

# CONSTRUCTION: JOINING OF PIPES BY WELDING

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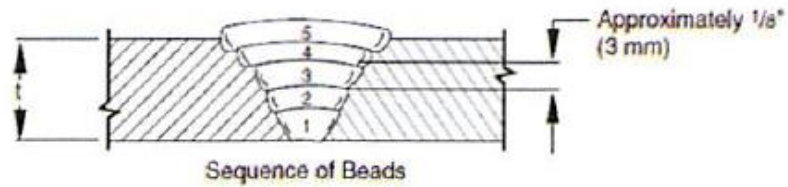
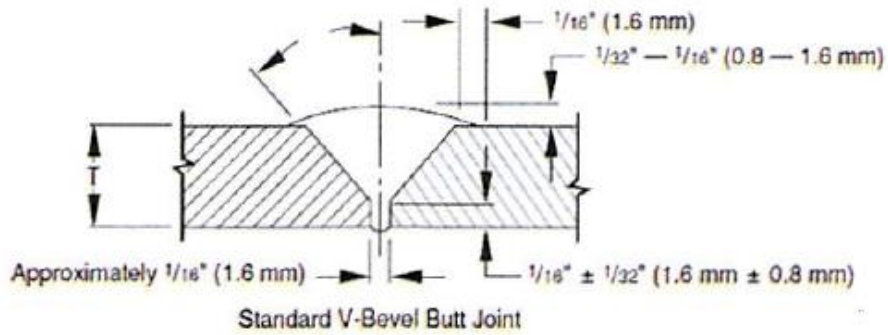
Issued: 8/13/07 Revised: 12/13/2022 Number: 5GH Page: \_\_\_\_\_

## STANDARD WELDING PROCEDURE SPECIFICATION #: 5GH

- A. Process: Manual Electric Arc
  - B. Material: API-5L Grade A thru X42
  - C. Diameter and Wall Thickness: 8" thru 12" & 0.188 thru 0.500 WT
  - D. Joint Design: Standard Vee Groove 30 degrees
  - E. Filler Metal & Number of Beads: Electrode Classification Electrode E6010 & 8010 AWS Class A 5.1 — 5.1
  - F. Electric or Flame Characteristics: D.C. Reverse Polarity Electrode Positive
  - G. Position: Fixed Horizontal
  - H. Direction of Welding: Vertical Down
  - I. Number of Welders: 1
  - J. Time Lapse Between Passes: Maximum of 5 minutes between stringer and hot pass; 3 minutes maximum when temperature is below 35°F
  - K. Type of Line-Up Clamp: External
  - L. Removal of Line-Up Clamp: After 50% completion of stringer bead
  - M. Cleaning: Taper grind starts and craters and flatten crown by grinding stringer bead, power buff all remaining passes
  - N. Speed of Travel: String bead 10-12 inches per minute maximum
  - O. \*Preheat, Stress Relief: Maximum of 300°F Minimum 150°F Preheat shall be done with device or equipment which will heat entire circumference(s) in single application 2" back from pipe ends
  - P. Notes: Welded pipe strings shall be temporarily capped to prevent air draft cooling of stringer beads. Welds shall be completely protected from moisture until it has cooled to ambient temperature. Weld zone shall be protected so that the wind velocity near it does not exceed 8mph.
- \* X-Rated pipe must be stress relief if the carbon content exceeds 0.32% or C+1/4 Mn exceeds 0.65% Heating of X-Rated pipe is limited to 600°F

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Note: Dimensions are for example only.

| Bead No. | Electrode Diameter | Amperage Range | Voltage Range | Type Rod  | Notes |
|----------|--------------------|----------------|---------------|-----------|-------|
| 1        | 1/8                | 100-125        | 28-35         | E6010 5P+ |       |
| 2        | 1/8                | 85-110         | 25-35         | E8010     |       |
| 3        | 1/8 **             | 100-115        | 20-30         | E8010     |       |
| 4        | 5/32               | 105-135        | 20-35         | E8010     |       |
| 5        | *                  |                |               |           |       |

| Bead No. | Notes  |
|----------|--|
|          | Electrodes may be substituted within rod group 1&2 of AWS specification A5.1-A5.5  |
| **       | Pass 3 may be made with 5,32 at same settings as pass 4                            |
| *        | Additional passes may be made using 8010 3/16 at amp range 132-170 and 25-35 volts |

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## WELD TEST REPORT

(USE SEPARATE FORM FOR EACH WELDING PROCEDURE)

|   |  |   |  |  |   |
|---|--|---|--|--|---|
| DATE<br><i>1-11-08</i>  |  | WELDER'S NAME<br><i>Donell Lawford</i>  |  | SOCIAL SECURITY NUMBER<br><i>2519</i>            |   |
| LOCATION<br><i>COMPTON</i>  |  | NAME OF CONTRACTOR OR COMPANY<br><i>West Texas Gas</i>  |  | RIGHT HANDED <input checked="" type="checkbox"/> | REQUALIFYING TEST <input checked="" type="checkbox"/>                       |
| POSITION<br>INCLINED <input type="checkbox"/> FIXED <input checked="" type="checkbox"/><br>HORIZONTAL <input checked="" type="checkbox"/> |  | ELECTRIC ARC <input checked="" type="checkbox"/> INDOORS <input checked="" type="checkbox"/><br>OX-ACETYLENE <input type="checkbox"/> OUTDOORS <input type="checkbox"/> |  | LEFT HANDED <input type="checkbox"/>             | QUALIFYING TEST <input type="checkbox"/> LINE TEST <input type="checkbox"/> |
| PIPE SPECIFICATION<br><i>API-5L 60 X 42</i>   |  | PIPE MANUFACTURER<br><i>Republic</i>  |  | WEATHER<br><i>CL</i>                             | TEMPERATURE<br><i>75</i>  |
| MAKE OF WELDING MACHINE<br><i>Lid.</i>  |  | SIZE<br><i>300</i>  | MAKE OF OX-ACETYLENE APPARATUS<br><i>-</i> | WELDING NOZZLE SIZE<br><i>-</i>                  | OX-ACETYLENE PRESSURE FLOWING<br><i>-</i>                                   |
| BRAND OF ELECTRODE<br><i>Lid.</i>   |  | BRAND OF OX-ACETYLENE ROD AND SIZE<br><i>-</i>  |  | NUMBER OF PASSES - OX-ACETYLENE WELD<br><i>-</i> | WELDING PROCEDURE NO.<br><i>5-6H</i>  |

