groove: <u>ALL</u> Temperature Range <u>NONE</u> Welding Progression: Up <u>X</u> Down <u>X</u> Time Range | | | | | | | | |
| Welding Pro | ogression: Up | <u>X</u> | Down X | Time | e Kange | | | _ | |
| | of Fillet | ALL | | _ | 110111 105 | | | | |
| PREHEAT (| • | = =: | | | ((QW-408 | | | | |
| | np. Min.: | | | | ent Compo | Jacker) | /AAi~ | xture) | Flow Rate |
| | emp. Max.: | | | Ship | | | | | 25-30 CFH |
| Freneat Mai | int.: | | | Tra | ailing: | NONE | | | |
| | | | | Bac | cking: | NONE | | | |
| (Continue | ous or special heating | where applicable sho | ould be recorded.) | | | | | | |
| ELECTRICA | AL CHARACT | TERISTICS (C | QW-409) | | | | | | |
| Current A | C or DC | DCPo | olarity <u>RE</u> V | VERSE_ | | | | | |
| Amps Rar | nge 120-200 | Volts (Ra | ange) <u>14-1</u> 8 | 8 | | | | | |
| (Amps and | volts range should | d be recorded for | each electrode si | ize, | | | | | |
| position, and | d thickness, etc. | This information | may be listed in a | 1 | | | | | |
| tabular form | n similar to that sh | IOWN DEIOW.) | | | | | | | |
| Tungatas | Electrode Size | e and Type | | | | | | | |
| i ungsten t | LISCHOUE SIZE | Janu Type _ | | (Pure Tur | ngsten, 2% Th | noriated, etc. |) | | |
| Mode of m | netal Transfer | for GMAW | SHORT CI | RCUITING | | | + | | |
| ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | - ····· · · · · - | | (Spray are | c, short circuit | ting arc, etc. |) | _ | |
| Electrode \ | Wire feed spe | ed range | | | | | | | |
| | • | | | | | | | | |
| TECHNIQUI | E (QW-410) | | | | | | | | |
| | Veave Bead _ | STRI | NG | | | | | | |
| Orifice or 0 | Gas Cup Size | e 1/2 | 2" | | | | | | |
| Initial and | Interpass Cle | aning (Brushi | ing, Grinding, | etc.) Gl | RINDING, I | BRUSHIN | 1G | | |
| Method of | Back Gougin | O NOME | | | | | | | <u> </u> |
| Oscillation | Back Gougin | REVERSE | | | | | | | |
| Contact Tu | ube to Work D | Distance1 | <u> 1/8" - 1/4" </u> | | | | | | _ |
| Multiple or | Single Pass | (per side) | MULTIPL | <u>.E</u> | | | | | |
| Multiple or | Single Electr | rodes | SINGLE | | | | | | |
| • | eed (Range) _ | | PM | | | | | | |
| Peening | NO PA | NONE SS GREATE | R THAN 1/2" | 1 | | | | | |
| Omer | NO PA | JU GREATE | 111744 1/2 | | | | | | |
| | | | Filler | Metal | | Current | | | |
| | | | | | | | | | Other (e.g., Remarks, |
| | | | | Туре | 1 | | | Travel | Comments, Hot Wire |
| Weld | | | Dia. | Polar. | Amp | | 'olt | Speed | Addition, Technique, |
| Layer(s) | Process | Class | | | Range | | nge | Range | Torch Angle, Etc.) |
| ALL | GMAW S/C ARC | ER-70S-7 | 1/8" OR 3/32" | DCRP | 12-200 | 14 | -19 | 10-15 IPM | HOME |
| | ARU | | V, UZ | | | | | | |
| | | | | | | _ | | | |
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QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORDS (PQR) (See QW-200.2, Section IX, ASME Boiler and Pressure vessel Code) Record Actual Conditions Used to Weld Test Coupon Company Name: XYZ COMPANY Procedure Qualification Record No.: _____ GMAW-1 2-29-92 Date: WPS No.: GMAW-1 Welding Process(s): GMAW-1 SHORT CIRCUITING ARC Types (Manual, Automatic, Semi-Auto.): ____SEMI-AUTO_ JOINTS (QW-402) Groove Design of Test Coupon (For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.) **POSTWELD HEAT TREATMENT (QW-407) BASE METALS (QW-403)** Temperature: NONE Material Spec.: SA 516 Type or Grade: GR 70 Time: P-No.: 1_____ to P-No.: _ Other: Thickness of Test Coupon: Diameter of Test Coupon: N/A Other: GAS (QW-408) FILLER METALS (QW-404) **Percent Composition** (Mixture) Flow SFA Specification: ____5.18_ Gas(es) AWS Classification: ER 70 S-2 Shielding: C02 20 CFH YES Filler Metal F No.: 6 Trailing: ___ NONE Backing: _ Weld metal Analysis No.: 1 NONE **ELECTRICAL CHARACTERISTICS (QW-409)** Size of Filler metal: 1/8" Current: DC_ Other: Polarity: RP_ Weld Metal Thickness: 2" Volts: 17 Amps.: ____130 Tungsten Electrode Size: NA POSITION (QW-405) Other: Position of Groove: ____3G_ Weld Progression (Uphill, Downhill) DOWNHILL **TECHNIQUE (QW-410)** Other: Travel Speed: 12 IPM_ String orWeaveBead WEAVE Oscillation: NONE PREHEAT (QW-406) Multipass or Single Pass (perside): MULTIPASS Preheat Temp.: 60 DEG 650 DEG_ Single or Multiple Electrodes: SINGLE Interpass temp Other:__ Other:

