

# 2023 MICHIGAN SKILLS USA CHAMPIONSHIPS

1 of 6

glasses) with side shields or safety goggles that meet OSHA Z87.1.

## WELDING SMAW, GMAW, GTAW, OFC, PAC TASKS & MATERIAL



### Purpose:

To evaluate each contestant's preparation for employment and recognize outstanding performance

### HIGH SCHOOL:

**First, refer to General Regulations.**

### General:

### CONTEST LOCATION:

Washtenaw Community College  
4800 E Huron River Dr.  
Ann Arbor, MI, US  
(734) 973-3300  
<https://www.wccnet.edu/>

### RESUME:

Each student must submit a one-page printed resume before the contest start at the contest site (present to contest coordinator, not judges). The resume is no longer submitted online. This is the only time that resumes can be turned in. Failure to do so will result in a 10-point penalty.

### Clothing Requirement

1. Required 100 percent cotton, fire resistant work pants, protective welder's clothing including welder's hat or skullcap, leather cape with sleeves or fire-resistant welding coat or sleeves, leather gauntlet welding gloves (for other than GTAW), leather welding gloves for GTAW, high-top (6" minimum height) leather shoes and welder's helmet. All outer clothing must be fire-resistant. Industrial quality safety glasses (No tinted safety

### Eligibility

Open to active Skills USA members enrolled in programs with welding as the occupational objective.

### Equipment and Materials:

1. Supplied by the technical committee:
  1. All necessary welding equipment and materials
  2. All instructions and procedure sheets with drawings
  3. All necessary information and furnishings for judges and technical committee
2. Supplied by the **contestant**:
  - a. Hearing and/or ear protection
  - b. Welding helmet with appropriate filter plate/lens and protective cover plate/lens for the arc process(s) being performed.
  - c. Welding helmet/face shield/goggles with appropriate #5/#7 filter plate/lens and protective cover plate/lens for OFC. (Safety glasses must be able to be worn underneath.)
  - d. No external filler metals.
  - e. Spare spatter and filter lenses/plates for arc welding helmet and oxyacetylene goggles
  - f. Calculator
  - g. Lead pencil and/or ballpoint pen
  - h. Soap stone with holder
  - i. Scribe with magnet
  - j. Combination square set
  - k. Steel tape measure
  - l. Fillet weld gauge
  - m. 16-ounce ball peen hammer
  - n. Center punch
  - o. 6-inch side cutting pliers or diagonal cutting pliers
  - p. 6-inch standard slip lock pliers
  - q. Chipping hammer with or without wire brush
  - r. Stainless steel wire brush
  - s. Tungsten GTAW 3/32 or 1/8 electrodes for AC welding - **pre-sharpened (can be re-sharpened)**. Contestant should bring multiple sharpened Tungsens.
  - t. Flat or Half Round, Bastard cut type- Metal Hand File- 12" - 14" length.
  - u. 2 - vise grip type pliers
  - v. 1 page resume
  - w. No gas lenses allowed!
  - x. Magnet for layout
  - y. Compass

## Specific Rules for Contest Participants

1. Contestants must correctly use the welding equipment during the contest. The contest chairperson or contest coordinator may *stop* a contestant at any section of the contest if they deem a contestant's manner to be hazardous to either themselves or others. Such stoppage shall disqualify the participant for that section of the contest. If the contestant is warned a second time, he or she will be disqualified as a contest+++ participant.
2. Contestants will be assigned a contest number for use during the welding contest. The contest judges will know the contestants by their assigned number only.
3. While the contest is in progress, there shall be no communication between the contestants or between the contestants and anyone else except as directed by a judge, contest coordinator or contest chairperson.
4. The welding contest will be of a performance nature.
5. All terms and definitions and welding symbols will be in accordance with the current editions of ANSI/AWSA3.0 (Terms and Definitions) and ANSI/AWSA2.4 (Symbols).
6. Time limits will be established on the contest procedure sheets for all segments of the test.
7. Evaluation of the completed project will be judged visually. Non-destructive and/or destructive tests may be used to complete the project evaluation.
8. Welding and cutting operation instructions will be specified in drawings and procedure sheets provided to the contestants.
9. Drawings/prints will be provided at the day of competition. Drawings must be returned in after the project is welded complete.
10. Reference - base metal may include, but is not limited to Mild Steel, Stainless Steel, and Aluminum.
11. No cell phones or cameras allowed in the welding lab.

## Scope of the Contest

1. Contestants will demonstrate their ability to perform jobs and skills selected from the following list of competencies as determined by the Skills USA Welding Technical Committee.
  - a. **Safety**
    1. Demonstrate personal safety including PPE.
    2. Demonstrate general shop safety.
    3. Demonstrate gas, electrical and chemical safety.
    4. Demonstrate knowledge of proper actions to be taken in an emergency.
  - b. **Measurements**
    1. Identify basic metal working tools used in measuring.
    2. Use visual measuring tools to accurate of 1/32 of an inch.
    3. Employ the components of a combination square set.
    4. Use layout and marking tools as required.
  - c. **Blueprint Reading**
    1. Use information found in the information block of the drawing.
    2. Read and understand three-dimensional drawings.
    3. Identify the basic views used in blueprints including assembly, detail and fit-up drawings.
    4. Identify common types of lines, abbreviations and symbols in accordance with national drawing standards -ANSI.
    5. Identify basic welding symbols and components of a symbol (such as arrow, reference line, tail, size or length) in accordance with the national welding symbols standards - AWS.
  - d. **Shielded Metal Arc Welding (SMAW)**
    1. **I/O** Demonstrate safety procedures for SMAW.
    2. **I/O** Demonstrate the ability to correctly set up SMAW power sources, related welding equipment, and do basic process and equipment troubleshooting.
    3. **I/O** Correctly identify base metal prior to welding.
    4. **I/O** Set up and shut down equipment.

