UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

FCAW

1. WELD IN ACCORDANCE WITH WPS# 108
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

<table>
<thead>
<tr>
<th>ID</th>
<th>Qty</th>
<th>Title</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>1/4 x 3 x 3.75 Plate</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>1/4 x 3 x 6 Plate</td>
</tr>
<tr>
<td>F</td>
<td>1</td>
<td>5/16 x 3 x 3 x 6 Steel Angle</td>
</tr>
</tbody>
</table>
ALL PROCESSES TO BE COMPLETED WITH THE MATERIALS PROVIDED

1. WELD IN ACCORDANCE WITH WPS# 104.

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 DOWNHILL FOR APPEARANCE PURPOSES
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

2017 National SkillsUSA Welding Contest

GTAW

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

<table>
<thead>
<tr>
<th>ID</th>
<th>Qty</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>1</td>
<td>0.125 x 5 x 5 Aluminum Sheet</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
<td>0.125 x 4 x 4 Aluminum Sheet</td>
</tr>
<tr>
<td>A</td>
<td>1</td>
<td>0.125 x 6 x 6 Aluminum Sheet</td>
</tr>
</tbody>
</table>

NOTE: Weld #2 Weld 4 Sides Typ.
3/16 Four Pcs Typ. Wrap Corners
ALL PROCESSES TO BE COMPLETED WITH THE MATERIALS PROVIDED

1. LAYOUT IN ANY POSITION

2. CUTTING TO BE COMPLETED WITH PLATE FLAT ON TABLE

ID | Qty | Title
---|-----|------
A  | 1   | 1/2 x 12 x 12 Plate
ALL PROCESSES TO BE COMPLETED WITH THE MATERIALS PROVIDED

1. TACK COMPLETE ASSEMBLY IN ANY POSITION

2. WELDING TO BE COMPLETED WITH THE GROOVE WELD IN THE 3G POSITION WITH PLATE A ON THE TABLE

<table>
<thead>
<tr>
<th>ID</th>
<th>Qty.</th>
<th>Desc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>0.25 X 4.5 X 8 Steel Plate</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>3/8 x 7 x 3 22.5 Bevel One End</td>
</tr>
<tr>
<td>C</td>
<td>1</td>
<td>3 x 5.0# x 7 Steel Channel</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>0.25 x 2 x 7 Steel Plate</td>
</tr>
</tbody>
</table>
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
WPS 101

Welding Procedure Specification

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

Authorized By EN Date 6/22/2017 Prequalified ○

Welding Process(es) SMAW Type: Manual ■ Machine ○ Semi-Auto ○ Auto ○

Supporting PQR(s) 4/21/2013 NP

JOINT

Type Butt / T-Joint

Backing Yes ■ No ○ Single Weld ■ Double Weld ○

Backing Material A-36

Root Opening Per Drawing Root Face Dimension Per Drawing

Groove Angle Per Drawing Radius (J-U) Per Drawing

Back Gouge Yes ■ No ○

Method N/A

BASE METALS

Material Spec. A-36 to A-36

Type or Grade to

Thickness: Groove (in ) 1/8in. - Unlimited

Fillet ( ) Unlimited - Unlimited

Diameter (Pipe, in ) 4in. - Unlimited

FILLER METALS

AWS Specification A5.1

AWS Classification E-7018

SHIELDING

Flux N/A

Composition N/A

Electrode-Flux (Class) 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

WELDING PROCEDURE

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

All SMAW E-7018 3/32 DCEP 70-110 N/A 4-10 ipm

All SMAW E-7018 1/8 DCEP 90-150 N/A 4-10 ipm

POSITION

Position of Groove Any Fillet Any

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

EN
WPS 103

Welding Procedure Specification

WPS No. WPS 103  Revision 3  Date 04/20/2013  By NP

Authorized By EN  Date 6/22/2017  Prequalified  

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

Supporting PQR(s)  

JOINT

Type  T-Joint / Corner

Back Gouge  Yes  □  No  ■

Method  N/A

BASE METALS

Material Spec. 3003  to  3003

Type or Grade  

Thickness:  Groove (  ) 1/8in.  - Unlimited

Fillet (in)  Unlimited  - Unlimited

Diameter (Pipe,  )  Unlimited  - Unlimited

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"  N/A

Interpass Temp., Min. N/A  Max. N/A

POSITION

Position of Groove  Any  Fillet  Any

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

WELDING PROCEDURE

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

All  GTAW  ER4043  3/32"  AC  MAX175  N/A  4-8 ipm  AC Bal. 65-75%EN

AC Hz. 60 - 120
# Welding Procedure Specification

**WPS No.:** WPS 104  
**Revision:** 3  
**Date:** 04/20/2013  
**By:** NP  
**Prequalified:** No

**Welding Process(es):** GMAW  
**Type:** Manual

## JOINT
- **Type:** T-Joint
- **Back-up:** No
- **Back-up Material:** N/A
- **Root Opening:** Per Drawing
- **Root Face Dimension:** Per Drawing
- **Groove Angle:** Per Drawing
- **Back Gouge:** Yes
- **Method:** N/A

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

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

## SHIELDING
- **Flux:** Gas, 75% Argon/25% CO2  
- **Electrode-Flux (Class):** N/A  
- **Flow Rate:** 30-40 CFH  
- **Gas Cup Size:** 1/2” - 3/4”