| C | OPTRIGHT 1996 | - 1. SCHINDLER A | WP CODEMES! | 83 (Bac | 7 | ATED - DO NOT | | | | | | |
|-----------------------|---------------------------------------|-------------------------------|---------------|---------------|-------------------|---------------|-------------|----------------------------|--------------|--|--|--|
| | | | QW-4 | tos (Daci | ' / | PQR | No.: | GMAW-1 | | | | |
| Tensile Test (QW-150) | | | | | | | | | | | | |
| | · · · · · · · · · · · · · · · · · · · | | - | | | Ultima | ite L | Ultimate | Type of | | | |
| Specimer | , | | | | | Total Lo | 1 | it Stress | Failure & | | | |
| No. | Wic | ith Th | ickness | Are | a | Lb. | | psi | Location | | | |
| T-1 | .75 | 50 | 1" | .75 | 0 | 56,40 | | 75,200 | DF-HAZ | | | |
| T-2 | .74 | 19 | 1" | .74 | 9 | 54,20 | 0 | 72,363 | DF-HAZ | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | uided Ben | d Tests (| QW-1 | 60) | | • | | | | |
| | | nd Figure No |), | | | | Resu PAS | | | | | |
| | | ACE #1 | | | | | PAS | | | | | |
| | | ROOT #1 | | | | | PAS | | | | | |
| | | ROOT #1 | | | | | PAS | | | | | |
| | | | Toughness | Tests (C | W-17 | 0) | .,,,, | | | | | |
| | | | | | | | | | | | | |
| | | | | | <u>In</u> | npact Value | s | _ | | | | |
| Specimen | Notch | Specimen | Test | | | | | Drop | Vojaht Brook | | | |
| No. | Location | Size | Temp. | Ft. LI | os. | % Shear | Mils | Drop Weight Break (Y/N) | | | | |
| | | | | | | | | | | | | |
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| C | | | | | | | | | | | | |
| Comments | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | Fillet Weld | • | | • | | M | | | | |
| | | Yes: | | | | | | No: | _ | | | |
| Macro F | tesults: | | | | | | | | | | | |
| | | | Oth | er Tests | | | | | | | | |
| Type of Te | st: | | | | | | | | | | | |
| Deposit An | alysis: | | | | | | | | | | | |
| | | | | | | | | | _ | | | |
| | | E BLOW JR | | | | | | | | | | |
| Tests cond | ucted by: _ | JIMS TEST | LAB | | | Labo | ratory Test | No.: <u>1234</u> | | | | |
| Ma contient | hat the etek | ements in thi | e record ar | a correct | t and ' | that the test | t welds we | re prepared | I_ | | | |
| | | ements in thi iccordance w | | | | | | | •• | | | |
| | | | N | lanufactı | urer: _ | BILLS | WELDING | SHOP | | | | |
| Date: | 2-29-92 | 2 | | Bv | :_ E | BILL BLOW | | | _ | | | |
| - Jako. | Date: BJLL BLOW | | | | | | | | | | | |

WPS #SAW-1, REV. O, PQR #SAW-1

- 1. The deposited weld metal thickness range listed on the WPS:
 - a. is correct as shown
 - b. is incorrect should be 3/16" 2" max.
 - c. should be 4" max.
 - d. none of the above
- 2. The SFA specification for the filler metal classification shown is:
 - a. SFA 5.7
 - b. SFA 5.17
 - c. SFA 5.30
 - d. SFA 5.20
- 3. An essential variable that has not been addressed on both the WPS and PQR is:
 - a. QW-404.36
 - b. QW-403.9
 - c. QW-403.13
 - d. all of the above
- 4. The pipe diameter range listed on the WPS:
 - a. is acceptable as shown
 - b. is incorrect plate does not qualify for pipe
 - c. should be 2 24" o.d.
 - d. should be shown as $\geq 2.7/8$ " o.d.
- 5. Post-weld heat treatment as shown on the WPS/PQR is:
 - a. incorrect, as all codes require PWHT in this thickness
 - b. incorrect, as the PQR should be PWHT'd
 - c. incorrect as the WPS should specify required PWHT of production welds
 - d. none of the above
- 6. The tension test results shown on the PQR are:
 - a. acceptable as shown
 - b. unacceptable due to insufficient width of specimens
 - c. unacceptable due to insufficient number of specimens
 - d. unacceptable because multiple specimens cannot be used in this thickness of plate coupon
- 7. The bend test results shown on the PQR are:
 - a. acceptable as shown
 - b. unacceptable due to insufficient number of specimens
 - c. unacceptable due to wrong type of bend test specimen
 - d. unacceptable due to wrong size of specimen
- 8. The tension test results shown on the PQR are:
 - a. sufficiently strong to meet the Code
 - b. too weak to meet the Code
 - c. 1,5% over the rated base metal tensile strength, and therefore, do not meet the Code
 - d. unacceptable because the results look "bogus"

