<table>
<thead>
<tr>
<th></th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Does the bevel angle stay within +/- 5 degrees in any location along its entire length? (Use angle finder tool)</td>
</tr>
<tr>
<td>2</td>
<td>Does the cut quality of the BEVEL face display minimal undulations that do not exceed an inconsistency greater than 1/32 in?</td>
</tr>
<tr>
<td>3</td>
<td>Does the cut quality of the LARGE SHAPE face display minimal undulations that do not exceed an inconsistency greater than 1/32 in?</td>
</tr>
<tr>
<td>4</td>
<td>Does the cut quality of the SMALL SHAPE face display minimal undulations that do not exceed an inconsistency greater than 1/32 in?</td>
</tr>
<tr>
<td>5</td>
<td>Does the cut quality of the THIRD SHAPE face display minimal undulations that do not exceed an inconsistency greater than 1/32 in?</td>
</tr>
<tr>
<td>6</td>
<td>Does the cut stay inside the diameter of the Go / no-go gauge for The Large SHAPE?</td>
</tr>
<tr>
<td>7</td>
<td>Does the cut stay inside the diameter of the Go / no-go gauge for The Small SHAPE?</td>
</tr>
<tr>
<td>8</td>
<td>Does the cut stay inside the diameter of the Go / no-go gauge for The THIRD SHAPE?</td>
</tr>
<tr>
<td>9</td>
<td>Does the Go / no-go gauge fit inside of the Large Shape?</td>
</tr>
<tr>
<td>10</td>
<td>Does the Go / no-go gauge fit inside of the Small Shape?</td>
</tr>
<tr>
<td>11</td>
<td>Does the Go / no-go gauge fit inside of the THIRD SHAPE?</td>
</tr>
<tr>
<td>12</td>
<td>Is the Bevel accuracy along its length Straight to within no more than a variation of 1/8 in.? (Set two parallel lines along the entire length of the bevel and no point should fall outside that window)</td>
</tr>
</tbody>
</table>

Was their a safety infraction? BE SURE TO NOTE The Competitor Number and Explain the safety violation on the Safety Infraction Sheet.
Cut 6" Long Width = Kerf

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>1/4 x 6 x 6</td>
</tr>
</tbody>
</table>

ALL PROCESSES TO BE COMPLETED WITH THE MATERIALS PROVIDED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
‘A’=YES it meets this criteria
‘B’=NO it does NOT meet this criteria

**GTAW FINAL**

<table>
<thead>
<tr>
<th>Assembly Questions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is the Project Assembled In Accordance to the Drawing?</td>
<td></td>
</tr>
<tr>
<td>2. Was the order of operations followed?</td>
<td></td>
</tr>
<tr>
<td>3. The GTAW Project should show no post weld wire brushing, does this project display no post weld wire brushing?</td>
<td></td>
</tr>
<tr>
<td>4. Weld #_____ Placed in the proper Location?</td>
<td></td>
</tr>
<tr>
<td>5. Weld #_____ Proper Size and Length?</td>
<td></td>
</tr>
<tr>
<td>6. Weld #_____ Overall bead width not to exceed 1/32 in. variation in width (from max to min) for any weld face. Does the weld meet this requirement?</td>
<td></td>
</tr>
<tr>
<td>7. Are all present welds free from porosity? No visible porosity is acceptable, Do the Welds Meet this Requirement?</td>
<td></td>
</tr>
<tr>
<td>8. Weld #_____ Crater Cross Section. All craters should be filled to provide the specified weld size, except for the end of intermittent fillet welds outside of their effective length. Are the weld craters completely filled to the weld size?</td>
<td></td>
</tr>
<tr>
<td>9. Did Welder complete _________ Number of welds or more?</td>
<td></td>
</tr>
<tr>
<td>10. Did Welder complete _________ Number of welds or more?</td>
<td></td>
</tr>
<tr>
<td>11. Did Welder complete _________ Number of welds or more?</td>
<td></td>
</tr>
<tr>
<td>12. FOR PROJECTS THAT HAVE _________ OR MORE WELDS COMPLETED (For projects with less weld, or it has been wirebrushed, the answer is NO. &quot;Touchdowns&quot; are when the tungsten is touched to the workpiece or the filler metal and an indication can be visible as long as no post wirebrushing is performed. Is the project free from any &quot;touchdowns&quot;?</td>
<td></td>
</tr>
</tbody>
</table>

