Welding

CHAIR: Greg Siepert, Hutchinson Community College

CO-CHAIR: Brandon Stock, Textron Aviation

CONTEST DATE: April 25, 2019

CONTEST LOCATION: Hutchinson Community College, Ade Wifco RCIC Building

CONTEST TIME: 6:00 am

PURPOSE: To evaluate each contestant’s preparation for employment and to recognize outstanding students for excellence and professionalism in the field of Welding

ELIGIBILITY: Open to active SkillsUSA members enrolled in programs with welding as the occupational objective

CLOTHING REQUIREMENT: STRICT ENFORCEMENT of PPE (Personal protective equipment) will be observed during the welding competition.

- All issues concerning inadequate or inappropriate PPE must be resolved during the allowed check-in time for each student.
- Issues that cannot be resolved during this time period, WILL PREVENT the student from competing.
- Please review the list of PPE requirements they will be strictly enforced.

Students are required to wear the Official SkillsUSA Kansas T-shirt and blue jeans (no tears, holes, or bagginess, rolled up pant legs or frayed jeans) clean and neat with appropriate LEATHER BOOTS for the contest. Students may wear the Official SkillsUSA Khaki work shirt and pants (both the shirt and pants must be 100 percent cotton); black, brown or tan leather high-top work boots (no shoes of any kind, leather or otherwise). PLEASE review the new guidelines in the Technical Standard concerning the dress code. Compliance with this dress code will be assessed in the final score for each student. Denim or FRC Pants will be permitted.

* Safety glasses with side shields or goggles. (Prescription glasses can be used only if they are equipped with side shields. If not, they must be covered with goggles.)
CONTEST UPDATES:

ATTENTION!!!!!!!

STRICT ENFORCEMENT of Personal Protective Equipment (PPE) will be observed during the 2019 welding competition.

All issues concerning inadequate or inappropriate PPE must be resolved during the allowed check-in time for each student. If the issue cannot be resolved during this time period, the student will not be allowed to compete. Please review the list of PPE requirements for this will be strictly enforced.

- Each student contestant is assigned a specific check-in time this is the time listed on the schedule sheet provided by Skills USA Kansas. This is when the contestant will enter the contest do not be late!!!

- Prior to the contestant’s check-in time, and after the contest, they are welcome to wait in classroom #106 in the Ade-Wifco RCIC building.

  o Building Address
    ▪ Ade-Wifco RCIC
    613 E 14th Ave
    Hutchinson, KS 67501

  o Due to congestion and tripping hazards, no one will be allowed to sit in the hallway during the duration of the contest. Sorry for any inconvenience caused.
2019 KANSAS STATE CHAMPIONSHIPS (KSC) CONTEST UPDATE

- Contestants will not check-in prior to your assigned time.
- A contest judge will come to get each group of 4 contestants from the gathering area (AW106) at the designated check-in time.
- The designated check-in time will be the only opportunity for the contestant to enter the competition.
- Contestants will not be able to return to the check-in area after they are done with the contest. Anything left in the check-in area will have to be picked up after 1:30 pm once all contestants have begun the contest.
- Advisors will be allowed to join their students during check-in and take all un-needed equipment and/or gear back to the gathering area.
- After the contest contestants will be allowed to return to the gathering area to pick up their stuff.
- **Once contestants leave the check-in area for the written test they are to have no further contact with their advisor.**

**In the event that an advisor is found on the contest floor, or check-in area after their contestant's check-in and move to the written test, their contestants will be disqualified from the contest. There will be no room for interpretation on this. Please let your students have the best experience possible.**

- Contestants not having the required PPE during check-in will not be allowed to enter the contest at a later time.
- **No communication devices will be allowed in the competition area.**
Contest Format

1. Check-In (30 minutes) – Contest begins for the contestant (5 minute rotation time)
2. Written Test (30 minutes) (5 minute rotation time)
3. GMAW Process (30 minutes) (5 minute rotation time)
4. SMAW Process (30 minutes) (5 minute rotation time)
5. FCAW Process (30 minutes) (5 minute rotation time)
6. Oxy-Fuel Cutting (30 minutes) (5 minute rotation time)
7. GTAW Process (30 minutes) (5 minute rotation time)

PLEASE REVIEW THE NEW GUIDELINES PROVIDED BY SkillsUSA (see skillsusastore.org ref. #101-12xx) CONCERNING THE DRESS CODE.

