'A' = YES it meets this criteria
'B' = NO it does NOT meet this criteria

OFC FINAL

<table>
<thead>
<tr>
<th></th>
<th>Description</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 there a safety infraction? BE SURE TO NOTE The Competitor Number and Explain the safety violation on the Safety Infraction Sheet.
Item | Qty. | Description
--- | --- | ---
A | 1 | 1/4 x 6 x 6

ALL PROCESSES TO BE COMPLETED WITH THE MATERIALS PROVIDED

State SkillsUSA Welding Contest
OFC

SkillsUSA

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

Cut 6" Long Width = Kerf
<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.**
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

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
## Welding Procedure Specification

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

**JOINT**
- **Type:** T-Joint / Corner
- **Backgouge:** Yes [ ] No [ ] Single Weld [ ] Double Weld [ ]
- **Backing:** Yes [ ] No [ ] Single Weld [ ] Double Weld [ ]
- **Backing Material:** N/A
- **Root Opening:** 0
- **Root Face Dimension:** 0
- **Groove Angle:** 30-90
- **Back Gouge:** Yes [ ] No [ ] Single Weld [ ] Double Weld [ ]
- **Method:** N/A

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

**FILLER METALS**
- **AWS Specification:** A5.10
- **AWS Classification:** ER4043

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

**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

**ELECTRICAL CHARACTERISTICS**
- **Transfer Mode (GMAW):** Short-Circuiting [ ] Globular [ ] Spray [ ]
- **Current:** AC [ ] DCEP [ ] DCEN [ ] Pulsed [ ]
- **Other:** N/A
- **Tungsten Electrode (GTAW):** Size 3/32" Type Ew2CE2

**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:** N/A

**POSTWELD HEAT TREATMENT**
- **PWHT Required:** 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>GTAW</td>
<td>ER4043</td>
<td>3/32&quot;</td>
<td>AC</td>
<td>110-175</td>
<td>N/A</td>
<td>4-8 ipm</td>
<td>AC Bal. 65-75%EN</td>
</tr>
</tbody>
</table>

| | | | | | | | | |

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

**OTHER**
- **Technical Notes:**

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**SkillsUSA**

Welding Procedure Specification

WPS 103
‘A’=YES it meets this criteria
‘B’= NO it does NOT meet this criteria

SMAW 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>
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<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? (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>
<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>7</td>
<td>Weld #_____ Porosity. No visible porosity is acceptable, Does the Weld Meet this Requirement?</td>
</tr>
<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.
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

SkillsUSA

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES.
## SkillsUSA
### Welding Procedure Specification

<table>
<thead>
<tr>
<th>WPS No.</th>
<th>WPS 101</th>
<th>Revision</th>
<th>3</th>
<th>Date</th>
<th>4/21/2013</th>
<th>By</th>
<th>NP</th>
</tr>
</thead>
</table>

**Authorized By**: GH

**Welding Process(es)**: SMAW

**Supporting PQR(s)**: Prequalified

**Welding Process(es)**: SMAW

**Supporting PQR(s)**: Prequalified

### JOINT

- **Type**: Butt / T-Joint
- **Backing**: Yes ■ No □ Single Weld ■ Double Weld □
- **Backing 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 Gouge**: Yes ■ No □
- **Method**: N/A

### BASE METALS

- **Material Spec.**: A-36 to A-36
- **Type or Grade**:
  - Thickness: Groove (in): 1/8 - 3/4
  - Fillet (in): Unlimited
  - Diameter (Pipe, in): 4 - Unlimited

### FILLER METALS

- **AWS Specification**: A5.1
- **AWS Classification**: E-7018

### SHIELDING

- **Flux**: N/A
- **Composition**: N/A
- **Electrode-Flux (Class)**: N/A
- **Gas**: N/A
- **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" Temperature: N/A
  - Over 1-1/2" to 2-1/2" Temperature: N/A
  - Over 2-1/2" Temperature: N/A
- **Interpass Temp., Min.**
- **Max.**

### 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>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>
**SkillsUSA**