---

**Was there a safety infraction? BE SURE TO NOTE**

**The Competitor Number and Explain the safety violation on the Safety Infraction Sheet.**
<table>
<thead>
<tr>
<th>Item</th>
<th>QTY</th>
<th>Desc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>0.125 x 8 x 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aluminum Sheet</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td>0.125 x 6 x 6 x 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aluminum Sheet</td>
</tr>
</tbody>
</table>

ALL PROCESSES TO BE COMPLETED WITH THE MATERIALS PROVIDED

1. WELD IN ACCORDANCE WITH WPS# 103
2. TACK COMPLETE ASSEMBLY IN ANY POSITION
3. WELDING TO BE COMPLETED WITH PLATE A FLAT TO THE TABLE
4. ALL VERTICAL WELDS TO BE UPHILL
5. NO POST CLEANING

State SkillsUSA Welding Contest

GTAW

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
Welding Procedure Specification

WPS No. WPS 103  Revision 2  Date 04/20/2013  By NP

Authorized By GH  Date 5/15/2011  Prequalified □

Welding Process(es) GTAW  Type: Manual □  Machine □  Semi-Auto □  Auto □

Supporting PQR(s) Prequalified

JOINT
Type T-Joint / Corner
Back-up Yes □  No □  Single Weld □  Double Weld □
Back-up Material N/A
Root Opening 0  Root Face Dimension 0
Groove Angle 30-90°  Radius (J-U) N/A
Back Gouge Yes □  No □
Method N/A

BASE METALS
Material Spec. 3003 to 3003
Type or Grade
Thickness: Groove ( ) Unlimited - N/A
Fillet (in ) Unlimited -
Diameter (Pipe, ) N/A - N/A

FILLER METALS
AWS Specification A5.10
AWS Classification ER4043

SHIELDING
Flux Gas 100%Argon
N/A Composition 100%Argon
Electrode-Flux (Class) Flow Rate 15-25 CFH
N/A Gas Cup Size 3/8” Min. (#6)

PREHEAT
Preheat Temp., Min. 60 Deg.F
Thickness Up to 3/4” Temperature N/A
Over 3/4” to 1-1/2” N/A
Over 1-1/2” to 2-1/2” N/A
Over 2-1/2” □
Interpass Temp., Min. N/A Max. N/A

WELDING PROCEDURE

Layer/Pass Process Filler Metal Class Diameter Cur. Type Amps Volts Travel Speed Other Notes
All GTAW ER4043 3/32” AC 110-175 N/A 4-8 ipm AC Bal. 65-75%EN

POSITION
Position of Groove All  Fillet All
Vertical Progression: □ Up  □ Down

ELECTRICAL CHARACTERISTICS
Transfer Mode (GMAW): Short-Circuiting □  Globular □  Spray □
Current: AC □  DCEP □  DCEN □  Pulsed □
Other N/A
Tungsten Electrode (GTAW):
Size 3/32”  Type EWCe2

TECHNIQUE
Stringer or Weave Bead Stringer
Multi-pass or Single Pass (per side) Multiple/Single
Number of Electrodes 1
Electrode Spacing: Longitudinal N/A
Lateral N/A
Angle N/A
Contact Tube to Work Distance N/A
Peening N/A
Interpass Cleaning □

POSTWELD HEAT TREATMENT PWHT Required □
Temp. N/A  Time N/A

AC Hz. 60 - 120
`A`=YES it mees this criteria 
`B`= NO it does NOT meet this criteria