COMPLIANCE WITH THIS DRESS CODE WILL BE ASSESSED IN THE FINAL SCORE FOR EACH STUDENT. DENIM OR FRC PANTS WILL BE PERMITTED.
Welding Schedule Set:

<table>
<thead>
<tr>
<th>TIME</th>
<th>CONTESTANT #</th>
<th>STUDENT</th>
<th>SCHOOL/COLLEGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00 am</td>
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<tr>
<td>6:35 am</td>
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<td>7:10 am</td>
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<td>7:45 am</td>
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<td>8:20 am</td>
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<td>8:55 am</td>
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<tr>
<td>9:30 am</td>
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<tr>
<td>10:05 am</td>
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<tr>
<td>10:40 am</td>
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<td></td>
<td></td>
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<tr>
<td>11:15 am</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
**2019 KANSAS STATE CHAMPIONSHIPS (KSC) CONTEST UPDATE**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:50 am</td>
<td></td>
</tr>
<tr>
<td>12:25 pm</td>
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</tr>
</tbody>
</table>

**** CONTINUED ON NEXT PAGE ****
2019 KANSAS STATE CHAMPIONSHIPS (KSC) CONTEST UPDATE

TOOLS / SAFETY EQUIPMENT

*No communication devices will be allowed in the competition area.*

*No contact by teachers or coaches during the competition.*

Each contestant will supply the following safety equipment:

*Items in red not provided will prevent a contestant from entering the contest.*

*Items in green are optional and allowed for use within the contest.*

- ☐ A one-page résumé to submit in hard copy format at check-in. Failure to do so will result in a 10-point penalty.
- ☐ Welding cap/beanie
- ☐ Hearing or ear protection
- ☐ Eye protection (must have side shields or fit over prescription glasses)
- ☐ Welding Jacket (Cloth or Leather), Cape Sleeves (cloth or leather) or FR Welding Shirt (Long sleeved t-shirts, flannel shirts, denim shirts, jean jackets, or “heavy” button front shirts will not be acceptable if it isn’t designed for welding don’t try it.)
- ☐ Full-length jeans without holes
- ☐ Leather boots
- ☐ Welding gloves—full length (gauntlet) for SMAW, GMAW, and FCAW
- ☐ Welding helmet/hood with appropriate filter plate/lens and protective cover lens for tacking and welding; auto-darkening filter plate/lens permissible.
- ☐ Cutting goggles—with shade 5 lens/cover lens for OFC/PAC; helmet/hood with shade 5 capability permissible; face shield headgear with shade 5 permissible. Spare filter and cover lens

**PPE will be strictly enforced**

- ☐ Welding gloves — appropriate for GTAW
2019 KANSAS STATE CHAMPIONSHIPS (KSC) CONTEST UPDATE

- Spare filter plate and cover lens
- Spare batteries for auto-darkening filter lens
- Pocket calculator – Not for weld settings
- Fillet weld gauges—standard set
- Lead pencil
- Soapstone (with or without holder) or silver pencil
- Sharpie type marker
- Scribe with or without magnet
- Compass
- Protractor
- Combination square set
- 10-foot (3.1 meters) minimum steel tape measure
- 16-ounce (.45 kilogram) ball peen hammer
- Center punch
- Cold chisel
- 11R or 10-inch (254 millimeters) vise grips
- 6-inch (152 millimeters) side cutting pliers or diagonal cutting pliers
- 6-inch (152 millimeters) needle nose pliers – welpers permissible
- Chipping hammer
- Stainless steel wire brush for GTAW
- Carbon steel wire brush for SMAW
- Friction lighter (striker) and tip cleaner

All tools will be placed into a bucket that is provided by the contest committee during check-in.

Only the tools on the list above are allowed into the contest.

No copies of the pre-test or outside notes are allowed.

Slide-rulers with welding settings, welding guides, and other information are not allowed.

Each contestant will be given a set of welding/cutting print and welding procedures before the start of each portion of the contest.
If you choose to use an auto-darkening welding helmet/hood for the contest it is highly recommended that you bring extra batteries. In the event your welding helmet/hood fails, quits working, batteries die or any other unsatisfactory operation happens during the contest, you will not be able to exchange your welding helmet/hood for another, contact your advisor or borrow a welding helmet/hood from anyone helping conduct the contest.

All students are required to wear Skills T-shirts or contest official dress for the competitions.

**** CONTINUED ON NEXT PAGE ****
DEMOnSTRATION:

AWS SENSE WPS WILL BE USED FOR WELDING PARAMETERS. PLEASE REVIEW THESE DOCUMENTS WITH YOUR STUDENTS PRIOR TO THE WELDING COMPETITION.