**Welding Procedure Specification**

**WPS No.**: WPS 106

**Revision**: 2

**Date**: 4/20/2012

**Authorized By**: GH

**Prequalified**: Yes

**Welding Process(es)**: SMAW

**Type**: Manual

**Supporting PQR(s)**: Prequalified

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**JOINT**

Type: T-Joint

- Backing: Yes
- Single Weld: Yes
- Double Weld: No
- Backing Material: N/A
- Root Opening: N/A
- Root Face Dimension: N/A
- Groove Angle: N/A
- Radius (J-U): N/A
- Back Gouge: No

**BASE METALS**

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

**FILLER METALS**

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

**SHIELDING**

- Flux: N/A
- Composition: N/A
- Electrode-Flux (Class): N/A
- 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" Temperature: N/A
- Over 1-1/2" to 2-1/2" Temperature: N/A
- Over 2-1/2" Temperature: N/A
- Interpass Temp., Min.: N/A
- Max.: N/A

**POSITION**

- Position of Groove: All
- Vertical Progression: Up
- Fillet: All
- Down

**ELECTRICAL CHARACTERISTICS**

- Transfer Mode (GMAW):
  - Short-Circuiting: N/A
  - Globular: N/A
  - Spray: N/A
- 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 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>4-10 ipm</td>
<td></td>
</tr>
</tbody>
</table>
SkillsUSA
Welding Procedure Specification

WPS 107

WPS No. WPS 107  Revision 2  Date 4/20/2012  By NP
Authorized By GH  Date 5/15/2011
Welding Process(es) SMAW  Type: Manual  Machine  Semi-Auto  Auto
Supporting PQR(s) Prequalified

JOINT
Type T-Joint
Backin' Yes  No  Single Weld  Double Weld
Backin' 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 N/A
Thickness: Groove (in ) N/A - N/A
Fillet ( ) Unlimited - N/A
Diameter (Pipe, in ) N/A - N/A

FILLER METALS
AWS Specification A5.1
AWS Classification E-7024

SHIELDING
Flux N/A
Gas N/A
Composition N/A
Electrode-Flux (Class) N/A
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

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
Layer/Pass Process Filler Metal Class Diameter Cur. Type Amps Volts Travel Speed Other Notes

All SMAW E-7024 1/8 DCEP 130-150 N/A 4-10 ipm
‘A’=YES it meets this criteria
‘B’= NO it does NOT meet this criteria

**GMAW FINAL**

| Assembly Questions |  
|--------------------|---|
| 1. Has surface slag, spatter, and smoke been removed from all of the joints and surrounding areas? |  
| 2. Is the Project Assembled In Accordance to the Drawing? |  
| 3. Does the overall workmanship display consistency among all welds? (ALL WELDS MUST BE GENERALLY CONSISTENT WITH NO SIGNIFICANT DISCONTUNITIES) |  
| 4. 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? |  
| 5. 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? |  
| 6. Weld #____ Porosity. No visible porosity is acceptable, Does the Weld Meet this Requirement? |  
| 7. Weld #____ Undercut. Not to exceed 1/32 in depth for a total accumulated length of 1/2in. Does the weld meet this requirement? |  
| 8. 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? |  
| 9. 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? |  
| 10. Weld #____ Weld/Base metal Fusion. Complete fusion shall exist between base and weld metal. Does the weld display complete fusion with no cold lap? |  
| 11. Weld #____ There shall be no Arc Marks outside the weld area. Does the weld meet this requirement? |  
| 12. 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? |  

**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 FLAT TO THE TABLE
4. ALL VERTICAL WELDS TO BE DOWNHILL

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES
SkillsUSA

Welding Procedure Specification

WPS No. WPS 104
Revision 2
Date 06/20/2015
By NP

Prequalified [ ]
Type: Manual [ ] Machine [ ] Semi-Auto [ ] Auto [ ]

JOINT
Type: T-Joint
Back: Yes [ ] No [ ] Single Weld [ ] Double Weld [ ]
Back 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: N/A
Thickness: Groove (in): N/A - N/A
Fillet (in): Unlimited -
Diameter (Pipe, in): N/A - N/A