I = Individual Competition

O = Overall Competition

5. **I/O** Select the correct type of filler metal and size of electrode based on the base material (1/8-inch to 1/2" thickness).
  6. **I/O** Prepare base material for welding.
  7. **I/O** Start, stop and restart stringer beads on the base material in the flat, horizontal, vertical up and down and overhead positions.
  8. **I/O** Weld a lap joint with a single pass and multi pass, fillet weld on the base material in flat, horizontal, vertical up and down and overhead positions.
  9. **I/O** Weld a T-joint with a single pass, fillet weld on the base material in the flat, horizontal, vertical up and down and overhead positions.
  10. **I/O** Weld a T-joint with a multiple pass, fillet weld on the base material in the flat, horizontal, vertical up and down and overhead positions.
  11. **I/O** Weld a butt joint with a single pass, square groove weld on the base material in the flat, horizontal, vertical up and down and overhead positions.
  12. **I/O** Weld a butt joint with a single pass, V-groove weld on the base material in the flat, horizontal, vertical up and down and overhead positions.
  13. **I/O** Weld a butt joint with a partial joint penetration, single pass, double V-groove weld on the base material in the flat, horizontal, vertical up and down and overhead positions.
  14. **I/O** Weld a butt joint with a multiple pass, double groove weld on the base material in the flat, horizontal, vertical up and down and overhead positions.
  15. **O** Weld 2 inch through 6 inch diameter, schedule 40, pipe, single/multiple pass V-groove weld in the 2G position. Also, fillet weld in the 2F and 5F positions.
  16. **I/O** Weld a plug weld in the flat position
- e. Gas Metal Arc Welding (GMAW)**
1. **I/O** Demonstrate correct safety procedures for GMAW.
  2. **I/O** Demonstrate ability to correctly set up GMAW power sources, related welding equipment, and do basic process and equipment troubleshooting.
  3. **I/O** Correctly identify base metal prior to welding.
  4. **I/O** Set up and shut down equipment.
  5. **I/O** For the electrode being used, be able to select correct, wire feed speed and voltage based on the material (14ga to 3/8-inch thickness).
6. **I/O** Prepare the base material for welding.
  7. **I/O** Start, stop and restart stringer beads on the base material in the flat, horizontal, vertical up and down and overhead positions.
  8. **I/O** Weld a lap joint with a single pass and multi pass fillet weld on the base material in the flat, horizontal, vertical up and down and overhead positions.
  9. **I/O** Weld a T-joint with a single pass and multi pass fillet weld on the base material in the flat, horizontal, vertical up and down and overhead positions.
  10. **I/O** Weld a butt joint with a single pass, square groove weld on the base material in the flat, horizontal, vertical up and down and overhead positions.
  11. **I/O** Weld a butt joint with a single pass and multi pass V-groove weld on the base material in the flat, horizontal, vertical up and down and overhead positions.
  12. **I/O** Weld a butt joint with complete joint penetration, multiple pass, double V-groove weld on the base material in the flat, horizontal, vertical up and down and overhead positions.
  13. **O** Weld 2-inch through 6-inch diameter schedule 40, and thinner carbon steel pipe, single/multiple pass V-groove weld in the 2G position. Also, fillet welds in the 2F and 5F positions.
  14. **I/O** Weld a plug weld in the flat position.
- f. Flux Cored Arc Welding (FCAW)**
1. **O** Weld fillet and groove welds in the flat, horizontal, vertical and overhead positions.
- g. Gas Tungsten Arc Welding (GTAW)**
1. **I/O** Demonstrate safety procedures for GTAW.
  2. **I/O** Demonstrate ability to correctly set up GTAW power sources, related welding equipment, and do basic process and equipment troubleshooting.
  3. **I/O** Correctly identify base metal prior to welding.
  4. **I/O** Set up and shut down equipment for welding of the base material
  5. **I/O** Select the correct size and type of tungsten and/or filler material for the base material (1/16-inch to 1/4-inch thickness).
  6. **I/O** Prepare the base material for welding.
  7. **I/O** Start, stop and restart stringer beads on the base material in the flat, horizontal, vertical up and overhead positions.
  8. **I/O** Weld a lap joint with a single pass, fillet weld on the base material in flat, horizontal, vertical up, and overhead positions.

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9. **I/O** Weld a T-joint with a single pass fillet weld on the base material in the flat, horizontal, vertical up, and overhead positions.
10. **I/O** Weld a butt joint with a single pass, square groove on the base material in the flat, horizontal, vertical up, and overhead positions.
11. **I/O** Weld a butt joint with a single pass and multi pass, V-groove weld on the base material in the flat, horizontal, vertical up, and overhead positions.
12. **I/O** Weld a butt joint with a multiple pass, V-groove weld on the base material in the flat, horizontal, vertical up, and overhead positions.
13. **I/O** Weld a butt joint with complete joint penetration, multiple pass, double V-groove weld on the base material in the flat, horizontal, vertical up, and overhead positions.
14. **O** Weld 2-inch through 4-inch diameter, schedule 40 and thinner, pipe, single/multiple pass V-groove weld in the 2G position. Also, fillet welds in the 2F and 5F positions.

#### **h. Oxygen Fuel Cutting (OFC)**

1. **I/O** Demonstrate safety procedures for OFC.
2. **I/O** demonstrates ability to correctly set up OAC equipment for cutting and do basic process troubleshooting.
3. **I/O** correctly identifies base metal prior to cutting.
4. **I/O** Set up and shut down equipment for cutting carbon steel plate.
5. **I/O** Select correct tip size and gas pressure for cutting carbon steel plate (1/4-inch to 1/2-inch thickness).
6. **I/O** Prepare carbon steel for cutting.
7. **I/O** Cutting operations will be specified in drawings and procedure sheets provided to the contestants.
8. **I/O** Properly light, adjust the flame, and shut down the OFC equipment.
9. **I/O** Use a straight edge and soaps stone for laying out the prescribed pattern.
10. **I/O** Make a square cut on carbon steel in flat, horizontal and vertical positions.
11. **I/O** Make a bevel cut (45-degree angle) on carbon steel plate in the flat, horizontal and vertical positions.
12. **I/O** Pierce a hole in carbon steel in the flat, horizontal and vertical position.
13. **I/O** Make a cut on carbon steel pipe in flat, horizontal, and vertical positions.
14. **No cutting guides allowed**

#### **i. Plasma Arc Cutting**

1. **I** Demonstrate the ability to correctly set up the PAC equipment and do basic process troubleshooting.
2. **I** Correctly identify base metal prior to cutting Set machine to properly cut carbon steel plate (1/16 inch to 1/4 inch thickness).
3. **I** Perform cuts to the specifications listed on the blueprint.