Each student will be expected to demonstrate the following process:

<table>
<thead>
<tr>
<th>PROCESS</th>
<th>EQUIPMENT BEING USED FOR CONTEST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENERAL KNOWLEDGE TEST</strong></td>
<td></td>
</tr>
<tr>
<td>***Test will include 50 multiple choice questions covering GMAW, GTAW, SMAW, FCAW, welding symbols and general welding knowledge. This will be the tiebreaker for the contest. ***</td>
<td></td>
</tr>
<tr>
<td>GMAW-S</td>
<td>Lincoln Power MIG 350MP</td>
</tr>
<tr>
<td>SMAW</td>
<td>Miller Multimatic® 255 Multiprocess Welder</td>
</tr>
<tr>
<td><a href="https://www.millerwelds.com/equipment/welders/multiprocess/multimatic-255-multiprocess-welder-m30175">https://www.millerwelds.com/equipment/welders/multiprocess/multimatic-255-multiprocess-welder-m30175</a></td>
<td></td>
</tr>
<tr>
<td>FCAW</td>
<td>Lincoln Power MIG 350MP</td>
</tr>
<tr>
<td><strong>OXY-FUEL CUTTING</strong></td>
<td>Victor Performer Cutting Torch with Edge Regulators</td>
</tr>
<tr>
<td><em><strong>ACETYLENE GAS</strong></em></td>
<td></td>
</tr>
<tr>
<td>GTAW</td>
<td>Miller Multimatic® 220 AC/DC</td>
</tr>
<tr>
<td><em><strong>All consumables will be provided</strong></em></td>
<td></td>
</tr>
<tr>
<td><a href="https://www.millerwelds.com/equipment/welders/multiprocess/multimatic-220-ac-dc-multiprocess-welder-m30190">https://www.millerwelds.com/equipment/welders/multiprocess/multimatic-220-ac-dc-multiprocess-welder-m30190</a></td>
<td></td>
</tr>
</tbody>
</table>

All projects will have blueprints provided – NO STUDENTS WILL BRING THEIR OWN BLUEPRINTS

IMPORTANT:

WHILE WELDING, BASE PLATE DESIGNATED “A” MUST REMAIN IN THE HORIZONTAL AND IN FULL CONTACT WITH WELDING TABLE. ONE WARNING WILL BE GIVEN BEFORE THE LOSS OF POINTS.
CONTESTANTS DEMONSTRATING UNSAFE BEHAVIOR WILL BE STOPPED BY THE FLOOR JUDGE AND PREVENTED FROM MOVING FORWARD IN THAT INDIVIDUAL PORTION OF THE CONTEST. THIS WILL BE DOCUMENTED ON THE SCORE SHEET AS TO WHY THE CONTESTANT WAS STOPPED. TEACHERS, ADVISORS, ADMINISTRATORS OR COACHES WILL NOT HAVE ANY CONTACT WITH THE COMPETITORS DURING THE COMPETITION AFTER THEY MOVE FROM CHECK-IN AND ONTO THE WRITTEN TEST.

THERE WILL BE NO COMMUNICATION DEVICES ALLOWED AFTER THE STUDENT CHECKS IN. SIMPLY PUT, IF CAUGHT – YOU ARE DISQUALIFIED.

NOTE: Any questions concerning the operation of the equipment used during this competition should be direct to:

**Miller** – [www.millerwelds.com](http://www.millerwelds.com)
Byron Nield
[byron.nield@millerwelds.com](mailto:byron.nield@millerwelds.com)
316-665-2439

**Lincoln Electric** – [www.lincolnelectric.com](http://www.lincolnelectric.com)
Josh Thieme -
[josh_thieme@lincolnelectric.com](mailto:josh_thieme@lincolnelectric.com)
316-789-5954

**ESAB/Victor** – [www.esabna.com](http://www.esabna.com)
Brandon Boyd
[brandon.boyd@esab.com](mailto:brandon.boyd@esab.com)
918-934-5268
Victor Oxy-Fuel Torches W/Edge Regulators -

AWS SENSE WPS WILL BE USED FOR WELDING PARAMETERS. PLEASE REVIEW THESE DOCUMENTS WITH YOUR STUDENTS PRIOR TO THE WELDING COMPETITION.
State SkillsUSA Welding Contest

OFC

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

<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

Cut 6" Long Width = Kerf
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
SkillsUSA
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  
Backacing  Yes  [ ]  No  [ ]  Single Weld  [ ]  Double Weld  [ ]
Backacing 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  -  N/A  
Diameter (Pipe,  )  N/A  -  N/A  

FILLER METALS
AWS Specification  A5.10  
AWS Classification  ER4043  

SHIELDING
Flux  N/A  
Composition  100%Argon  
Electrode-Flux (Class)  
Flow Rate  15-25 CFH  
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  

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  

Authorized By  GH  Date 5/15/2011
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