FILLER METALS
AWS Specification: A5.18
AWS Classification: ER70S-6

SHIELDING
Gas: M20-ArC-10
Composition: 95% Argon/10% CO2
Electrode-Flux (Class): N/A
Flow Rate: 35-45 CFH
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

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: 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

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 (in)</th>
<th>Cur. Type</th>
<th>Amps</th>
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<tr>
<td>All</td>
<td>GMAW</td>
<td>ER70S-6</td>
<td>0.035</td>
<td>DCEP</td>
<td>90-150</td>
<td>16-20</td>
<td>6-8 ipm</td>
<td>WFS 140-350</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 Questions</th>
<th>Description</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? (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 1/2 in. 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>
</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>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>5/16 x 3 x 3 x 10 Steel Angle</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# 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

American Welding Society
SkillsUSA

Welding Procedure Specification

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

Authorized By EN  Date 4/19/2016  Prequalified ☐

Welding Process(es) FCAW-G  Type: Manual ☐ Machine ☐ Semi-Auto ☐ Auto ☐

Supporting PQR(s) Prequalified

JOINT

Type T-Joint, Butt, Flanged

Backing Yes ☐ No ☐ Single Weld ☐ Double Weld ☐

Back 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  to  A-36

Type or Grade

Thickness: Groove ( ) Unlimited - N/A

Fillet (in ) Unlimited - N/A

Diameter (Pipe, ) N/A - N/A

FILLER METALS

AWS Specification A5.20

AWS Classification E71T-1

SHIELDING

Gas Composition 75%Argon/25%CO2

Electrode-Flux (Class) Flow Rate 35-45 CFH

Electrode-Flux (Class) Gas Cup Size 1/2" - 3/4"

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 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

Layer/Pass Process Filler Metal Class Diameter Cur. Type Amps Volts Travel Speed Other Notes

All FCAW-G E71T-1M 0.045 DCEP 200-260 24-26 5-12 WFS:340-500ipm

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
Appendix A - Zipgrade Tips

Zipgrade.com is a phone app that is easy to use and inexpensive. It has significantly reduced the time to record all scores then total them to determine the top finishers.

Below is an outline of tips to using zipgrade.com for creating score sheets to quickly and accurately capture score points. Creating “quizzes” in zipgrade for each of the score criteria sheets for each part of the competition is the “how” to be able to use a simple grade system to act as a scoring system.

1. Decide on Contest Areas

<table>
<thead>
<tr>
<th>Contest Area</th>
<th>Input</th>
<th>Factored Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contest-Section-1</td>
<td>350</td>
<td>181.3471503</td>
</tr>
<tr>
<td>Contest-Section-2</td>
<td>300</td>
<td>155.4404145</td>
</tr>
<tr>
<td>Contest-Section-3</td>
<td>200</td>
<td>103.626943</td>
</tr>
<tr>
<td>Contest-Section-4</td>
<td>100</td>
<td>51.8134715</td>
</tr>
<tr>
<td>Contest-Section-5</td>
<td>15</td>
<td>7.772020725</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>965</strong></td>
<td><strong>500</strong></td>
</tr>
</tbody>
</table>

2. Determine how to collect the data

- If ZipGrade will work, follow the ZipGrade instructions
  - ZipGrade Instructions
    - Create Quiz for each contest area and a Key
    - Import the list of Students (Contestants), linked to a Class
    - Link the Class to each quiz
    - Create Bubble Answer Sheets for each Quiz
    - Print all score sheet packets
    - Scan Bubble Sheets for Perfect Score Contestants for testing
    - Review Results in ZipGrade

- If ZipGrade will not work, use Excel to capture the totals per contest area
  - Setup separate tabs to capture scores per contest area
  - Easiest to capture scores as they come in, and not fill in all contestant numbers to start. Once all scores are entered, data can be sorted by Contestant #.
  - Determine how to capture scores in the contest area and print out score sheets
  - Input Perfect Score Contestants into XLS tab(s) for testing.