- 9. The PQR:
 - a. does not need to be signed
 - b. must be signed to be "Code legal"
 - c. must be signed by the President of the Company
 - d. none of the above
- 10. An essential variable that is addressed on the WPS but not addressed on the PQR is:
 - a. QW 404.25
 - b. QW 406.1
 - c. QW 407
 - d. QW 404.34

| (See QW-200. | 1, Section IX, ASME Bo | PROCEDURE SPECIFICATION (Control of the control of | |
|--|---------------------------------------|---|----------------|
| Company Name:XYZ COMP | ANY | By: JOE BLOV | <u>v</u> |
| Welding Procedure Spec. No.: | SAW-1 Date: | <u>2-29-92</u> Supporting PQR No. (s) | : <u>SAW-1</u> |
| Revision No.:0 | Date: <u>2-29-92</u> | | |
| Welding Process(s): SAW | Type(s): | MACHINE (Automatic, Manual, Machine | or Semi-Auto) |
| JOINTS (QW-402) | | | Details |
| Joint Design: <u>DOUBLE V</u> | EE GROOVE | | |
| Backing: (Yes) X | (No) ELD METAL | | |
| Backing Material: (Type): W | (Refer to both backing & retained | ers) | |
| XMetal • Nonfusing Metal • Nonmetalic • Other | | | |
| Sketches, Production Drawings, Wel should show the general arrangement applicable, the root spacing and the cospecified. | it of the parts to be welded. Write | n ere | |
| (At the option of the Mfgr., Sketches design, weld layers, and the bead se procedures, for multiple process pro | quence, e.g. for noton toughines | t s | |
| to Specification type and | grade <u>SA 285 GR C</u> . Prop. | | |
| Thickness range: | • • | | |
| Base Metal: Groove | | Fillet: Fillet: | N/A N/A |
| Pipe Dia. Range: Groove | e: 6" OD AND OVER GREATER THAN 1/2" T | <u> </u> | 1975 |
| • | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | |
| * FILLER METALS (QW-404 | | | |
| Spec. No. (SFA): _ AWS No. (Class): _ | 5.17 F7A-EM12 | | |
| Filler Metal F-No.: | 6 | | |
| Chem. Comp A No.: | 1 | | |
| Size of Filler Metals: _ Weld Metal | 1/8" - 1/4" | | |
| Thickness range: | 2" MAX | | |
| Groove: _ | 2" MAX | | |
| Fillet: | N/A | | |
| Electrode-Flux (Class): _ Flux Trade Name: _ | F7A2 (NEUTRAL) LINCOLN | | |
| Consumable Insert: | N/A | | |
| Other: <u>N</u> | O SUPPLEMENTAL POWDER | | |
| 1 | etal combination should be recor | ded individually. | |
| * Each base metal-filler me | stal Compination should be recor | | |

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|------------------|--|--|--------------------|----------------|--|---------------|--------------|-------------------------|
| | | | Q11-40. | • | | | /. No.: | |
| POSITIONS | (QW-405) | | | POST | WELD HEAT | TREATME | NT (QW-407) | |
| | of Groove: | 1G | | Temp | erature Rang | e <u>NONE</u> | | |
| Welding Pro | ogression: Up | N/A_ Do | wn N/A | Time | Range | NONE | | |
| Positions(s) | of Fillet | NONE | | _ | | | | |
| PREHEAT | | | | GAS | ((QW-408) | | | |
| | np. Min.: | 60 DEG F N | IIN | Perce | ent Composition | on | | |
| Internace Te | emp. Max.: _ | 650 DEG F | MAX | _ | | | dure) Flo | w Rate |
| Drohest Ma | int.: | NONE | | Shield | ding: N/A iling: N/A | | | |
| 1 Torroat Wila | | | | Tra | iling: <u>N/A</u> | | | |
| | | | | Bac | king: N/A | <u> </u> | | |
| (Continu | ious or special heating | where applicable sho | uld be recorded.) | | | | | |
| FLECTRIC | AL CHARAC | TERISTICS (| QW-409) | | | | | 1 |
| | C or DC | | | RSE | | | | Į |
| Current A | inge <u>300-400</u> | Volts (Ra | ange) 34-40 | | | | | I |
| | | | | | | | | Į. |
| (Amps and | l volts range shou nd thickness, etc. | ld be recorded for This information | may be listed in a | ize, | | | | İ |
| tabular for | m similar to that sl | hown below.) | , | | | | | 1 |
| | | | | | | | | Į |
| Tunasten | Electrode Siz | e and Type _ | | I/A | | | | |
| , angeren | | • • | | (Pure Tun | gsten, 2% Thorial | ed, etc.) | | |
| Mode of r | netal Transfei | r for GMAW _ | | V/A | | | | |
| | | | | | , short circuiting a | | | |
| Electrode | Wire feed sp | eed range | | 60-100 IPM | | | | |
| | | | | | | | | - |
| TECHNICI | JE (QW-410) | | | | | | | |
| | | 0.71 | 7110 | | | | | |
| String or | Weave Bead | 311 N// | KING | | | | | |
| Orifice or | Gas Cup Size I Interpass Cle | e N/F | ing Grinding | etc.) BRI | ISHING AND | GRINDING | | |
| Initial and | i interpass Cit | Balling (Diusii | ing, Grinding, | , 010. / | | | | |
| Method o | f Back Gougi | ng AIR CA | ARBON ARC | | | | | - |
| Oscillatio | n | NONE | | | | | | |
| Contact 1 | ube to Work | | 1/8" - 1/4" | | | | | - |
| Multiple of | or Single Pass | (per side) | MULTIPLE | | | | | |
| Multiple o | or Single Elec | trodes | SINGLE | | | | | - |
| | peed (Range) | | 27-40 IPM | | | . <u></u> | | |
| Peening | | | NONE PE | RMITTED | | | | - |
| Other | | | | | | | | |
| | | | | | | | | |
| | | | Filler | Metal | Cur | rent | | <u> </u> |
| | | | | | | | | Other (e.g., |
| | | | | T | | ! | Travel | Remarks, Comments, |
| 144-14 | | 1 | Dia. | Type Polar. | Amp | Volt | Speed | Hot Wire |
| Weld Layer(s) | Process | Class | J.G. | | Range | Range | Range | Addition, Technique, |
| ,, | | } | | | | | | Torch Angle, Etc.) |
| | SAW | F7A-EM12 | 1/8-1/4 | DCRP | 300-400 | 34-40 | 27-40 IPM | |
| ALL | SAV | 175 EMILE | | | | | | |
| | | | | | | | | |
| | <u> </u> | | | | | | | |
| <u> </u> | - | | | | | | | |
| | | | | | | | | |
| } | 1 | T T | 1 | 1 | | J | 1, | 1 |

