

2022 MICHIGAN SKILLS USA CHAMPIONSHIPS

WELDING TASKS & MATERIAL



Purpose:

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

RESUME:

Each Student must submit a one-page resume at the start of the Competition. This is the only time to turn in your resume. 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 jacket 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 with side shields or safety goggles that meet OSHA Z87.1+.

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 materials to complete the weldment.
 2. All instructions and procedure sheets with drawings.
 3. All welding equipment and Filler Metals.
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 (Safety glasses must be able to be worn underneath.)
 - d. Spare spatter and filter lenses/plates for arc welding helmet
 - e. Calculator
 - f. Lead pencil and/or ballpoint pen
 - g. Soap stone
 - h. Scribe
 - i. Combination square set
 - j. Tape measure-Min. 10'
 - k. Fillet weld gauge
 - l. 16-ounce ball peen hammer
 - m. Center punch
 - n. 6-inch standard slip lock pliers
 - o. Chipping hammer with or without wire brush
 - p. Stainless steel wire brush
 - q. Tungsten GTAW 3/32" and/or 1/8" electrodes for DC- welding – **pre-sharpened (can be re-sharpened)**.
 - r. Flat or Half Round, Bastard cut type- **Metal Hand File- 12" - 14" length.**
 - s. **2 – vise grip type pliers**
 - t. **1 page resume**

Specific Rules for Contest Participants

1. Contestants must correctly use the welding equipment during the contest. The contest Judges may issue a verbal warning or 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 number shall be worn visibly on the back of the contestants. The contest judges will only know the contestants by their assigned number.
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 the contest judges.
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. Reference – base metal may include, but is not limited to Mild Steel, Stainless Steel, and Aluminum.

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 accuracy of 1/16 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 title 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), Gas Metal Arc Welding (GMAW), Flux Cored Arc Welding (FCAW), Gas Tungsten Arc Welding (GTAW)**
 1. Demonstrate safety procedures for each process.
 2. Demonstrate the ability to correctly set up power sources, related welding equipment, and do basic process and equipment troubleshooting for each process.
 3. Correctly identify base metal prior to welding.
 4. Set up and shut down equipment.

5. Select the correct type of filler metal and size of electrode based on the base material.
 6. Prepare base material for welding.
 7. Start, stop, and restart stringer beads on the base material in the flat, horizontal, vertical up and down and overhead positions.
 8. Weld a lap and T-joint 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. 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.
 10. 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.
 11. 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.
 12. 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.
 13. Weld 2-inch through 6-inch diameter, schedule 40, pipe, single/multiple pass fillet weld in the 2F and 5F positions.
 14. Weld a plug weld in the flat position.
- 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

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

- b. Welding equipment may be obtained from a variety of manufacturers and may include transformer/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
 - E 6010 – 1/8-inch diameter
 - 7018 – 3/32-inch, 1/8-inch diameter
 2. Gas Metal Arc
 - E70S-3 (or -6)
 - .035-.045
 - 75% Ar 25% CO2
 3. Gas Tungsten Arc
 - 3/32-inch, 1/8-inch diameter
 - ER70S-2 – 1/16-inch – 3/32-inch diameter
 - ER4043 – 3/32-inch and 1/8-inch diameter
 - ER308L – 1/16-inch, 3/32-inch diameter

2022 Contest Summary

Competition Date: Saturday April 9. Welding will be in person at Grand Rapids Community College Tassell M-TEC Building Weld Shop. This is a one-day competition. GRCC is under a Mask Mandate-Unless this changes, everyone in the building will be required to wear a mask covering their mouth and nose. GRCC capacity limits will be in effect-only students and advisors will be allowed to attend this event.

Saturday April 9th, 2022-Performance Schedule

Time	Location	Description
8:00am – 8:20am	M-TEC Lobby	Introduction
8:20am – 8:30am	Welding Lab	Welding Lab Tour
8:30am – 8:45am	106 MTEC	Overall Introduction
8:45am – 1:45pm	Welding Lab	Overall Welding Contestants

Lunch—a 30-minute lunch break will be included in the lab time for all contestants.
Exact time TBD once food delivery schedule is known.

2:00pm – 3:00pm	104 MTEC	Written Test-OVERALL
3:00pm – 4:00pm	203 MTEC	INTERVIEW-OVERALL

IMPORTANT NOTE:

Contestants are to find an interview with designated high school instructor after performance test and before/after written test as time permits