<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>

State SkillsUSA
Welding Contest

SMAW
WPS 101

SkillsUSA

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

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 A-36 to A-36

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

Fillet (in) Unlimited - Unlimited

Diameter (Pipe, in) 4 - Unlimited

FILLER METALS

AWS Specification A5.1

AWS Classification E-7018

SHIELDING

Flux N/A

Electrode-Flux (Class) N/A

Gas N/A

Gas Cup Size N/A

PREHEAT

Preheat Temp., Min. 60 Deg.F

Thick. 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

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

OR

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

**WPS No. WPS 106**

**Revised 2** Date 4/20/2012 By NP

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


Supporting PQR(s): Prequalified

### JOINT

**Type** T-Joint

- **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** Unlimited to Unlimited
- **Thickness:**
  - **Groove** (in) N/A
  - **Fillet** (in) Unlimited
- **Diameter (Pipe, in)** N/A to N/A

### FILLER METALS

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

### SHIELDING

- **Flux** 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

### 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** [ ]
- **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>90-115</td>
<td>N/A</td>
<td>4-10 ipm</td>
<td></td>
</tr>
</tbody>
</table>
# Welding Procedure Specification

**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  
**Supporting PQR(s):** Prequalified

## JOINT
- **Type:** T-Joint
- **Backing:** Yes ❑ No ■ Single Weld ■ Double Weld □
- **Material Spec.:** A-36
- **Type or Grade:** A-36
- **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
- **Type or Grade:** Unlimited
- **Thickness:**  
  - Groove: N/A
  - Fillet: Unlimited
- **Diameter (Pipe, in):** N/A
- **Shade Method:** N/A

## FILLER 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": 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

## POSITION
- **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>
<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>
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

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

<table>
<thead>
<tr>
<th>ID</th>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>.25 x 7 x 7 Plate</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
<td>.25 x 3 x 5.5 Plate</td>
</tr>
</tbody>
</table>
Welding Procedure Specification

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

Authorized By EN
Date 6/20/2015
Prequalified 

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 N/A to N/A
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
N/A 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

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 Stringer Single
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
Layer/Pass Process Filler Metal Class Diameter Cur. Type Amps Volts Travel Speed Other Notes
All GMAW ER70S-6 0.035" DCEP 90-150 16-20 6-8 ipm WFS 140-35 0 ipm
State SkillsUSA
Welding Contest

FCAW-G

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

<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>
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<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
# Welding Procedure Specification

## WPS 108

**Welding Process(es)**: FCAW-G  
**Prequalified**: Yes  
**Type**: Manual  
**WPS No.**:  
**Date**: 4/19/2016  
**By**: NP  
**Revision**: 1

### JOINT

- **Type**: T-Joint, Butt, Flanged  
- **Backing**: Yes  
- **Root Opening**: 0  
- **Root Face Dimension**: N/A  
- **Groove Angle**: N/A  
- **Radius (J-U)**: N/A  
- **Back Gouge**: Yes  
- **Method**: N/A  

### BASE METALS

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

### FILLER METALS

- **AWS Specification**: A5.20  
- **AWS Classification**: E71T-1  
- **Electrode-Flux (Class)**: N/A  
- **Gas Cup Size**: 1/2" - 3/4"  

### SHIELDING

- **Flux**: N/A  
- **Composition**: 75%Argon/25%CO2  
- **Electrode-Flux (Class)**: N/A  

### 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  

### POSITION

- **Position of Groove**: All  
- **Vertical Progression**: Up, Down  

### ELECTRICAL CHARACTERISTICS

- **Transfer Mode (GMAW)**:  
  - **Current**: Short-Circuiting, Globular, Spray  
  - **Other**: 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**: 1/2" to 3/4"  
- **Peening**: N/A  
- **Interpass Cleaning**: Chip slag and wire brush

### POSTWELD HEAT TREATMENT

- **Temp.**: N/A  
- **Time**: N/A  
- **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>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>
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<tr>
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</table>

### RECOMMENDED SETTINGS:

<table>
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<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>1F &amp; 2F</td>
<td>FCAW-G</td>
<td>E71T-1M</td>
<td>0.045</td>
<td>DCEP</td>
<td>260</td>
<td>26</td>
<td>5-12</td>
<td>WFS:500ipm</td>
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<tr>
<td>4F</td>
<td>FCAW-G</td>
<td>E71T-1M</td>
<td>0.045</td>
<td>DCEP</td>
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<td>24</td>
<td>5-12</td>
<td>WFS:380ipm</td>
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<tr>
<td>3F</td>
<td>FCAW-G</td>
<td>E71T-1M</td>
<td>0.045</td>
<td>DCEP</td>
<td>200</td>
<td>24</td>
<td>5-12</td>
<td>WFS:340ipm</td>
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</tbody>
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