#### **2. Judging Criteria**

The contestant will be evaluated on the competencies based on the following rating system. The technical committee according to the difficulty of the assigned task will establish point values for each item. Final judging of the welded projects will be evaluated using the following:

##### **a. Visual Inspection Criteria:**

1. Dimensional accuracy, including distortion. Reference the notes concerning the allowable tolerances on the print
2. Conformity to drawing requirements including determination of whether all welds have been completed and whether the finished welds conform to the required size and contour.
3. Visual examination of the welds for:
  - i. Cracks
  - ii. Undercut
  - iii. Overlap
  - iv. Crater fill
  - v. Spatter
  - vi. Arc strikes
  - vii. Porosity
  - viii. Convexity and reinforcement
  - ix. Tungsten inclusions
  - x. Inadequate joint penetration
  - xi. Surface irregularities
  - xii. Other irregularities

**b.** Welding equipment may be obtained from a variety of manufacturers and may include transformers, rectifiers and/or inverters.

**c.** Filler metals will be compatible with the metals being welded and will be detailed on the contest procedure sheet. Instructions to the contestants will define more specifically the filler metals that may be used. Below is a suggested list of electrodes and filler metal types and sizes:

1. Shielded Metal Arc
  - i. E 6010 - 1/8-inch diameter
  - ii. E7018 - 3/32-inch, 1/8-inch diameter

2. Gas Metal Arc
    - i. E70S-3 (or -6) .035 diameter (75% Ar 25% CO2 Shielding Gas)
  3. Gas Tungsten Arc
    - i. 3/32-inch, 1/8-inch diameter
    - ii. ER70-2 - 1/16-inch - 1/8-inch diameter
    - iii. ER4043 - 3/32-inch and 1/8-inch diameter
    - iv. ER308L - 1/16-inch, 3/32-inch diameter
  4. Oxyacetylene Welding
    - i. RG45 - 3/32-inch - 1/8-inch diameter
- d. Cutting and Welding Tip Sizes:
    1. Oxyacetylene Cutting
      - i. Cutting tip sizes: 0 - 1 (Victor or Harris equipment)
      - ii. Welding tip sizes: 0 - 3 (Victor or Harris equipment)
      - iii. Equipment
        - (i) CC/CV machines
        - (ii) GMAW - CV only
        - (iii) SMAW - CC
        - (iv) GTAW- CC

***SkillsUSA Michigan Welding Competition***  
***High School: March 17th, 2023, Washtenaw Community College, Ann Arbor***

The following is the contest meeting times and places for Secondary Welders at Washtenaw Community College Welding Lab on Friday March 17<sup>th</sup>, 2023. **Anyone who is not on time forfeits that time allotment.**

**NOTE: Group assignments will be sent to advisors NO LATER than Friday, March 10<sup>th</sup>. Geographical location will be taken into account for group selection.**

**Friday March 17<sup>th</sup> 2023 - Performance Test Schedule (Group 1)**

<b>Time</b>	<b>Location</b>
7:30am - 8:00am	Occupational Education Building
8:30am - 9:00am	Various Rooms
9:00am – 1:00pm	Welding Lab

**Lunch on own**

**Friday March 17<sup>th</sup> 2023 - Performance Test Schedule (Group 2)**

<b>Time</b>	<b>Location</b>	<b>Description</b>
12:00pm - 12:30pm	Occupational Education Building	Arrival
12:30pm - 1:00pm	Various Rooms	Orientation
1:00pm – 5:00pm	Welding Lab	Welding Contests

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**Note:**

Your Contest numbers must be visible at all times and will be checked at your scheduled contestant's times. If you miss the time of your contest you might not be allowed to compete in the event.

**Test Schedule**

**The SkillsUSA Leadership Test will be administered online beginning March 28<sup>th</sup> – April 6<sup>th</sup>. This will be used as a tie breaker.**

Revised 2/12/2023

I = Individual Competition

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## SkillsUSA Michigan State Welding Competition Registration for Early Contests