Note: All data is managed by Contestant# (no names required, each contestant gets a unique number in zipgrade for tracking all scores)

3. Combine the ZipGrade totals with XLS totals.

- Copy & Paste Gradebook into XLS final score sheet
- Copy & Paste XLS scores into XLS final score sheet

4. Convert the totals into the SkillsUSA required points (use the Multiplier to convert)

Note: The example below shows how you determine the multiplier and the Factored Score is equal to the perfect score. You make up your contest and your actual points any way you want, and in the end, you convert your points into the points you need to turn into SkillsUSA.

In the example below, SkillsUSA wants your total points to be 500. So, you take each actual score and multiply it by the Multiplier. To determine the multiplier you divide the Actual Total by the SkillsUSA Total and you have a multiplier to reach an established final score regardless of how you assign score points. It saves significant time determining how many points every item you are evaluating should be in order to reach the determined number.

It’s easier to collect the totals in the Gradebook format, so the contestant # is on the left and the contest area is at the top. When you setup the conversion routine, format the sheet columns in the order you give to SkillsUSA.

5. Once all scores have been collected paste the final values into the SkillsUSA Scorecard.

6. Subtract any safety violations/penalties Manually enter any safety violations/penalties per contestant directly into the SkillsUSA Scorecard.

\[
\text{Factored Score} = \frac{\text{Actual Score}}{\text{Multiplier}}
\]

\[
\text{Actual Total Points} \times \text{Multiplier} = \text{SkillsUSA Total Points}
\]

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ZIPGRADE OVERVIEW

You will need to login to WWW.ZIPGRADE.COM and register. Once registered, you can use the same logon via the mobile application or the website application. All individuals on your scoring team can use the same logon to capture the scores in the same cloud account. It’s important to understand that certain functions are performed on your phone, while others are only available via the website application.

<table>
<thead>
<tr>
<th>Mobile Application</th>
<th>Website Application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Create Quiz</strong></td>
<td>Manage Students</td>
</tr>
<tr>
<td>Load Key via scan or type in answers</td>
<td>Upload via CSV file</td>
</tr>
<tr>
<td>Set points per question (limited to two decimal places)</td>
<td>Edit - Add/Change/Delete</td>
</tr>
<tr>
<td>Link class to Quiz</td>
<td>Link student to Class (via upload or manually)</td>
</tr>
<tr>
<td><strong>Enter Scores</strong></td>
<td>Bubble Sheets</td>
</tr>
<tr>
<td>Select Quiz, Scan Papers</td>
<td>Print Bubble Sheets per class/pre-numbered</td>
</tr>
<tr>
<td>Review Scores/Paper</td>
<td>Print Blank Bubble Sheets</td>
</tr>
<tr>
<td>Edit Answers (if bad scan)</td>
<td><strong>Grade Report</strong></td>
</tr>
<tr>
<td><strong>Sync to Cloud (manually or automatic)</strong></td>
<td>Use grade report to obtain all scores for all papers graded</td>
</tr>
<tr>
<td><strong>Quiz Results</strong></td>
<td><strong>Quiz Results</strong></td>
</tr>
<tr>
<td>Item Analysis (see total correct per question) - not easily seen on mobile app</td>
<td>Quiz Details &amp; Stats - includes Item Analysis, Score Distribution graph, Graded Papers with scores. Much better visibility of overall contest results than on mobile app.</td>
</tr>
<tr>
<td><strong>Archive</strong></td>
<td><strong>Class</strong> - includes Class, Students and graded papers</td>
</tr>
<tr>
<td>In 2018, we agreed to keep all students (High School as 100 thru 170 and College as 500 thru 525) and copy all required Quizzes from year to year. Once copied, archive the prior year's Quiz so it can't be selected during the contest.</td>
<td><strong>Quiz</strong> - includes Quiz and all graded papers</td>
</tr>
</tbody>
</table>

ZIPGRADE INITIAL SETUP (on phone)

1. Find Application in App Store
   - zipgrade

2. Download and Open application
3. Login using registered User Name and Password.

4. Press OK when the message box appears

5. Update settings to allow camera usage and cell data (it's better if you have internet service on day of contest)

- Camera
- SIM & Search
- Contacts
- Calendar Data

6. Check/Set the following other settings – you decide what you want here. Note: if you have trouble with your scans, adjust the sharpness & strictness bars. Important to turn on WARN BEFORE OVERWRITING and One Quiz Per Student.