## PREHEAT
- **Preheat Temp., Min.:** 60 Deg.F  
- **Thickness:** Up to 3/4” - 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

## ELECTRICAL CHARACTERISTICS
- **Transfer Mode (GMAW):** Short-Circuiting
- **Current:** AC
- **Other:** N/A
- **Tungsten Electrode (GTAW):** Size 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:** 3/8” - 1/2”
- **Peening:** N/A
- **Interpass Cleaning:** Chip slag and wire brush

## POSTWELD HEAT TREATMENT
- **PWHT Required:** No

## 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”</td>
<td>DCEP</td>
<td>80-175</td>
<td>16-20</td>
<td>6-12 ipm</td>
<td>WFS 100-250 ipm</td>
</tr>
</tbody>
</table>

---

**Position:**
- **Position of Groove:** Any  
- **Vertical Progression:** Up

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**WELDING PROCEDURE**

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**SkillsUSA**

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**SkillsUSA**
### WPS 106

**Welding Procedure Specification**

<table>
<thead>
<tr>
<th>WPS No.</th>
<th>WPS 106</th>
<th>Revision</th>
<th>3</th>
<th>Date</th>
<th>4/20/2012</th>
<th>By</th>
<th>NP</th>
</tr>
</thead>
</table>

#### Authorized By
EN | Date 6/22/2017 | Prequalified | ☐ |

#### Welding Process(es)
SMAW | Type: Manual ☐ | Machine ☐ | Semi-Auto ☐ | Auto ☐ |

#### Supporting PQR(s)

### JOINT

**Type:** T-Joint
- **Backings:** Yes ☐ | No ☐ | Single Weld ☐ | Double Weld ☐ |
- **Back Material:** N/A

<table>
<thead>
<tr>
<th>Root Opening</th>
<th>Per Drawing</th>
<th>Root Face Dimension</th>
<th>Per Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Groove Angle</strong></td>
<td>Per Drawing</td>
<td>Radius (J-U)</td>
<td>Per Drawing</td>
</tr>
<tr>
<td><strong>Back Gouge</strong></td>
<td>Yes ☐</td>
<td>No ☐</td>
<td></td>
</tr>
<tr>
<td><strong>Method</strong></td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### BASE METALS

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

### FILLER METALS

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

### SHIELDING

- **Flux:** Gas 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:** Any
- **Fillet:** Any
- **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/Simple
- **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-6010</td>
<td>1/8</td>
<td>DCEP</td>
<td>75-135</td>
<td>N/A</td>
<td>4-10 ipm</td>
<td></td>
</tr>
</tbody>
</table>
# Welding Procedure Specification

**WPS No.:** WPS 107  
**Date:** 4/20/2012  
**By:** NP  
**Prequalified:**  

**Welding Process(es):** SMAW  
**Supporting PQR(s):**  
**Type:** Manual  
**Method:** N/A  

## JOINT
- **Type:** T-Joint  
- **Backgroud:** Yes  
- **Backgroud Material:** N/A  
- **Root Opening:** Per Drawing  
- **Back Gouge:** Yes  
- **Method:** N/A

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

## BASE METALS
- **AWS Specification:** A5.1  
- **AWS Classification:** E-7024  

## SHIELDING
- **Flux:** N/A  
- **Composition:** N/A  
- **Electrode-Flux (Class):** N/A  
- **Gas Cup Size:** N/A  

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

## POSTWELD HEAT TREATMENT
- **PWHT Required:**  
- **Temp.:** N/A  
- **Time:** N/A  

## FILLER METALS
- **AWS Specification:** A5.1  
- **AWS Classification:** E-7024  

## ELECTRICAL CHARACTERISTICS
- **Transfer Mode (GMAW):** Short-Circuiting  
- **Current:** AC  
- **DCEP:**  
- **DCEN:**  
- **Pulsed:**  
- **Other:** N/A  
- **Tungsten Electrode (GTAW):** N/A

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

## 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-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>
WPS 108

Welding Procedure Specification

WPS No. WPS 108 Revision 2 Date 4/19/2016 By NP

Prequalified □

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

Supporting PQR(s) □ □ □ □

JOINT

Type T-Joint, Butt, Flanged

Back Gouge Yes □ No ■

Back Gouge Method N/A

Groove Angle Per Drawing

Root Face Dimension Per Drawing

Backing Material N/A

Root Opening Per Drawing

Groove Angle Per Drawing

Backing Yes □ No ■

Groove Angle Per Drawing

Method N/A

BASE METALS

Material Spec. A-36 to A-36

Type or Grade

Thickness: Groove ( ) 1/8in. - Unlimited

Fillet (in) Unlimited - Unlimited

Diameter (Pipe, ) 4in. - Unlimited

FILLER METALS

AWS Specification A5.20

AWS Classification E71T-1

SHIELDING

Flux Gas

Electrode-Flux (Class) N/A

Composition 75% Argon/25% CO2

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

POSTWELD HEAT TREATMENT

PWHT Required □

Temp. N/A Time 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 1/2" to 3/4"

Peening N/A

Interpass Cleaning Chip slag and wire brush

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 125-190 21-27 5-12 WFS:175-400 ipm