**SMAW FINAL**

<table>
<thead>
<tr>
<th></th>
<th>Assembly Questions</th>
</tr>
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<tbody>
<tr>
<td>1</td>
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<td>3</td>
<td>Does the overall workmanship display consistency among all welds? (ALL WELDS MUST BE GENERALLY CONSISTENT WITH NO SIGNIFICANT DISCONTUNITIES)</td>
</tr>
<tr>
<td>4</td>
<td>Weld #_____ Crack Propagation. Any crack is unacceptable. Are there no visible cracks? (Yes= &quot;Yes, there are no visible cracks)</td>
</tr>
<tr>
<td>5</td>
<td>Weld #_____ Crater Cross Section. All craters should be filled to provide the specified weld size, except for the end of intermittent fillet welds outside of their effective length. Are the weld craters completely filled to the weld size?</td>
</tr>
<tr>
<td>6</td>
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<tr>
<td>7</td>
<td>Weld #_____ Porosity. No visible porosity is acceptable, Does the Weld Meet this Requirement?</td>
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<tr>
<td>8</td>
<td>Weld #_____ Undercut. Not to exceed 1/32 in depth for a total accumulated length of 1/2in. Does the weld meet this requirement?</td>
</tr>
<tr>
<td>9</td>
<td>Weld #_____ Undersized Welds. Weld Size not to be larger by anything greater than 1/16 in. anywhere along the weld length and no smaller than specified on the drawing. Does the weld size meet this requirement?</td>
</tr>
<tr>
<td>10</td>
<td>Weld #_____ Weld Profiles. Fillet welds can be slightly concave, flat, or slightly convex with the crown not to exceed 3/32 in. above flush. Groove Welds can be flush with an even crown not to exceed 3/32 in. Does this weld meet this requirement?</td>
</tr>
<tr>
<td>11</td>
<td>Weld #_____ Weld/Base metal Fusion. Complete fusion shall exist between base and weld metal. Does the weld display complete fusion with no cold lap?</td>
</tr>
<tr>
<td>12</td>
<td>Weld #_____ There shall be no Arc Marks outside the weld area. Does the weld meet this requirement?</td>
</tr>
</tbody>
</table>

---

Was their a safety infraction? BE SURE TO NOTE The Competitor Number and Explain the safety violation on the Safety Infraction Sheet.
<table>
<thead>
<tr>
<th>ID</th>
<th>QTY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>0.25 X 8 X 8 Steel Plate</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>5/16 x 3 x 3 x 6 Steel Angle</td>
</tr>
<tr>
<td>C</td>
<td>1</td>
<td>3 x 5.0# x 10 Steel Channel</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>0.25 x 6 x 10 Steel Plate</td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td>0.25 x 3 x 6 Steel Plate</td>
</tr>
</tbody>
</table>

ALL PROCESSES TO BE COMPLETED WITH THE MATERIALS PROVIDED

1. WELD IN ACCORDANCE WITH WPS# 101 UNLESS NOTED
2. TACK COMPLETE ASSEMBLY IN ANY POSITION
3. WELD COMPLETE ASSEMBLY WITH PLATE A FLAT TO THE TABLE
4. ALL VERTICAL WELDS TO BE UPHILL

State SkillsUSA
Welding Contest

TITLE
SMAW

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

AWS American Welding Society

Sheet 1 of 1
Welding Procedure Specification

WPS No. WPS 101 Revision 3 Date 4/21/2013 By NP

Authorized By GH Date 5/15/2011 Prequalified [ ]

Welding Process(es) SMAW Type: Manual [ ] Machine [ ] Semi-Auto [ ] Auto [ ]

Supporting PQR(s) Prequalified [ ]

**JOINT**

Type Butt / T-Joint

Backer Yes [ ] No [ ] Single Weld [ ] Double Weld [ ]

Backer Material A-36

Root Opening 1/8" ±1/16" Root Face Dimension 0" - 1/8"

Groove Angle 45 Deg. Radius (J-U) N/A

Back Gauge Yes [ ] No [ ]

Method N/A

**BASE METALS**

Material Spec. A-36 to A-36

Type or Grade N/A to N/A

Thickness: Groove (in) 1/8 - 3/4

Fillet (in) Unlimited - Unlimited

Diameter (Pipe, in) 4 - Unlimited

**POSITION**

Position of Groove 1G, 2G, 3G, 4G Fillet 1F, 2F, 3F, 4F

Vertical Progression: [ ] Up [ ] Down

**ELECTRICAL CHARACTERISTICS**

Transfer Mode (GMAW):