Welding Advisors,

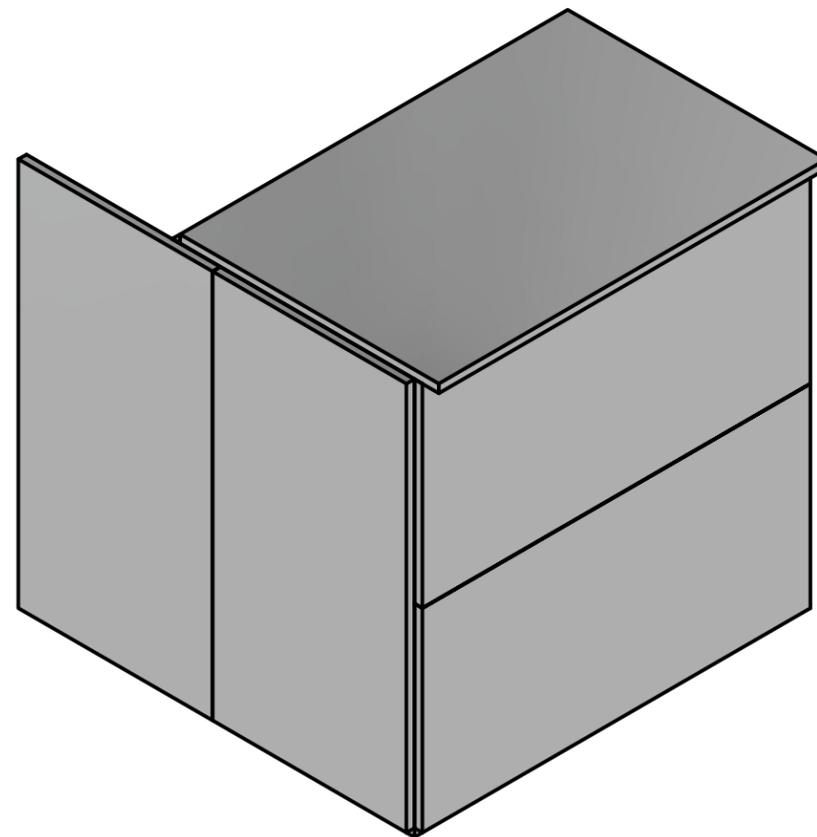
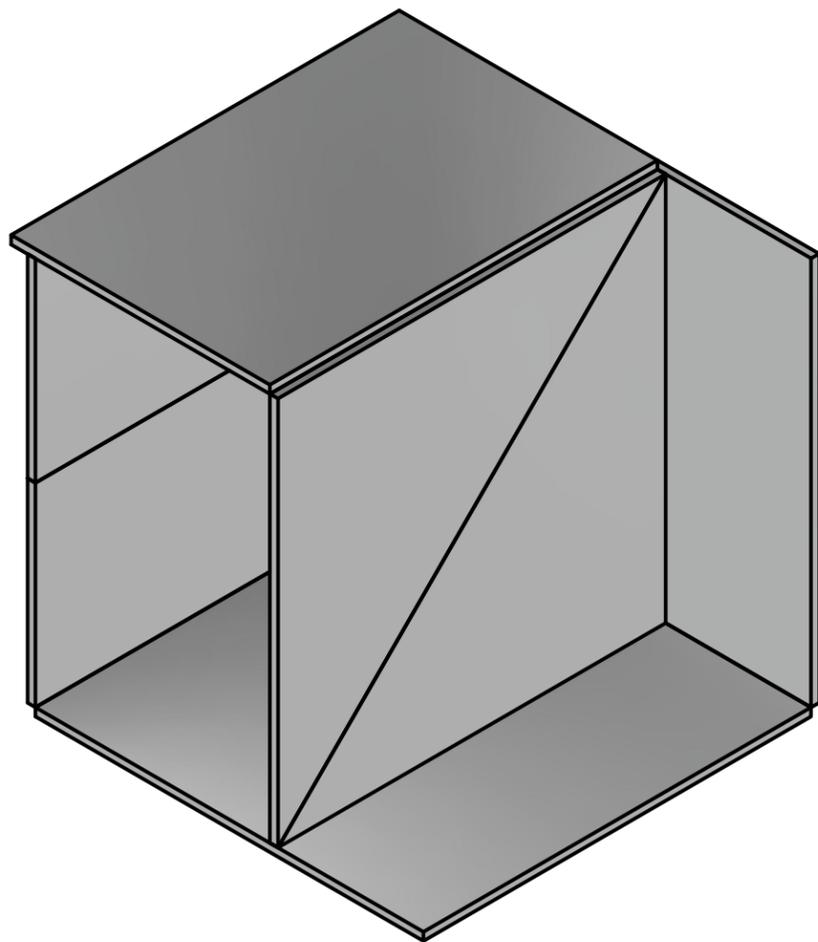
Similar to last year, after competitions have been scored and tests have been taken, all early welding advisors will find out which competitors medaled without revealing their places. The medaling competitors and advisors should plan to come to the Award Ceremony at our State Leadership and Skills Conference (SLSC) to receive their awards and find out their places. All competitors are invited to attend regardless of whether they medal.

Full details regarding our State Leadership and Skills Conference can be found on our [Conference webpage](#). Below you will find a timeline to help you plan for participating in an early contest at SLSC.

- Register your competitors for their welding competition by March 10<sup>th</sup>. Registration can be found by following this link to our [Conference webpage](#) and opens March 1<sup>st</sup>.
- Book Hotel March 1-22. Registration can be found by following this link to our [Conference webpage](#) and opens March 1<sup>st</sup>.
- Compete March 17<sup>th</sup>.
- Competitors must take the SkillsUSA Leadership Test between March 28<sup>th</sup> and April 4<sup>th</sup>. The testing link will be emailed directly to your competitor so make sure you enter the correct email address during registration. A [sample test](#) can be found here. Email or call Customer Care with any questions or testing problems.  
**SkillsUSA Customer Care**  
**P: 844-875-4557**  
**Customer Care Hours**  
Monday/Wednesday/Friday 8 a.m.-5 p.m. ET  
Tuesday/Thursday: 11 a.m.-7 p.m. ET  
14001 SkillsUSA Way, Leesburg, VA, 20176  
[CustomerCare@skillsusa.org](mailto:CustomerCare@skillsusa.org)
- We plan to announce welding medalists to advisors via email on April 6<sup>th</sup>.
- If your competitor did not medal and you will not be traveling to the SLSC event, you must cancel your hotel by April 10<sup>th</sup> to receive a refund. We encourage all competitors to come regardless of whether they medal.