REQUIRED IMAGE SHARPNESS

Move to left to allow less sharp images if app is not recognizing answer sheet. Move to right if experiencing fuzzy graded papers. Default is in center.

SHEET STRICTNESS

Move left to accommodate poor form copies. Keep right for most accurate grading.
5. Update settings to allow camera usage and cell data (it's better if you have internet service on day of contest)

6. Check/Set the following other settings – you decide what you want here. Note: if you have trouble with your scans, adjust the sharpness & strictness bars. Important to turn on WARN BEFORE OVERWRITING and One Quiz Per Student.

ZIPGRADE LESSONS LEARNED

LL1 - Use Google Chrome, not IE, as copy/paste text from the Grade Book Report to Excel doesn’t work in IE.

LL2 - In Edit Key, set points per question had a max of 20.9 in the past, but is no longer limited. Can use up to four characters, but limited to two decimal places. So, can use up to 9999 or 999.9 or 99.99 per question.

LL3 - In Edit Key, if multiple correct answers, pick both. If either answer 1 or answer 2 is correct, use Alternate Option.

LL4 - Student ID can’t exceed 9 digits (999999999).

LL5 - Quizzes will be displayed in the Grade Book Report based on the Quiz Date. Update the date to show in the order you want.

LL6 - Pick 100 Question form so you can print the bubble sheets with contestant number already filled in.

LL7 - See ZipGrade Setup page for warning message if scanned multiple times for same student/quiz. If scanner doesn’t overwrite, the entry will be listed twice, but will only appear in the Grade Book Report once. This has been tested and the highest score is what appears in the Grade Book Report. When the second scan was done for Student ID#2, scanner would have received a warning message. If the correct exam is selected, the appropriate answer is to Overwrite Previous.
Multiple scores for Student ID#2, appears if Keep Both is selected.

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Score</th>
<th>% Correct</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1. PERFECT SCORE</td>
<td>20</td>
<td>100.0 %</td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>2. PERFECT SCORE</td>
<td>20</td>
<td>100.0 %</td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>2. PERFECT SCORE</td>
<td>2</td>
<td>10.0 %</td>
<td>A</td>
</tr>
</tbody>
</table>

LL8 - if reviewing scores, back button appears to work to go back and select another score to view. However, it sometimes seems to lose its place, sometimes the best choice is to just select ZipGrade Section from the menu.

**ZipGrade**

LL9 - Look for multiple (as shown above) and/or any papers that didn't scan properly (not linked to a Student ID). Examples, Student ID not clear, fuzzy scan, etc. Please note, graded papers can only be deleted in the mobile app.

Invalid graded papers don't link to a Student ID (as shown in the Quiz screens)
StudentID not valid

To Delete a scanned paper, slide scanned paper score to left, and select Delete

LL10 – During the contest, if you have a scoring table, it's difficult to scan all bubble sheets manually, arms/shoulders start hurting after hours of scanning. After our trial use of Zipgrade, we created some cellphone holders, to help with scanning. We could place the bubble sheets directly below the cell phone holder, stack the pages, then remove one page at a time, quickly. Scoring became much faster.
Many bubble sheets, from many contest areas are hard to keep track of. And, if multiple scanners, it’s best to have individuals scan certain contest areas, so scores from one contest area don’t accidently get saved in the wrong QUIZ. To eliminate these problems, we created scorebooks.

In 2018, we let the judges scan their own scores. This was great, but came with new problems. If a score gets overwritten from another contest, to better identify the problem ensure all bubble sheets have the contest area listed in the QUIZ box. We created booklets and just used blank bubble sheets because the scoring booklet had a name. Note: We will not do that again!

It doesn’t matter if you have scorebooks or loose score sheets, for best results always pre-print the student number and the contest area!