- Short-Circuiting [ ] Globular [ ] Spray [ ]
- Current: AC [ ] DCEP [ ] DCEN [ ] Pulsed [ ]

Other N/A

Tungsten Electrode (GTAW):

- Size N/A Type N/A

**TECHNIQUE**

Stringer or Weave Bead Both

Multi-pass or Single Pass (per side) Single / Multiple

Number of Electrodes 1

Electrode Spacing: Longitudinal N/A Lateral N/A Angle N/A

Contact Tube to Work Distance N/A

Peening N/A

Interpass Cleaning Chip slag and wire brush

**POSTWELD HEAT TREATMENT** PWHT Required [ ]

- Temp. N/A Time N/A

**WELDING PROCEDURE**

<table>
<thead>
<tr>
<th>Layer/Pass</th>
<th>Process</th>
<th>Filler Metal Class</th>
<th>Diameter</th>
<th>Cur. Type</th>
<th>Amps</th>
<th>Volts</th>
<th>Travel Speed</th>
<th>Other Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>SMAW</td>
<td>E-7018</td>
<td>3/32</td>
<td>DCEP</td>
<td>70-110</td>
<td>N/A</td>
<td>4-10 ipm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>SMAW</td>
<td>E-7018</td>
<td>1/8</td>
<td>DCEP</td>
<td>90-150</td>
<td>N/A</td>
<td>4-10 ipm</td>
<td></td>
</tr>
</tbody>
</table>
**Welding Procedure Specification**

**WPS No.** WPS 106  
**Revision** 2  
**Date** 4/20/2012  
**By** NP  

**Authorized By** GH  
**Date** 5/15/2011  
**Prequalified**  

**Welding Process(es)** SMAW  
**Type:** Manual □ Machine □ Semi-Auto □ Auto □  

**Supporting PQR(s)** Prequalified  

---

**JOINT**

**Type** T-Joint  
**Backing** Yes □ No ■ Single Weld ■ Double Weld □  
**Backing Material** N/A  
**Root Opening** N/A  
**Root Face Dimension** N/A  
**Groove Angle** N/A  
**Radius (J-U)** N/A  
**Groove Gouge** Yes □ No ■  
**Method** N/A  

---

**BASE METALS**

**Material Spec.** A-36 to A-36  
**Type or Grade**  
**Thickness:** Groove (in) N/A - N/A  
**Fillet** Unlimited -  
**Diameter (Pipe, in)** N/A - N/A  

---

**FILLER METALS**

**AWS Specification** A5.1  
**AWS Classification** E-6010  

---

**SHIELDING**

**Flux** Gas N/A  
**Composition** N/A  
**Electrode-Flux (Class)** Flow Rate N/A  
**Gas Cup Size** N/A  

---

**PREHEAT**

**Preheat Temp., Min.** 60 Deg F  
**Thickness** Up to 3/4" Temperature N/A  
**Over 3/4" to 1-1/2"** N/A  
**Over 1-1/2" to 2-1/2"** N/A  
**Over 2-1/2"** N/A  
**Interpass Temp., Min.** N/A  
**Max.** N/A  

---

**POSITION**

**Position of Groove** All □ Fillet All □  
**Vertical Progression:** Up □ Down □  

---

**ELECTRICAL CHARACTERISTICS**

**Transfer Mode (GMAW):**  
- Short-Circuiting □  
- Globular □  
- Spray □  
**Current:** AC □ DCEP ■ DCEN □ Pulsed □  
**Other** N/A  
**Tungsten Electrode (GTAW):**  
- Size N/A □  
- Type N/A □  

---

**TECHNIQUE**

**Stringer or Weave Bead** Both □  
**Multi-pass or Single Pass (per side)** Multiple/Single □  
**Number of Electrodes** 1 □  
**Electrode Spacing:** Longitudinal N/A □  
**Lateral** N/A □  
**Angle** N/A □  
**Contact Tube to Work Distance** N/A □  
**Peening** N/A □  
**Interpass Cleaning** Chip slag and wire brush □  
**POSTWELD HEAT TREATMENT** PWHT Required □