# SkillsUSA Welding Contest

## State - Aluminum GTAW



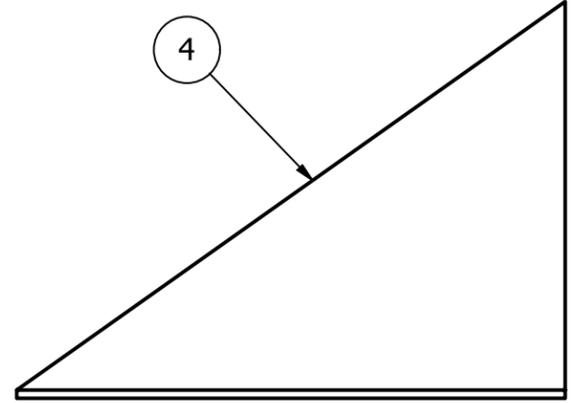
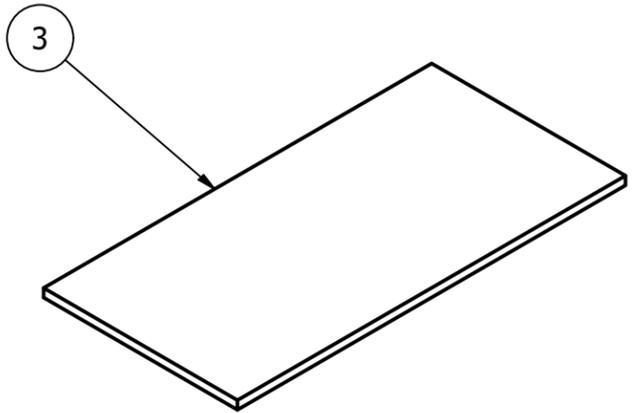
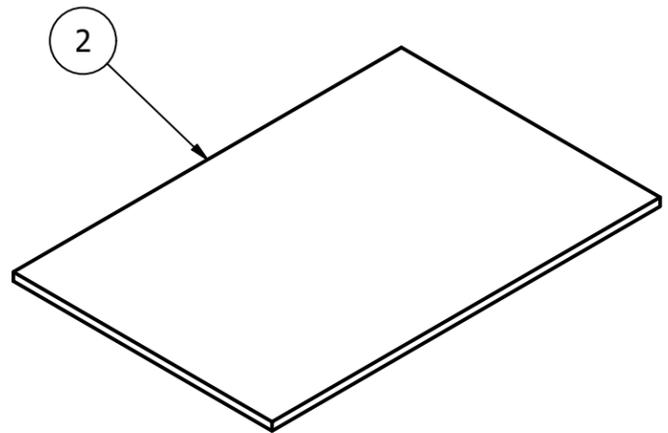
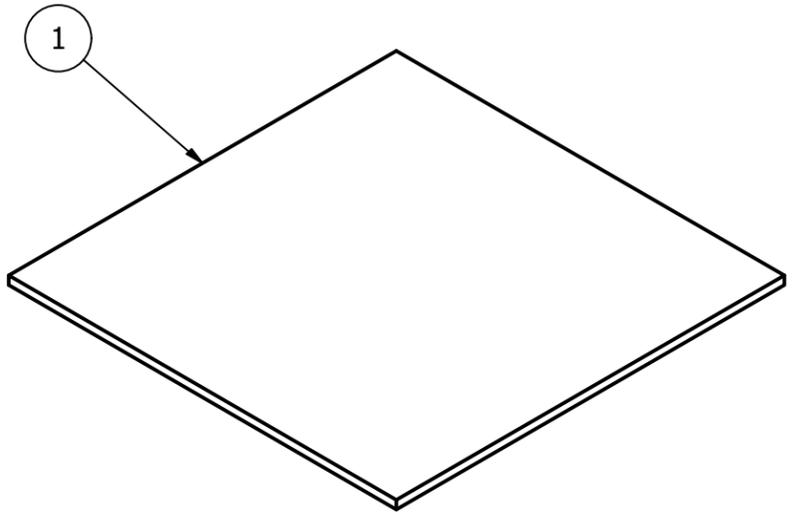
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2

1

PARTS LIST		
ITEM	QTY	PART NUMBER
1	1	.125 x 6 x 6 Base AL Plate
2	1	.125 x 4 x 6 AL Plate
3	4	.125 x 3 x 6 AL Plate
4	2	.125 x 6 x 6 Triangle AL Plate