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORDS (PQR) (See QW-200.2, Section IX, ASME Boiler and Pressure vessel Code) **Record Actual Conditions Used to Weld Test Coupon** Company Name: XYZ COMPANY Procedure Qualification Record No.: SAW-1 Date: 2-29-92 WPS No.: ___ SAW-1_ Welding Process(s):___ SAW Types (Manual, Automatic, Semi-Auto.): MACHINE JOINTS (QW-402) Groove Design of Test Coupon (For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.) POSTWELD HEAT TREATMENT (QW-407) **BASE METALS (QW-403)** Temperature: NONE Material Spec.: SA 285 Time: Type or Grade: GR C P-No.: 1 to P-No.: 1 Other: 1" Thickness of Test Coupon:____ N/A Diameter of Test Coupon: __ Other: NO SUPPLEMENTAL POWDER USED GAS (QW-408) **Percent Composition** FILLER METALS (QW-404) Gas(es) (Mixture) SFA Specification: ____5.7__ Shielding: NONE AWS Classification: F7A-EM12 Filler Metal F No.: _____ Backing: ___ Weld metal Analysis No.: _ **ELECTRICAL CHARACTERISTICS (QW-409)** Size of Filler metal: 1/8" Current:__ DC Other: NO PASS GREATER THAN 1/2" THICK Polarity: REVERSE Volts: Amps.: ___ Weld Metal Thickness: _____ Tungsten Electrode Size: _____ Other: **POSITION (QW-405)** Position of Groove: 1G **TECHNIQUE (QW-410)** Weld Progression (Uphill, Downhill): FLAT Travel Speed: 30 IPM Other: _____ String or Weave Bead: STRING Oscillation: NONE PREHEAT (QW-406) Multipass or Single Pass (perside): MULTIPASS Preheat Temp.: 60 DEG F Interpass temp.: 650 DEG F Single or Multiple Electrodes: SINGLE Other: Other:

QW-483 (Back)

Tensile Test (QW-150)

| PQR | No.: | SAW-1 | |
|-----|------|-------|--|
| | | | |

| | | | , | | | |
|-----------------|-------|-----------|------|-------------------------------|--------------------------------|----------------------------|
| Specimen No. | Width | Thickness | Area | Ultimate Total Load Lb. | Ultimate Unit Stress psi | Type of Failure & Location |
| 140. | | .500 | .375 | 37,500 | 100,000 | DF/HAZ |
| 7 1 | .750 | .500 | .370 | | | 1 |
| 2 | .750 | .500 | .375 | 35,000 | 93,300 | DF/HAZ |
| | .750 | .500 | .375 | 37,500 | 100,000 | DF/HAZ |
| 3 | ./ 50 | .300 | .070 | | | |
| 4 | .750 | .500 | .375 | 35,000 | 93,300 | DF/HAZ_ |

Guided Bend Tests (QW-160)

| | Type and Figure No. | Result |
|---------|---------------------|--------|
| SIDE #1 | QW 462.2 | ACCEPT |
| SIDE #2 | QW 462.2 | ACCEPT |
| SIDE #3 | QW 462.2 | ACCEPT |
| SIDE #4 | QW 462.2 | ACCEPT |

Toughness Tests (QW-170)

| | | | Test Temp. | Impact Values | | Impact Values | | |
|-----------------|-------------------|------------------|---------------|---------------|---------|---------------|----------------------------|--|
| Specimen No. | Notch Location | Specimen Size | | Ft. Lbs. | % Shear | Mils | Drop Weight Break (Y/N) | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | - | | _ | | | | |
| | | | | | | | | |

| Comments: | | | | | | | |
|--|---------------------------|--|--|--|--|--|-------------|
| Fil | let Weld Test (QW-180) | | | | | | |
| Result Satisfactory: Yes: No: Penetration Into Parent Metal: Yes: No: Macro Results: | | | | | | | |
| | | | | | | | Other Tests |
| Type of Test: | | | | | | | |
| Deposit Analysis: | Deposit Analysis: | | | | | | |
| Other: | | | | | | | |
| Welder's Name:JOE BLOW JR | Clock No.:Stamp No.: | | | | | | |
| Tests conducted by: XYZ NDE LAB Laboratory Test No.: | | | | | | | |
| We 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 IX of the ASME Code. | | | | | | | |
| | Manufacturer: XYZ COMPANY | | | | | | |
| Date:2-29-92 | By: JOE BLOW | | | | | | |