---

**WELDING PROCEDURE**

<table>
<thead>
<tr>
<th>Layer/Pass</th>
<th>Process</th>
<th>Filler Metal Class</th>
<th>Diameter</th>
<th>Cur. Type</th>
<th>Amps</th>
<th>Volts</th>
<th>Travel Speed</th>
<th>Other Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>SMAW</td>
<td>E-6010</td>
<td>1/8</td>
<td>DCEP</td>
<td>90-115</td>
<td>N/A</td>
<td>4-10 ipm</td>
<td></td>
</tr>
</tbody>
</table>
WPS No. WPS 107 Revision 2 Date 4/20/2012 By NP
Authorized By GH Date 5/15/2011 Prequalified
Welding Process(es) SMAW Type: Manual □ Machine □ Semi-Auto □ Auto □
Supporting PQR(s) Prequalified

**JOINT**

<table>
<thead>
<tr>
<th>Type</th>
<th>T-Joint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backing</td>
<td>Yes □ No ■ Single Weld □ Double Weld □</td>
</tr>
<tr>
<td>Backing Material</td>
<td>N/A</td>
</tr>
<tr>
<td>Root Opening</td>
<td>N/A</td>
</tr>
<tr>
<td>Root Face Dimension</td>
<td>N/A</td>
</tr>
<tr>
<td>Groove Angle</td>
<td>N/A</td>
</tr>
<tr>
<td>Radius (J-U)</td>
<td>N/A</td>
</tr>
<tr>
<td>Back Gouge</td>
<td>Yes □ No ■</td>
</tr>
<tr>
<td>Method</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**BASE METALS**

| Material Spec. | A-36 to A-36 |
| Type or Grade | □ |
| Thickness: Groove (in) | N/A |
| Diameter (Pipe, in) | N/A |
| Fillet (Unlimited) | N/A |

**FILLER METALS**

| AWS Specification | A5.1 |
| AWS Classification | E-7024 |

**SHIELDING**

| Flux | Gas N/A |
| N/A | Composition N/A |
| Electrode-Flux (Class) | Flow Rate N/A |
| N/A | Gas Cup Size N/A |

**PREHEAT**

| Preheat Temp., Min. | 60 Deg F |
| Thickness Up to 3/4" | Temperature N/A |
| Over 3/4" to 1-1/2" | N/A |
| Over 1-1/2" to 2-1/2" | N/A |
| Over 2-1/2" | N/A |
| Interpass Temp., Min. | Max N/A |

**POSITION**

| Position of Groove | Fillet 1F, 2F |
| Vertical Progression | □ Up □ Down |

**ELECTRICAL CHARACTERISTICS**

| Transfer Mode (GMAW): | □ Short-Circuiting □ Globular □ Spray |
| Current: | AC □ DCEP □ DCEN □ Pulsed □ |
| Other | N/A |
| Tungsten Electrode (GTAW): | Size N/A |
| Type | N/A |

**TECHNIQUE**

| Stringer or Weave Bead | Both |
| Multi-pass or Single Pass (per side) | Multiple/Single |
| Number of Electrodes | 1 |
| Electrode Spacing: | Longitudinal N/A |
| Lateral N/A |
| Angle N/A |
| Contact Tube to Work Distance | N/A |
| Peening | N/A |
| Interpass Cleaning | Chip slag and wire brush |

**POSTWELD HEAT TREATMENT**

| PWHT Required | □ |
| Temp. | N/A |
| Time | N/A |

### WELDING PROCEDURE

<table>
<thead>
<tr>
<th>Layer/Pass</th>
<th>Process</th>
<th>Filler Metal Class</th>
<th>Diameter</th>
<th>Cur. Type</th>
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<th>Volts</th>
<th>Travel Speed</th>
<th>Other Notes</th>
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</thead>
<tbody>
<tr>
<td>All</td>
<td>SMAW</td>
<td>E-7024</td>
<td>1/8</td>
<td>DCEP</td>
<td>130-150</td>
<td>N/A</td>
<td>4-10 ipm</td>
<td></td>
</tr>
</tbody>
</table>
‘A’=YES it meets this criteria  
‘B’= NO it does NOT meet this criteria  