4

3

2

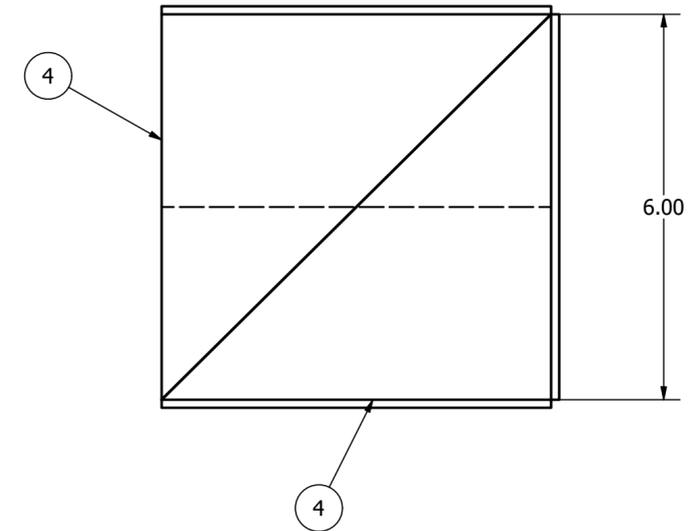
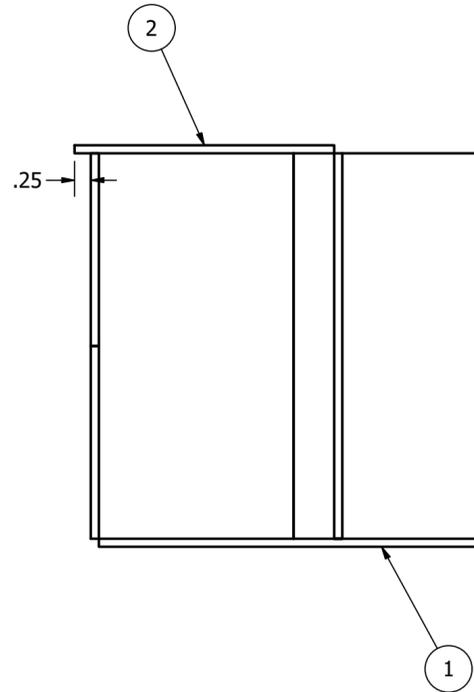
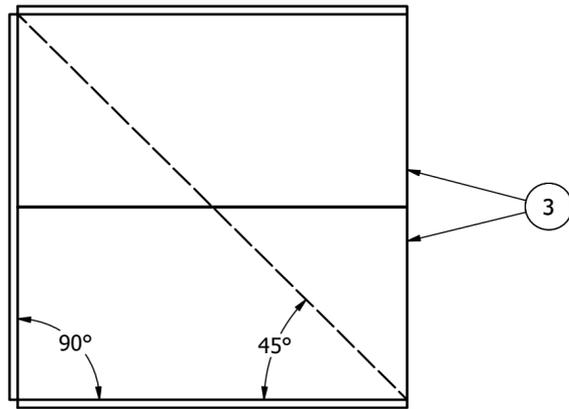
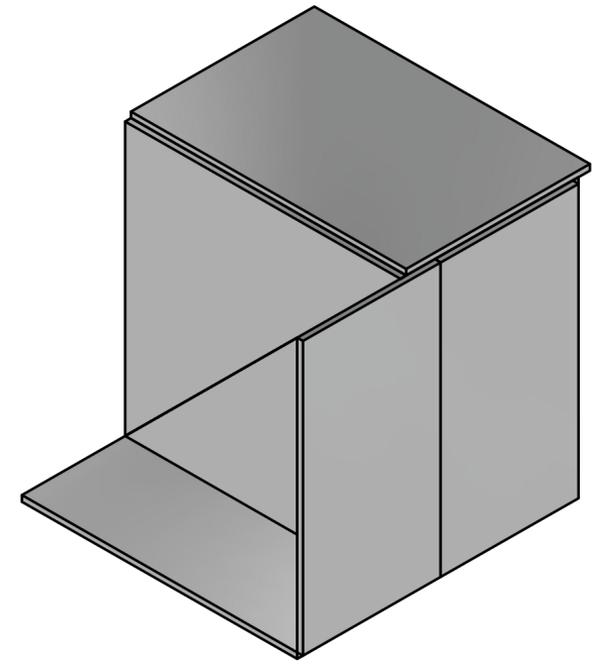
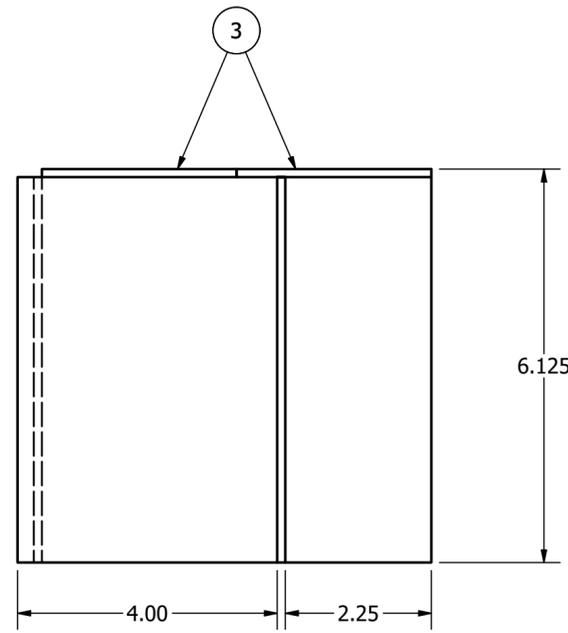
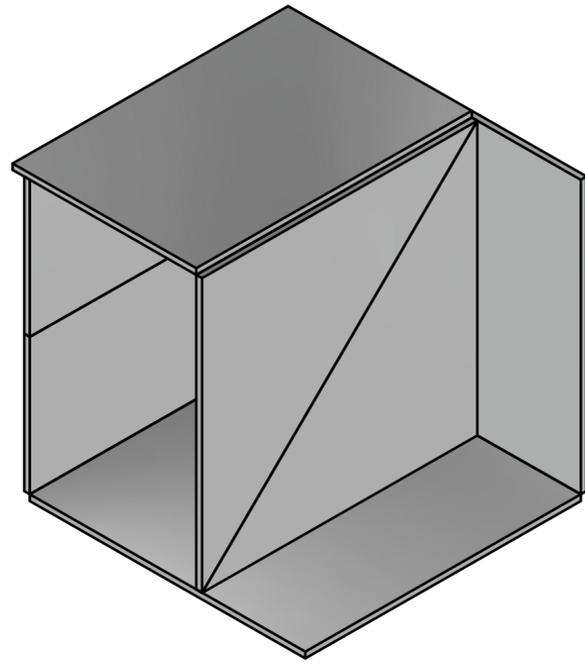
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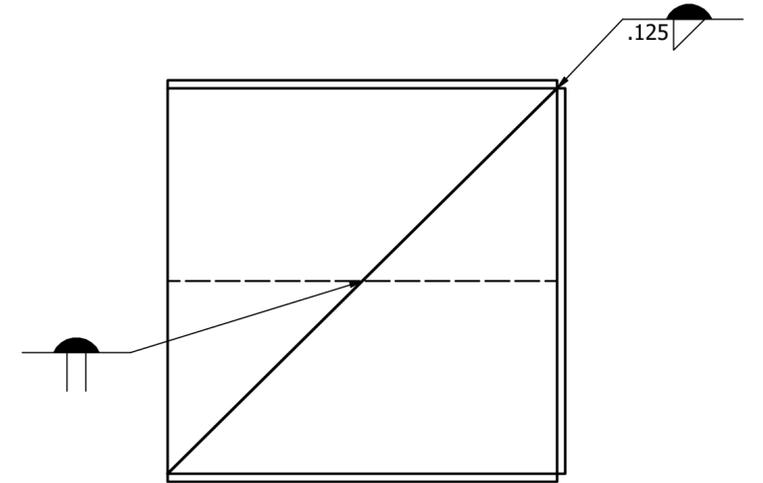