WPS #SMAW-1, REV. 0 AND PQR # SMAW-1A

| 1. | The base metal thickness range shown on the WPS is: |
|----|---|
| | a. correct as shown b. incorrect - should be - 1/16" - 1 1/2" c. incorrect - should be - 3/16" - 2" d. incorrect - should be 3/8" - 1" |
| 2. | The deposited weld metal thickness range shown on the WPS is: |
| | a. correct as shown b. incorrect - should be "unlimited" c. incorrect - should be 8" maximum d. incorrect - should be 2" maximum |
| 3. | The welding rod change (from 7018 on the PQR to 7016 on the WPS) is: |
| | a. acceptable as shown b. unacceptable - can only be 7018 on the WPS c. acceptable - provided the rod is 7016 A1 d. unacceptable - the rod on the WPS must be 6010 only |
| 4. | The preheat temperature shown on the WPS should be: |
| | a. 60° F minimum b. 100° F minimum c. 250° F minimum d. 300° F minimum |
| 5. | The tension test specimen results shown on the PQR are: |
| | a. acceptable as shown b. unacceptable - not enough specimens c. unacceptable - ultimate stress does not meet ASME IX d. unacceptable - width of specimens are incorrect |
| 6. | The bend test results shown on the PQR are: |
| | a. acceptable as shown b. unacceptable - defect greater than allowed c. unacceptable - wrong type and insufficient number of specimens d. unacceptable - incorrect Figure # - should be QW-463.2 |
| 7. | The PQR must be to be "Code legal". |
| | a. certifiedb. notarizedc. authorizedd. witnessed |
| 8. | Essential variable # QW 403.9 has been: |
| | a. correctly addressed on the WPS b. incorrectly addressed on the WPS c. not addressed on the PQR d. both B & C above |

- 9. The position of the groove on the PQR is:
 - a. acceptable as shown
 - b. unacceptable essential variable not addressed
 - c. unacceptable position shown does not correlate to plate
 - d. both B & C above
- 10. The PQR shows "string" beads. The WPS shows "both" string and weave beads. This condition is:
 - a. unacceptable doesn't meet Code
 - b. acceptable meets Code
 - c. acceptable if "string" beads are in the root only
 - d. acceptable if "weave" beads are in the cap pass only

| Company Name: XYZ COMPANY | By: JOE BL0W |
|--|--|
| Velding Procedure Spec. No.: <u>SMAW-1</u> Date: <u>2-19-92 Sevision No.: 0 Date:2-19-92 Sevision No.:0 Date:2-19-92 Date:</u> | |
| Valding Process(s): SMAW Type(s): | AUTOMATIC |
| veraling 1 100035(3) | (Automatic, Manual, Machine, or Semi-Auto) |
| JOINTS (QW-402) | Details |
| Joint Design: SINGLE VEE GROOVE Backing: (Yes) X (No) X Backing Material: (Type): CARBON STEEL OR W. METAL (Refer to both backing & retainers) | SEE PRODUCTION DRAWING |
| x Metal • Nonfusing Metal • Nonmetalic • Other | |
| Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified. | |
| (At the option of the Mfgr., Sketches may be attached to illustrate joint design, weld layers, and the bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.) | |
| *BASE METALS (QW-403) P-No1 Group No1 to P-No | 4 Group No. 1 |
| | Group No |
| ∩P | |
| OR Specification type and grade | |
| OR Specification type and grade to Specification type and grade | |
| Specification type and gradeto Specification type and gradeOR | |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop | |
| Specification type and gradeto Specification type and gradeOR OR Chem. Analysis and Mech. Propto Chem. Analysis and Mech. Prop | |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop to Chem. Analysis and Mech. Prop Thickness range: | |
| Specification type and grade | Fillet: <u>ALL</u> |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop to Chem. Analysis and Mech. Prop Thickness range: | |
| Specification type and grade | Fillet: <u>ALL</u> |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop. to Chem. Analysis and Mech. Prop. Thickness range: Base Metal: Groove: 1/16" - 2" Pipe Dia. Range: Groove: ALL * FILLER METALS (QW-404) Spec. No. (SFA): SFA 5.1 | Fillet: <u>ALL</u> |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop. to Chem. Analysis and Mech. Prop. Thickness range: Base Metal: Groove: 1/16" - 2" Pipe Dia. Range: Groove: ALL * FILLER METALS (QW-404) Spec. No. (SFA): SFA 5.1 AWS No. (Class): E 7016 | Fillet: <u>ALL</u> |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop. to Chem. Analysis and Mech. Prop. Thickness range: Base Metal: Groove: 1/16" - 2" Pipe Dia. Range: Groove: ALL * FILLER METALS (QW-404) Spec. No. (SFA): SFA 5.1 AWS No. (Class): E 7016 Filler Metal F-No.: 6 | Fillet: <u>ALL</u> |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop. to Chem. Analysis and Mech. Prop. Thickness range: Base Metal: Groove: 1/16" - 2" Pipe Dia. Range: Groove: ALL *FILLER METALS (QW-404) Spec. No. (SFA): SFA 5.1 AWS No. (Class): E 7016 Filler Metal F-No.: 6 Chem. Comp A No.: 4 | Fillet: <u>ALL</u> |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop. to Chem. Analysis and Mech. Prop. Thickness range: Base Metal: Groove: 1/16" - 2" Pipe Dia. Range: Groove: ALL *FILLER METALS (QW-404) Spec. No. (SFA): SFA 5.1 AWS No. (Class): E 7016 Filler Metal F-No.: 6 Chem. Comp A No.: 4 Size of Filler Metals: ALL | Fillet: <u>ALL</u> |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop. to Chem. Analysis and Mech. Prop. Thickness range: Base Metal: Groove: 1/16" - 2" Pipe Dia. Range: Groove: ALL *FILLER METALS (QW-404) Spec. No. (SFA): SFA 5.1 AWS No. (Class): E 7016 Filler Metal F-No.: 6 Chem. Comp A No.: 4 | Fillet: <u>ALL</u> |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop. to Chem. Analysis and Mech. Prop. Thickness range: Base Metal: Groove: 1/16" - 2" Pipe Dia. Range: Groove: ALL *FILLER METALS (QW-404) Spec. No. (SFA): SFA 5.1 AWS No. (Class): E 7016 Filler Metal F-No.: 6 Chem. Comp A No.: 4 Size of Filler Metals: ALL Deposited Weld Metal Thickness range: | Fillet: <u>ALL</u> |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop. to Chem. Analysis and Mech. Prop. Thickness range: Base Metal: Groove: 1/16" - 2" Pipe Dia. Range: Groove: ALL *FILLER METALS (QW-404) Spec. No. (SFA): SFA 5.1 AWS No. (Class): E 7016 Filler Metal F-No.: 6 Chem. Comp A No.: 4 Size of Filler Metals: ALL Deposited Weld Metal Thickness range: Groove: ALL | Fillet: <u>ALL</u> |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop. to Chem. Analysis and Mech. Prop. Thickness range: Base Metal: Groove: 1/16" - 2" Pipe Dia. Range: Groove: ALL *FILLER METALS (QW-404) Spec. No. (SFA): SFA 5.1 AWS No. (Class): E 7016 Filler Metal F-No.: 6 Chem. Comp A No.: 4 Size of Filler Metals: ALL Deposited Weld Metal Thickness range: Groove: ALL Fillet: ALL | Fillet: <u>ALL</u> |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop. to Chem. Analysis and Mech. Prop. Thickness range: Base Metal: Groove: 1/16" - 2" Pipe Dia. Range: Groove: ALL *FILLER METALS (QW-404) Spec. No. (SFA): SFA 5.1 AWS No. (Class): E 7016 Filler Metal F-No.: 6 Chem. Comp A No.: 4 Size of Filler Metals: ALL Deposited Weld Metal Thickness range: Groove: ALL Fillet: ALL | Fillet: <u>ALL</u> |
| Specification type and grade to Specification type and grade OR Chem. Analysis and Mech. Prop. to Chem. Analysis and Mech. Prop. Thickness range: Base Metal: Groove: 1/16" - 2" Pipe Dia. Range: Groove: ALL *FILLER METALS (QW-404) Spec. No. (SFA): SFA 5.1 AWS No. (Class): E 7016 Filler Metal F-No.: 6 Chem. Comp A No.: 4 Size of Filler Metals: ALL Deposited Weld Metal Thickness range: Groove: ALL Fillet: ALL Electrode-Flux (Class): N/A | Fillet: <u>ALL</u> |