GMAW FINAL

<table>
<thead>
<tr>
<th>Assembly Questions</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Has surface slag, spatter, and smoke been removed from all of the joints and surrounding areas?</td>
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<td>4</td>
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<td>5</td>
<td>Weld # _____ Overall bead width not to exceed 1/16 in. variation in width (from max to min) for any weld face. Does the weld meet this requirement?</td>
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<tr>
<td>6</td>
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<td>7</td>
<td>Weld # _____ Undercut. Not to exceed 1/32 in depth for a total accumulated length of 1/2in. Does the weld meet this requirement?</td>
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<td>8</td>
<td>Weld # _____ Undersized Welds. Weld Size not to be larger by anything greater than 1/16 in. anywhere along the weld length and no smaller than specified on the drawing. Does the weld size meet this requirement?</td>
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<td>9</td>
<td>Weld # _____ Weld Profiles. Fillet welds can be slightly concave, flat, or slightly convex with the crown not to exceed 3/32 in. above flat. Groove Welds can be flush with an even crown not to exceed 3/32 in. Does this weld meet this requirement?</td>
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<td>10</td>
<td>Weld # _____ Weld/Base metal Fusion. Complete fusion shall exist between base and weld metal. Does the weld display complete fusion with no cold lap?</td>
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<tr>
<td>11</td>
<td>Weld # _____ There shall be no Arc Marks outside the weld area. Does the weld meet this requirement?</td>
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<tr>
<td>12</td>
<td>All other Fillet Welds Undersized Welds. Weld Size not to be larger by anything greater than 1/16 in. anywhere along the weld length and no smaller than specified on the drawing. Do all remaining fillet welds meet this requirement?</td>
</tr>
</tbody>
</table>

Was there a safety infraction? BE SURE TO NOTE  
The Competitor Number and Explain the safety violation on the Safety Infraction Sheet.
ALL PROCESSES TO BE COMPLETED WITH THE MATERIALS PROVIDED

1. WELD IN ACCORDANCE WITH WPS# 104-035
2. TACK COMPLETE ASSEMBLY IN ANY POSITION
3. WELD COMPLETE ASSEMBLY WITH PLATE D FLAT TO THE TABLE
4. ALL VERTICAL WELDS TO BE DOWNHILL

State SkillsUSA Welding Contest

GMAW

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
# Welding Procedure Specification

**WPS No.** WPS 104  
**Revision** 2  
**Date** 06/20/2015  
**By** NP  
**Authorized By** EN  
**Date** 6/20/2015  
**Welding Process(es)** GMAW-S  
**Type:** Manual ☐ Machine ☐ Semi-Auto ☐ Auto ☐  
**Supporting PQR(s)** Prequalified  

## JOINT

**Type** T-Joint  
**Backing** Yes ☐ No ☐ Single Weld ☐ Double Weld ☐  
**Backing Material** N/A  
**Root Opening** N/A  
**Root Face Dimension** N/A  
**Groove Angle** N/A  
**Radius (J-U)** N/A  
**Back Gouge** Yes ☐ No ☐  
**Method** N/A  

## BASE METALS

**Material Spec.** A 36 to A 36  
**Type or Grade** to  
**Thickness: Groove** N/A - N/A  
**Fillet (in)** Unlimited -  
**Diameter (Pipe, )** N/A - N/A  

## FILLER METALS

**AWS Specification** A5.18  
**AWS Classification** ER70S-6  

## SHIELDING

**Flux** Gas M20-Arc-10  
**Composition** 90% Argon/10% CO2  
**Electrode-Flux (Class)** Flow Rate 35-45 CFH  
**N/A** Gas Cup Size 1/2" - 3/4"  

## PREHEAT

**Preheat Temp., Min.** 60 Deg.F  
**Thickness** Up to 3/4" Temperature N/A  
**Over 3/4" to 1-1/2"** N/A  
**Over 1-1/2" to 2-1/2"** N/A  
**Over 2-1/2"** N/A  
**Interpass Temp., Min.** N/A  
**Max.** N/A  