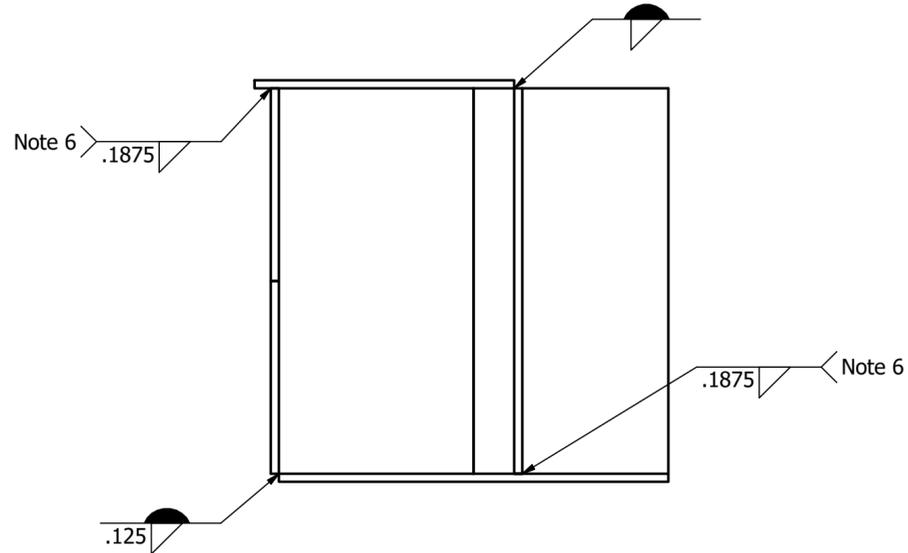
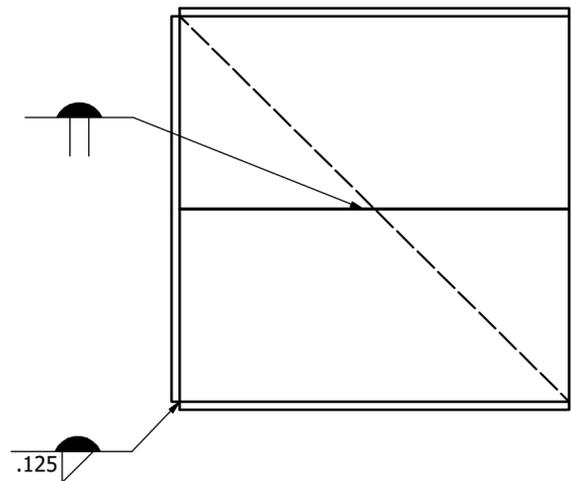
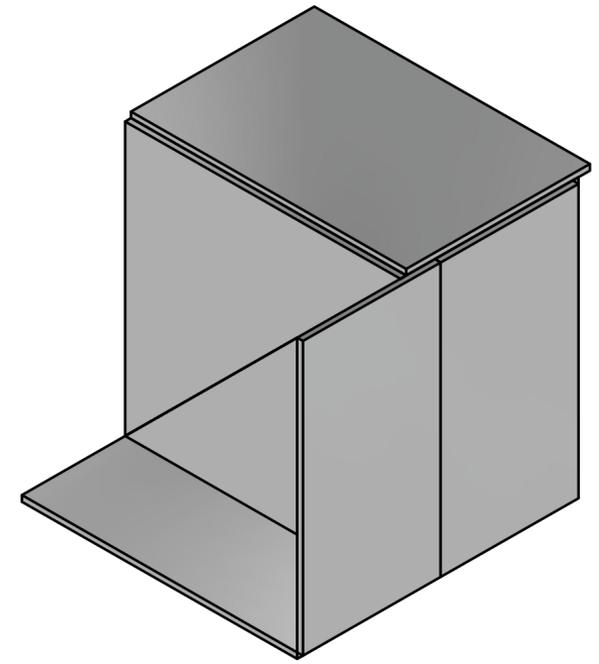
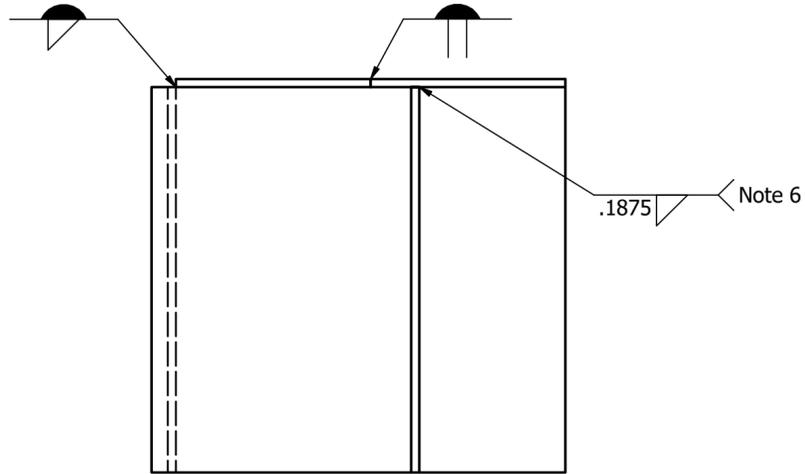
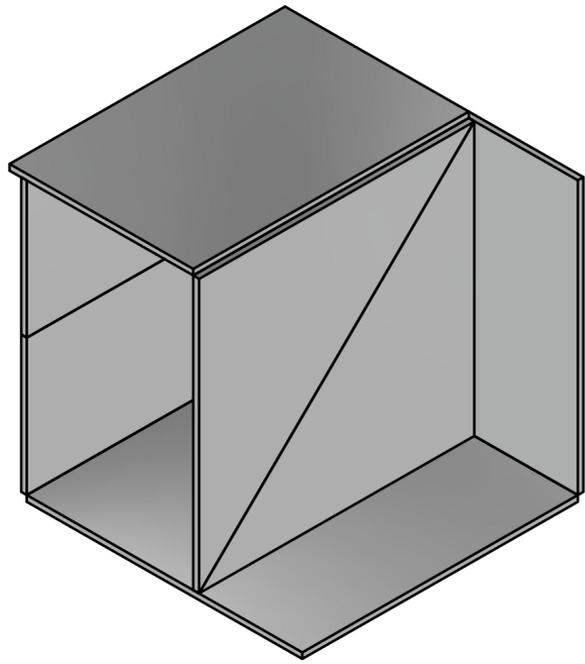
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**Notes:**

