



WELDING

Clothing Requirements

Black or brown leather work shoes and 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.)

Note: At the district level if a student is not able to wear the official SkillsUSA attire he/she may wear an outfit that would be acceptable in their specific field of study. *Please keep in mind that official SkillsUSA attire will be required at the state and national level.*

Eligibility

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

Equipment and Materials: Supplied by host school:

1. All necessary welding equipment and materials
2. All instructions and procedure sheets with drawings
3. All necessary information and furnishings for judges and the technical committee

Equipment and Materials: Supplied by contestant:

- All students must have a one-page, typewritten resume.
- Welding helmet with appropriate filter plate/lens and protective cover plate/lens in a flip or slide front. Auto darkening shields are permissible.
- Welding helmet with appropriate filter plate/lens and protective cover plate/lens in a flip or slide front for OFC. Auto darkening shields are permissible.
- Spare spatter and filter lenses/plates for arc welding helmet and oxyacetylene goggles
- Pocket calculator
- Lead pencil and/or ballpoint pen
- Soap stone with holder
- Scribe
- Combination square set
- 10-foot (3.1 meters) steel tape measure
- Fillet weld gauge
- 16-ounce (.45 kilogram) ball peen hammer
- Center punch
- 10-inch (254 millimeters) vise grips
- 6-inch (152 millimeters) side cutting pliers or diagonal cutting pliers or welpers
- 6-inch (152 millimeters) needle nose pliers or welpers
- Chipping hammer with or without wire brush
- Stainless steel wire brush
- Compass or Protractor

Scope of the Contest – (Defined by the National Competition Regulations)

(District Competitions are meant to be a scaled down version of National Competition. It is important for the students to participate in a competition that will reflect a cross-section of the industry skills needed to prepare them for the state and national levels)

Knowledge Performance

The contest will include a written knowledge exam that assesses the practical knowledge of welding, including safety, measurement and blue print reading.

Skill Performance

The skill performance assessment includes the completion of a steel project and a demonstration of the ability to weld an aluminum or stainless steel project in various positions using a variety of filler metals. Contestants will be involved in a series of stations testing various aspects of welding.

Safety Requirements

Both the instructor and the contestant certify by agreeing to enter the contest that the contestant has received instruction and has satisfactorily passed an examination on the safe use of all power tools. Further they agree that SkillsUSA, Bucks County Technical High School, the SkillsUSA Championships Technical Committee and judges are released from all responsibility relating to personal injuries resulting from their use. Contestants will be removed from the competition if proper training has not been provided and/or they are using the equipment in an unsafe manner.

Contest Guidelines

Specific Rules for Contest Participants

1. Contestants must correctly use the welding equipment during the contest. The contest chairman and 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 contestants will be known to the contest judges 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 chair.
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/AWS A3.0 (Terms and Definitions) and ANSI/AWS A2.4 (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.
8. Welding and cutting operation instructions will be specified in drawings and procedure sheets provided to the contestants.

Note: The following items marked * should be considered essential.

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.

Oxygen Fuel Cutting (OFC)

1. Demonstrate safety procedures for OFC.*
2. Demonstrate ability to correctly set up the OAC equipment for cutting and do basic process troubleshooting.
3. Correctly identify base metal prior to cutting.
4. Set up and shut down equipment for cutting carbon steel plate.
5. Select correct tip size and gas pressure for serving carbon steel plate (1.4-inch to 1.2-inch thickness).
6. Prepare carbon steel for cutting.
7. Cutting operations will be specified in drawings and procedure sheets provided to the contestants.
8. Properly light, adjust the flame, and shut down the oxygen fuel equipment.
9. Make a bevel cut (45-degree angle) on carbon steel plate in the flat position.
10. Pierce and cut a hole on carbon steel in the flat position.
11. Make a radius, and straight cut carbon steel in flat position.

Visual Inspection Criteria:

1. Dimensional accuracy, including distortion.
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:
 - Cracks
 - Undercut
 - Overlap
 - Crater fill
 - Spatter
 - Arc strikes
 - Porosity
 - Convexity and reinforcement
4. Welding equipment may be obtained from a variety of manufactures and may include transformers, rectifiers and/or inverters.
5. 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.
6. A written test will be administered and scored by judges. Total points for written, performance, resume and attitude will be a combined score for winner.

Note: No cell phones or other electronic devices may be used at any time during a competition; this includes using a calculator function on a cell phone for competitions in which calculators are permitted.

d) Measurements

1. Identify basic Metal-working tools used in measuring.
2. Employ the components of a combination square set.
3. 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. *

Skill/Test

Contestants will demonstrate their ability to perform jobs and skills selected from the following list of competencies:

Gas Metal Arc Welding (GMAW)

1. Demonstrate correct safety procedures for GMAW. *
2. Demonstrate ability to correctly set up GMAW power sources, related welding equipment and do basic process and equipment troubleshooting.
3. Correctly identify base metal prior to welding.
4. Set up and shut down equipment for GMAW.
5. Select correct wire feed speed and voltage based on carbon steel, (1/8 inch to 3/8-inch thickness).
6. Prepare the carbon steel for welding. Weld a Tee joint on carbon steel, vertical up position.

Shielded Metal Arc Welding (SMAW)

1. Demonstrate safety procedures for SMAW.
2. Demonstrate ability to correctly set up SMAW power sources related welding equipment and do basic process and equipment troubleshooting.
3. Correctly identify base metal prior to welding.
4. Set up and shut down equipment for welding of carbon steel.
5. Select correct type of filler metal size of electrode based on carbon steel (1/4 inch to 1/2-inch thickness).
6. Prepare carbon steel for welding.
7. Weld weave beads on V-groove carbon steel in the vertical up position with full root penetration with E6010/E7018 electrodes.

Gas Tungsten Arc Welding (GTAW)

1. Demonstrate safety procedures for GTAW. *
2. Demonstrate ability to correctly set up GTAW power sources, related welding equipment and do basic process and equipment troubleshooting.
3. Correctly identify base metal prior to welding.
4. Set up and shut down equipment for welding of aluminum, stainless steel.
5. Select the correct size and type of tungsten and/or filler metal based on aluminum, stainless steel plate size and fit-up.
6. Prepare aluminum, stainless steel for welding in a Tee joint vertical up.