## POSTWELD HEAT TREATMENT

**PWHT Required** ☐  
**Temp.** N/A  
**Time** N/A  

## TECHNIQUE

**Stringer or Weave Bead** Stringer  
**Multi-pass or Single Pass (per side)** Single  
**Number of Electrodes** 1  
**Electrode Spacing** Longitudinal N/A  
**Lateral** N/A  
**Angle** N/A  
**Contact Tube to Work Distance** 1/4" to 3/8"  
**Peening** N/A  
**Interpass Cleaning** Chip slag and wire brush  

## POSITION

**Position of Groove** All  
**Fillet** All  
**Vertical Progression:** ☐ Up ☐ Down  

## ELECTRICAL CHARACTERISTICS

**Transfer Mode (GMAW):**  
Short-Circuiting ☐ Globular ☐ Spray ☐  
**Current:** AC ☐ DCEP ☐ DCEN ☐ Pulsed ☐  
**Other** N/A  
**Tungsten Electrode (GTAW):**  
**Size** N/A  
**Type** N/A  

## WELDING PROCEDURE

<table>
<thead>
<tr>
<th>Layer/Pass</th>
<th>Process</th>
<th>Filler Metal Class</th>
<th>Diameter</th>
<th>Cur. Type</th>
<th>Amps</th>
<th>Volts</th>
<th>Travel Speed</th>
<th>Other Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>GMAW</td>
<td>ER70S-6</td>
<td>0.035&quot;</td>
<td>DCEP</td>
<td>90-150</td>
<td>16-20</td>
<td>6-8 ipm</td>
<td>WFS 140-35 0 ipm</td>
</tr>
</tbody>
</table>
‘A’=YES it meets this criteria  
‘B’= NO it does NOT meet this criteria  

**FCAW FINAL**

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Has surface slag, spatter, and smoke been removed from all of the joints and surrounding areas?</td>
</tr>
<tr>
<td>2</td>
<td>Is the Project Assembled In Accordance to the Drawing?</td>
</tr>
<tr>
<td>3</td>
<td>Does the overall workmanship display consistency among all welds?</td>
</tr>
<tr>
<td></td>
<td>(ALL WELDS MUST BE GENERALLY CONSISTENT WITH NO SIGNIFICANT DISCONTUNITIES)</td>
</tr>
<tr>
<td>4</td>
<td>Weld #_____ Crater Cross Section. All craters should be filled to provide the specified weld size, except for the end of intermittent fillet welds outside of their effective length. Are the weld craters completely filled to the weld size?</td>
</tr>
<tr>
<td>5</td>
<td>Weld #_____ Overall bead width not to exceed 1/16 in. variation in width (from max to min) for any weld face. Does the weld meet this requirement?</td>
</tr>
<tr>
<td>6</td>
<td>Weld #_____ Porosity. No visible porosity is acceptable, Does the Weld Meet this Requirement?</td>
</tr>
<tr>
<td>7</td>
<td>Weld #_____ Undercut. Not to exceed 1/32 in depth for a total accumulated length of 1/2in. Does the weld meet this requirement?</td>
</tr>
<tr>
<td>8</td>
<td>Weld #_____ Undersized Welds. Weld Size not to be larger by anything greater than 1/16 in. anywhere along the weld length and no smaller than specified on the drawing. Does the weld size meet this requirement?</td>
</tr>
<tr>
<td>9</td>
<td>Weld #_____ Weld Profiles. Fillet welds can be slightly concave, flat, or slightly convex with the crown not to exceed 3/32 in. above flat Groove Welds can be flush with an even crown not to exceed 3/32 in. Does this weld meet this requirement?</td>
</tr>
<tr>
<td>10</td>
<td>Weld #_____ Weld/Base metal Fusion. Complete fusion shall exist between base and weld metal. Does the weld display complete fusion with no cold lap?</td>
</tr>
<tr>
<td>11</td>
<td>Weld #_____ There shall be no Arc Marks outside the weld area. Does the weld meet this requirement?</td>
</tr>
<tr>
<td>12</td>
<td>All other Fillet Welds Undersized Welds. Weld Size not to be larger by anything greater than 1/16 in. anywhere along the weld length and no smaller than specified on the drawing. Do all remaining fillet welds meet this requirement?</td>
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---

