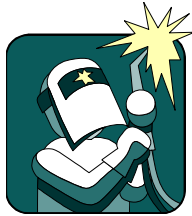


2017 MICHIGAN SKILLS USA CHAMPIONSHIPS

WELDING TASKS & MATERIAL



CONTEST SPONSOR: DASI Solutions



Purpose:

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

First, refer to General Regulations.

General:

CONTEST LOCATION:

M-TEC Tassell Center
622 Godfrey Ave SW
Grand Rapids, MI, US
(616) 234-3800
<http://cms.grcc.edu/node/2006>

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.

LUNCH:

Lunch will be provided for all contestants and their advisors thanks to DASI Solutions.

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

Eligibility

Open to active Skills USA-VICA 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. 10-foot 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

I = Individual Competition

O = Overall Competition

- s. Tungsten GTAW 3/32 or 1/8 electrodes for DC- + AC welding – pre-sharpened (can be re-sharpened). Contestant may bring multiple Tungsten.
- 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 lens allowed!

- 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 Championships Technical Committee.

a. Safety

- 1. Demonstrate personal safety.
- 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.

Specific Rules for Contest Participants

- 1. Contestants must correctly use the welding equipment during the contest. The contest chairman 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. Nondestructive 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.

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3. **I/O** Correctly identify base metal prior to welding.
 4. **I/O** Set up and shut down equipment.
 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. 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.

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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.
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.

g. 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

h. Oxygen Acetylene Welding

1. **I** Demonstrate the ability to correctly set up OAW equipment for gas welding and do basic process troubleshooting.
2. **I** Correctly identify base metal prior to welding.
3. **I** Select correct tip size and gas pressures for joining carbon steel plate (1/16 inch to 1/4 inch thickness).
4. **I** Demonstrate the ability to weld a butt joint in flat, horizontal, vertical or overhead positions.
5. **I** Demonstrate the ability to weld a fillet weld in flat, horizontal, vertical or overhead positions.

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

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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 - .045 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
College/Postsecondary: April 7, 2017, Washtenaw Community College, Ann Arbor
High School: April 7 & 8, 2017, M-TEC Tassell, Grand Rapids

The following is the group meeting times and places for Secondary Welders at M-TEC Tassell Welding Lab on Friday and Saturday, April 7 & 8, 2017.

- **April 7 – Fri. – Overall Contestants Only. 4:00pm @ M-TEC Tassell Welding Lab.**
Tack overall projects – All 18 overall contestants need to be at M-TEC Tassell welding lab by 4:00pm. Contestants will be given their prints; they will tack their projects together and begin welding between 4:00 and 6:30pm on Friday evening. (You will finish welding your projects on Saturday). Contest for Overall starts at 4:00pm on Friday night.
Shop tour – 4:00 to 4:15
Briefing – 4:15 to 4:30
Welding – 4:30 to 6:30

Anyone who is not on time forfeits that time allotment.

Saturday April 8, 2017 - Performance Test Schedule

Time	Location	Description
8:00am – 8:20am	M-TEC Lobby	Introduction
8:20am – 8:30am	Welding Lab	Welding Lab Tour
8:30am – 11:40am	Welding Lab	Overall Welding Contestants
8:30am – 8:40am	MTEC Room TBA	Oxy Fuel Introduction
8:40am – 10:40am	Welding Lab	Oxy Fuel Contestants
11:20am – 11:40am	MTEC Room TBA	GMAW Introduction
11:40am – 1:10pm	Welding Lab	GMAW Contestants
11:40am – 12:00pm	MTEC Room TBA	GTAW Introduction
12:00pm – 2:00pm	Welding Lab	GTAW Contestants
1:10pm – 1:30pm	MTEC Room TBA	SMAW Introduction

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1:30pm – 3:00pm

Welding Lab

SMAW Contestants

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.

- **Special Notes to Overall Contestants:**

- This year the overall contestants will start their projects on Friday evening. Please arrive no later than 4:00 pm to the M-TEC Tassell Welding Lab.

**Written Test Schedule
(Both Skills Knowledge and Welding Knowledge Test)**

Saturday April 8, 2017

GMAW – 9:00am – 10:00 am Written Test

GTAW - 9:00am – 10:00 am Written Test

SMAW – 10:00am – 11:00 am Written Test

Overall – 11:45am – 1:00 pm - Written Test – (after weld test)

Oxyacetyene 12:15pm – 1:00 pm Written Test – (after weld test)

Overall Contestant Job Interviews 1:30 pm

All competitors must have 1 page resume.

Revised 1/11/17

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SCORECARD Welding

Items Evaluated	Possible Points	Contestant Number						
GMAW (Gas Metal Arc Welding)	220							
GTAW (Gas Tungsten Arc Welding)	200							
OFC (Oxy Fuel Cutting)	100							
SMAW (Shielded Metal Arc Welding)	220							
Interview	60							
Visual Inspection Workstation	100							
Weld Written Test	100							
Résumé Penalty	0 or -10 only							
Clothing Penalty	0 to -50							
Safety Violation FCAW	-30							
Safety Violation GMAW-P	-30							
Safety Violation GTAW	-30							
Safety Violation OFC	-30							
Safety Violation SMAW	-30							
Total Possible Points	1000							

Date: _____

Judges' Signatures: _____