ASME SECTION IX PRACTICE QUESTIONS - T. SCHINDLER

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| QW-482 (Back) | | | | | | | | | |
|---------------------------------------|---|------------------|--|--------------|----------------------------------|------------------------|-----------------|--|--|
| | | | | • | | | Rev. No.: | | |
| POSITIONS (QW-405) | | | | | POSTWELD HEAT TREATMENT (QW-407) | | | | |
| Position(s | Position(s) of Groove: ALL | | | | | Temperature Range NONE | | | |
| Welding F | Welding Progression: Up YES Down YES Time Range NONE | | | | | | NONE | | |
| Positions(s) of Fillet ALL | | | | | | | | | |
| PREHEAT | r (QW-406) | | | | GAS ((QW- | • | | | |
| Preheat T | emp. Min.: | NONE | | | Percent Cor | • | /\$ 4°. 4 | Elam Daka | |
| | Interpass Temp. Max.: NONE Preheat Maint.: NONE | | | | | Gas(es) | (Mixture) | Flow Rate | |
| Preheat M | | | | | | NONE | | | |
| | | | | | | NONE NONE | | | |
| (Cont | (Continuous or special heating where applicable should be recorded.) Backing: NONE - | | | | | | | | |
| | CAL CHARA | | |) REVERSE | | | | | |
| | Range _100- | | | | - | | | | |
| (Amps a position, | nd volts range sl and thickness, e orm similar to the | hould be recorde | ed for each elect ation may be list | trode size, | | | | | |
| Tungste | n Electrode S | Size and Typ | oe <u>NON</u> | <u>IE</u> | Tung-4 00 | / Theristad ata | | | |
| | | | | (Pu | ire Tungsten, 29 | 6 Thoriated, etc. |) | | |
| Mode of | metal Trans | fer for GMA | w | /A | my are about si- | cuiting are ata \ | | | |
| | | _ | | • • | ray arc, snort cir | cuiting arc, etc.) | | | |
| Electrod | e Wire feed | speed range | NO | NE | | | | ······································ | |
| TECHNIC | UE (QW-41 | 0) | | | | | | | |
| String or | · Weave Bea | ad | вотн | | | | | | |
| Orifice of | r Gas Cup S | Size | N/A | | | | | | |
| Initial an | d Interpass | Cleaning (Br | ushing, Grin | ding, etc.)_ | BRUSHING | G, GRINDING | | | |
| Method | of Back Gou | aina | CARBON A | RC ELECTR | ODE | | | | |
| Oscillation | | J | NONE ALL | OWED | | | | | |
| Contact | Tube to Wor | rk Distance | 1/2" MAX | MUM | | | | | |
| Multiple | or Single Pa | ıss (per side |) MULTIPL | E PASS - NO | D PASS GRI | EATER THA | N 3/4" | | |
| Multiple | or Single Ele | ectrodes | MULTIPL | <u>.E</u> | | | | | |
| Travel Speed (Range) 10 IPM | | | | | | | | | |
| PeeningPEENING IS ALLOWED | | | | | | | | | |
| Other | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | - | |
| | Filler Metal Current | | | | | | | | |
| | | | , ,,,,, | | | | | Other | |
| | | | | | | | | (e.g., Remarks, Comments, Hot | |
| \A/alal | | | Dia | Type | Amp | Volt | Travel Speed | Wire Addition, | |
| Weld Layer(s) | Process | Class | Dia. | Polar. | Range | Range | Range | Technique, | |
| ALL | SMAW | E7016 | ALL | DCRP | 100-200 | 12-20 | AS REQUIRED | Torch Angle, Etc.) | |
| China Annua Piana Carrie Paris Inches | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | 1 | | 1 | | | |