1. Project may be tacked in any position
2. Project must be fully assembled prior to welding
3. Project must be **WELDED** with Base Plate (1) in the flat position
4. All 3G and 3F welds must be performed Vertical Up
5. No post-cleaning or grinding

DRAWN jlking	12/8/2022	Washtenaw Community College Welding and Fabrication Dept.		
CHECKED		TITLE <b>SkillsUSA State Assembly Aluminum GTAW</b>		
QA		SIZE <b>C</b>	DWG NO <b>SKILLSSTATE4</b>	REV
MFG		SCALE 1/2	SHEET 3 OF 4	
APPROVED				



**Notes:**

1. Project may be tacked in any position
2. Project must be fully assembled prior to welding
3. Project must be **WELDED** with Base Plate (1) in the flat position
4. All 3G and 3F welds must be performed Vertical Up
5. No post-cleaning or grinding
6. T-weld size as specified  $+0.0625"/-0.0"$

DRAWN jlking	12/8/2022	Washtenaw Community College Welding and Fabrication Dept.		
CHECKED		TITLE <b>SkillsUSA State Assembly Aluminum GTAW</b>		
QA		SIZE <b>C</b>	DWG NO <b>SKILLSSTATE4</b>	REV
MFG		SCALE 1/2	SHEET 4 OF 4	
APPROVED				

Competitor Number	
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## GTAW

Project was completed within the allotted time constraint	Max Mark	Points deducted
<b>Yes</b> = Continue with scoring rubric <b>No</b> = Zero points awarded for entire scoring rubric		
<b>Post-cleaning and workmanship</b>		
For each weld that displays post-cleaning, 50 points will be deducted from the overall score. <b>NOTE:</b> Welds that display post-cleaning are still subject to the criteria listed below. Filing on the face of any weld shall also constitute a deduction under this criteria.	Minus 50 points per defect	
<b>Project was fully assembled according to the specifications listed on the blueprint</b>		
<b>Yes (Zero points deducted)</b> = Project meets specified criteria to a dimension less than or equal to 1/8" <b>No (50 points deducted)</b> = Project does not meet the specified criteria	YES/NO	
<b>Project is free of arc strikes and touchdowns</b>		
Omit the bottom of the baseplate unless the edge of that baseplate ties into the toe of a weld, and only for 1" outside the weld zone for that specific weld. For each unintended arc strike or touchdown, 5 points will be deducted from the overall score.	Minus 5 points per defect	
<b>Weld joints free of undercut</b>		
Undercut greater in depth than 1/32" equals one defect (Less than or equal to 1/8" in length = one defect). For each defect, 5 points will be deducted from the overall score. <b>For reference: 1/4" of undercut exceeding 1/32" in depth equals two defects.</b>	Minus 5 points per defect	
<b>Porosity and inclusions</b>		
For each instance of porosity or inclusion within a 1/4" diameter, 5 points will be deducted from the overall score regardless of the diameter of each individual pore or inclusion. <b>For reference: any number of pores or inclusions within a 1/4" diameter circle equals one defect. The individual size of each pore does not matter.</b>	Minus 5 points per defect	
<b>Crater and crater cross section</b>		
All craters must be filled through the full cross section and cover the end of the specified weld joint. For each defect, 5 points will be deducted from the overall score. Holes left in craters from the arc shall also be included as a defect in this criteria. <b>For reference: An unfilled crater with a hole would constitute a 10 point deduction from the overall score.</b>	Minus 5 points per defect	
<b>Melt through (unintended)</b>		
Fillet welds that <b>do not</b> call for melt through are free from burn through or melt through (Any indication less than or equal to 1/8" in length = one defect). <b>For reference: A fillet weld showing 1/4" of undesired melt though and one instance of burn through would constitute a 15 point deduction from the overall score.</b>	Minus 5 points per defect	

<b>Lack of fusion and inadequate joint penetration</b>			
For each instance of lack of fusion or inadequate joint penetration less than or equal to 1/4" (including the roots of CJP groove welds) 5 points will be deducted from the overall score.		Minus 5 points per defect	
<b>Fillet weld size</b>			
Fillet weld size shall meet the specifications listed on the blueprint. The length of each defect shall not be greater than 1/4". <b>For reference:</b> 1/2" of undersized weld equals two defects. For each defect, 2.5 points will be deducted from the overall score.		Minus 2.5 points per defect	
<b>Cracking</b>			
Cracking shall be unacceptable regardless of size and location. For each instance of cracking less than or equal to 1/8", 50 points shall be deducted from the overall score. <b>For reference: A crack with a length of 1/4" shall constitute a 100 point deduction.</b>		Minus 50 points per defect	
<b>Face and root reinforcement (Groove Welds)</b>			
The face and root of CJP groove welds shall not exceed 1/8" and shall not fall below the surface of the baseplate. Weld meets criteria (zero points deducted) Weld does not meet criteria (50 points deducted)		Yes = No = YES/NO	
<b>Safety violations and cheating</b>			
Any competitor found intentionally violating safety regulations and/or intentionally working outside the scope of specifications listed on the blueprint shall be disqualified.		DQ	
<b>Competitor Resume (Yes/No)</b>			
Yes = 10 points		10	
No = 0 points			
<b>Welding knowledge test</b>			
Welding knowledge test scores shall be subtracted from the overall point deficit			