Was there a safety infraction? BE SURE TO NOTE  
The Competitor Number and Explain the safety violation on the Safety Infraction Sheet.
ALL PROCESSES TO BE COMPLETED WITH THE MATERIALS PROVIDED

1. WELD IN ACCORDANCE WITH WPS# 108
2. TACK COMPLETE ASSEMBLY IN ANY POSITION
3. WELD COMPLETE ASSEMBLY WITH PLATE A FLAT TO THE TABLE
4. ALL VERTICAL WELDS TO BE UPHILL

State SkillsUSA
Welding Contest

FCAW-G

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

SHEET 1 OF 1
**Welding Procedure Specification**

**WPS No:** WPS 108  
**Revision:** 1  
**Date:** 4/19/2016  
**By:** NP

**JOINT**

- **Type:** T-Joint, Butt, Flanged
- **Backing:** Yes [ ] No [ ] Single Weld [ ] Double Weld [ ]
- **Backing Material:** N/A
- **Root Opening:** 0  
  **Root Face Dimension:** N/A
- **Groove Angle:** N/A  
  **Radius (J-U):** N/A
- **Back Gouge:** Yes [ ] No [ ]
- **Method:** N/A

**BASE METALS**

- **Material Spec.:** A-36  
  **Type or Grade:** A-36  
  **Thickness:** Groove ( ) Unltd - N/A  
  **Fillet (in):** Unltd -
  **Diameter (Pipe, in):** N/A - N/A

**FILLER METALS**

- **AWS Specification:** A5.20  
  **AWS Classification:** E71T-1

**SHEILDING**

- **Flux:** N/A  
  **Gas Composition:** 75% Argon/25% CO2  
  **Electrode-Flux:** Flow Rate 35-45 CFH  
  **N/A:** Gas Cup Size 1/2" - 3/4"

**PREHEAT**

- **Preheat Temp., Min.:** 60 Deg.F
  - **Thickness Up to 3/4"** Temperature N/A
  - **Over 3/4" to 1-1/2"** N/A
  - **Over 1-1/2" to 2-1/2"** N/A
  - **Over 2-1/2"** N/A
  - **Interpass Temp., Min.:** N/A  
  **Max.:** N/A

**POSITION**

- **Position of Groove:** All  
  **Fillet:** All
- **Vertical Progression:** [ ] Up  [ ] Down

**ELECTRICAL CHARACTERISTICS**

- **Transfer Mode (GMAW):**
  - Short-Circuiting [ ]  
  - Globular [ ]  
  - Spray [ ]
  - Current: AC [ ]  
  **DCEP [ ]  DCEN [ ]  Pulsed [ ]**
  **Other:** N/A
- **Tungsten Electrode (GTAW):**
  - **Size:** N/A  
  - **Type:** N/A

**TECHNIQUE**

- **Stringer or Weave Bead:** Both  
  **Multi-pass or Single Pass (per side):** Multiple/Single
- **Number of Electrodes:** 1
- **Electrode Spacing:** Longitudinal N/A  
  **Lateral:** N/A  
  **Angle:** N/A
- **Contact Tube to Work Distance:** 1/2" to 3/4"
- **Peening:** N/A
- **Interpass Cleaning:** Chip slag and wire brush

**POSTWELD HEAT TREATMENT**

- **PWHT Required:** [ ]
- **Temp.:** N/A  
  **Time:** N/A

**WELDING PROCEDURE**

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<tbody>
<tr>
<td>All</td>
<td>FCAW-G</td>
<td>E71T-1M</td>
<td>0.045</td>
<td>DCEP</td>
<td>200-260</td>
<td>24-26</td>
<td>5-12</td>
<td>WFS:340-500ipm</td>
</tr>
</tbody>
</table>

**RECOMMENDED SETTINGS:**

| 1F&2F      | FCAW-G  | E71T-1M            | 0.045    | DCEP      | 260   | 26    | 5-12 | WFS:500ipm   |
| 4F         | FCAW-G  | E71T-1M            | 0.045    | DCEP      | 220   | 24    | 5-12 | WFS:380ipm   |
| 3F         | FCAW-G  | E71T-1M            | 0.045    | DCEP      | 200   | 24    | 5-12 | WFS:340ipm   |