ASME SECTION IX PRACTICE QUESTIONS - T. SCHINDLER

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(See QW-200.2, Section IX, ASME Boiler and Pressure vessel Code)

| | S Used to Weld Test Coupon |
|--|--|
| Company Name: XYZ COMPANY | |
| Procedure Qualification Record No.: SMAN | <u>/-1A</u> Date: <u>2-19-92</u> |
| WPS No.: SMAW-1 | |
| Welding Process(s): SMAW | HIAI |
| Types (Manual, Automatic, Semi-Auto.): <u>MAN</u> | JUAL |
| JOINTS (QW-402) | |
| SINGLE "VEE" GROOVE, | , 60 DEG ANGLE, NO BACKING |
| Groove Desig | ın of Test Coupon |
| (For combination qualifications, the deposited weld metal th | ickness shall be recorded for each filler metal or process used.) |
| BASE METALS (QW-403) | POSTWELD HEAT TREATMENT (QW-407) |
| Naterial Spec.: SA 516 | Temperature: |
| | |
| Type or Grade:70 | Time: NONE |
| Γype or Grade: <u>70</u> P-No.: 1 to P-No.: <u>1</u> | |
| Type or Grade: | Time: NONE Other: |
| Thickness of Test Coupon:1" | |
| Thickness of Test Coupon: 1" Diameter of Test Coupon PLATE | |
| Thickness of Test Coupon: 1" Diameter of Test Coupon PLATE | Other: |
| Thickness of Test Coupon:1" | GAS (QW-408) |
| Thickness of Test Coupon: 1" Diameter of Test Coupon PLATE Other: FILLER METALS (QW-404) | GAS (QW-408) Percent Composition |
| Thickness of Test Coupon:1" | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow |
| Thickness of Test Coupon:1" | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE |
| Thickness of Test Coupon:1" Diameter of Test CouponPLATE Dither: FILLER METALS (QW-404) SFA Specification:SFA 5.1 AWS Classification:E 7018 Filler Metal F No.:4 | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE |
| Thickness of Test Coupon: 1" Diameter of Test Coupon PLATE Other: FILLER METALS (QW-404) SFA Specification: SFA 5.1 AWS Classification: E 7018 Filler Metal F No.: 4 Weld metal Analysis No.: 1 | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE |
| Thickness of Test Coupon:1" Diameter of Test CouponPLATE Dither: | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE ELECTRICAL CHARACTERISTICS (QW-409) |
| Thickness of Test Coupon:1" Diameter of Test CouponPLATE Dither: | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE ELECTRICAL CHARACTERISTICS (QW-409) Current: DIRECT |
| Thickness of Test Coupon: 1" Diameter of Test Coupon PLATE Other: SFA 5.1 AWS Classification: E 7018 Filler Metal F No.: 4 Weld metal Analysis No.: 1 Size of Filler metal: 1/8" | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE ELECTRICAL CHARACTERISTICS (QW-409) Current: DIRECT Polarity: REVERSE |
| Thickness of Test Coupon: 1" Diameter of Test Coupon PLATE Other: SFA 5.1 AWS Classification: E 7018 Filler Metal F No.: 4 Weld metal Analysis No.: 1 Size of Filler metal: 1/8" | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE ELECTRICAL CHARACTERISTICS (QW-409) Current: DIRECT Polarity: REVERSE Amps.: 100 Volts: 10 |
| Thickness of Test Coupon:1" Diameter of Test CouponPLATE Other: | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE ELECTRICAL CHARACTERISTICS (QW-409) Current: DIRECT Polarity: REVERSE Amps.: 100 Volts: 10 Tungsten Electrode Size: N/A |
| Thickness of Test Coupon: 1" Diameter of Test Coupon PLATE Other: PLATE | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE ELECTRICAL CHARACTERISTICS (QW-409) Current: DIRECT Polarity: REVERSE Amps.: 100 Volts: 10 |
| Thickness of Test Coupon:1" Diameter of Test CouponPLATE Dither: | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE ELECTRICAL CHARACTERISTICS (QW-409) Current: DIRECT Polarity: REVERSE Amps.: 100 Volts: 10 Tungsten Electrode Size: N/A Other: |
| Thickness of Test Coupon:1" Diameter of Test CouponPLATE DIAMETER METALS (QW-404) SFA 5.1 AWS Classification: | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE ELECTRICAL CHARACTERISTICS (QW-409) Current: DIRECT Polarity: REVERSE Amps.: 100 Volts: 10 Tungsten Electrode Size: N/A Other: TECHNIQUE (QW-410) |
| Thickness of Test Coupon:1" Diameter of Test CouponPLATE DIAMETER METALS (QW-404) SFA 5.1 AWS Classification: | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE ELECTRICAL CHARACTERISTICS (QW-409) Current: DIRECT Polarity: REVERSE Amps.: 100 Volts: 10 Tungsten Electrode Size: N/A Other: TECHNIQUE (QW-410) Travel Speed: 25 IPM |
| Thickness of Test Coupon:1" Diameter of Test CouponPLATE DIAMETER METALS (QW-404) SFA 5.1 AWS Classification: | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE ELECTRICAL CHARACTERISTICS (QW-409) Current: DIRECT Polarity: REVERSE Amps.: 100 Volts: 10 Tungsten Electrode Size: N/A Other: TECHNIQUE (QW-410) Travel Speed: 25 IPM String or Weave Bead STRING |
| Thickness of Test Coupon:1" Diameter of Test CouponPLATE Dither: | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE ELECTRICAL CHARACTERISTICS (QW-409) Current: DIRECT Polarity: REVERSE Amps.: 100 Volts: 10 Tungsten Electrode Size: N/A Other: TECHNIQUE (QW-410) Travel Speed: 25 IPM String or Weave Bead STRING Oscillation: NONE |
| Thickness of Test Coupon:1" Diameter of Test CouponPLATE DIAMETER OF TEST OF | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE ELECTRICAL CHARACTERISTICS (QW-409) Current: DIRECT Polarity: REVERSE Amps.: 100 Volts: 10 Tungsten Electrode Size: N/A Other: TECHNIQUE (QW-410) Travel Speed: 25 IPM String or Weave Bead STRING Oscillation: NONE Multipass or Single Pass(perside): MULTIPASS |
| Ciameter of Test CouponPLATE Other: FILLER METALS (QW-404) SFA Specification:SFA 5.1 AWS Classification: 4 Weld metal Analysis No.:1 Size of Filler metal:1/8" Other: | GAS (QW-408) Percent Composition Gas(es) (Mixture) Flow Shielding: NONE Trailing: NONE Backing: NONE ELECTRICAL CHARACTERISTICS (QW-409) Current: DIRECT Polarity: REVERSE Amps.: 100 Volts: 10 Tungsten Electrode Size: N/A Other: TECHNIQUE (QW-410) Travel Speed: 25 IPM String or Weave Bead STRING |