| PIPE WELD  | ELECTRODE TYPE AND SIZE |                | WMOVE SETTINGS |                | AMPERAGE RG. | VOLTAGE RG. |
|------------|-------------------------|----------------|----------------|----------------|--------------|-------------|
|            | COARSE                  | FINE           | AMPERAGE       | VOLTS          |              |             |
| STRINGER   | <i>Lid. 1/8 5P+</i>     | <i>120-190</i> | <i>45</i>      | <i>100-125</i> | <i>28-35</i> |             |
| HOT PASS   | <i>Lid. 1/8 70+</i>     | <i>120-190</i> | <i>55</i>      | <i>85-110</i>  | <i>25-35</i> |             |
| FILLER (S) | <i>Lid. 1/8 70+</i>     | <i>120-190</i> | <i>55</i>      | <i>100-115</i> | <i>20-30</i> |             |
| CAP PASS   | <i>Lid. 5/32 70+</i>    | <i>120-190</i> | <i>65</i>      | <i>105-135</i> | <i>20-35</i> |             |

This weld has been visually and destructively tested in accordance with API-1104

| TENSILE TESTS | COUPON    |           |           | CROSS SEC. AREA SQ. IN. | LOAD          | % ELONG.   | COMPUTED TENSIL PSI | REMARKS          | AC-CEPTED                           | RE-JECTED                |
|---------------|-----------|-----------|-----------|-------------------------|---------------|------------|---------------------|------------------|-------------------------------------|--------------------------|
|               | LOCATION  | LENGTH    | WIDTH     |                         |               |            |                     |                  |                                     |                          |
| 1             | <i>T1</i> | <i>8"</i> | <i>1"</i> | <i>.190</i>             | <i>12,500</i> | <i>15%</i> | <i>45,783</i>       | <i>No defect</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2             | <i>T2</i> | <i>8"</i> | <i>1"</i> | <i>.190</i>             | <i>12,200</i> | <i>15%</i> | <i>43,152</i>       | <i>" "</i>       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3             |           |           |           |                         |               |            |                     |                  |                                     |                          |
| 4             |           |           |           |                         |               |            |                     |                  |                                     |                          |

| BEND TESTS | COUPON LOCATION | TYPE OF BEND | REMARKS                      | AC-CEPTED                           | RE-JECTED                           |
|------------|-----------------|--------------|------------------------------|-------------------------------------|-------------------------------------|
|            | 1               | <i>R1</i>    | <i>Root</i>                  | <i>No defect</i>                    | <input checked="" type="checkbox"/> |
| 2          | <i>R2</i>       | <i>Root</i>  | <i>Small opening on edge</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 3          | <i>F1</i>       | <i>Face</i>  | <i>No defect</i>             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 4          | <i>F2</i>       | <i>Face</i>  | <i>No defect</i>             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |

| NICK-BREAK TESTS | COUPON LOCATION | REMARKS                             | AC-CEPTED                           | RE-JECTED                           |
|------------------|-----------------|-------------------------------------|-------------------------------------|-------------------------------------|
|                  | 1               | <i>TN</i>                           | <i>Clean Gray Metal</i>             | <input checked="" type="checkbox"/> |
| 2                | <i>BN</i>       | <i>Small gas pocket - edge 1/4"</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 3                |                 |                                     |                                     |                                     |
| 4                |                 |                                     |                                     |                                     |

| TEE WELD TEST       | SIZE AND WALL THICKNESS OF MAIN |          | GAS PRESSURE ON MAIN PSIG |  | LOCATION OF FRACTURE          |                                 |                               |
|---------------------|---------------------------------|----------|---------------------------|--|-------------------------------|---------------------------------|-------------------------------|
|                     |                                 |          |                           |  | WELD <input type="checkbox"/> | NIPPLE <input type="checkbox"/> | MAIN <input type="checkbox"/> |
|                     | DID WELD CONTAIN:               |          |                           |  | DEPTH OF UNDERCUT             |                                 | LENGTH OF UNDERCUT            |
|                     | PINHOLES                        | COLDROLL | UNDERCUT                  |  |                               |                                 |                               |
| REMARKS ON TEE WELD |                                 |          |                           |  |                               |                                 |                               |

|           |   |   |          |  |  |
|-----------|---|---|----------|--|--|
| PIPE WELD | QUALIFIED <input checked="" type="checkbox"/><br>NOT QUALIFIED <input type="checkbox"/> | ELECTRIC ARC <input checked="" type="checkbox"/><br>OX-ACETYLENE <input type="checkbox"/> | TEE WELD | QUALIFIED <input type="checkbox"/><br>NOT QUALIFIED <input type="checkbox"/> | ELECTRIC ARC <input type="checkbox"/><br>OX-ACETYLENE <input type="checkbox"/> |
| TESTED BY | SIGNATURE<br><i>Ed Muehl</i>  |   | TITLE    | <i>Welding Inspector</i>   |  |