ASME SECTION IX PRACTICE QUESTIONS - T. SCHINDLER COPYRIGHT 1996 - T. SCHINDLER AND CODEWEST - ALL RIGHTS RESERVED - DO NOT COPY OR DISTRIBUTE QW-483 (Back) PQR No.: SMAW-1 Tensile Test (QW-150) Type of Ultimate **Ultimate** Failure & **Unit Stress** Specimen **Total Load** Location Width **Thickness** Lb. psi No. Area 73,236 BF/WM T-1 .750 .985 .7387 54,100 63,969 BF/WM .6253 40,000 T-2 .751 .975

Guided Bend Tests (QW-160)

| Type and Figure No. | Result | | |
|---------------------|--------------------------------|--|--|
| QW 462.2 - FACE | ONE DEFECT 1/16" LONG - ACCEPT | | |
| QW 462.2 - ROOT | NO DEFECTS | | |
| | | | |
| | | | |

Toughness Tests (QW-170)

| | | | | i | mpact Values | | |
|-----------------|-------------------|------------------|---------------|----------|--------------|------|----------------------------|
| Specimen No. | Notch Location | Specimen Size | Test Temp. | Ft. Lbs. | % Shear | Mils | Drop Weight Break (Y/N) |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| " | | | | | | | |
| | | | | | | | |
| | | | | | 1 | | |

| Comments: | | | | | | | |
|--|--------------------------------------|--|--|--|--|--|--|
| Fillet Weld Test (QW-180) | | | | | | | |
| Result — Satisfactory: Yes: No: Pen | etration Into Parent Metal: Yes: No: | | | | | | |
| Macro Results: | | | | | | | |
| Other Te | sete | | | | | | |
| Type of Test: | | | | | | | |
| Deposit Analysis: | | | | | | | |
| Other: | | | | | | | |
| Welder's Name: <u>JOE BLOW JR.</u> | | | | | | | |
| Tests conducted by: XYZ MET LAB | Laboratory Test No.:#1 | | | | | | |
| We 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 IX of the ASME Code. | | | | | | | |
| Ма | nufacturer:JOE BLOW | | | | | | |
| Date: 2-19-92 | By: XYZ COMPANY | | | | | | |

WELDING PROCEDURE REVIEW ANSWER SHEET

WPS# GTAW-1, REV. 0 AND PQR #GTAW-2

- 1. a
- 2. b
- 3. d
- 4. b
- 5. d
- 6. c
- 7. c
- 8. d
- 9. b
- 10. b
- 11. b
- 12. a
- 13. a

WELDING PROCEDURE REVIEW ANSWER SHEET

WPS #GMAW-1, REV. 0 AND PQR #GMAW-1

- 1. d
- 2. b
- 3. a
- 4. b
- 5. b
- 6. d
- 7. c
- 8. b
- 9. d
- 10. d
- 11. d

WELDING PROCEDURE REVIEW ANSWER SHEET

WPS #SAW-1, REV. 0 - PQR # SAW-1

- 1. a
- 2. b
- 3. a
- 4. a
- 5. d
- 6. d
- 7. a
- 8. a
- 9. b
- 10. d

WELDING PROCEDURE REVIEW ANSWER SHEET

WPS #SMAW-1, REV. 0, PQR #SMAW-1A

- 1. c
- 2. d
- 3. a
- 4. b
- 5. c
- 6. c
- 7. a
- 8. d
- 9. c
- 10. b