

WELDING NYS



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

White crew neck short-sleeved T-shirt, work pants, **(both the pants and shirt must be 100% cotton)** safety glasses or goggles, leather or steel-toed work shoes, hardhat. (Prescription glasses can be used only if they are equipped with side shields. If not, they must be covered with goggles.)

Note: Contestants must wear their contest clothing to the contest orientation meeting. Also bring #2 pencil, resume, and safety assurance form.

EQUIPMENT AND MATERIALS:

1. Supplied by the NY chair/committee:
 - a. All necessary welding equipment and materials
 - b. All instructions and procedure sheets with drawings
2. Supplied by the contestant:
 - a. Hearing and/or ear protection
 - b. Welding helmet with appropriate filter plate/lens and protective cover plate/lens in a flip or slide front. Auto-darkening shields are permissible
 - c. Spare spatter and filter lenses/plates for arc welding helmet and oxyacetylene goggles
 - d. Pocket calculator
 - e. Lead pencil and/or ballpoint pen
 - f. Soap stone with holder
 - g. Scribe with magnet
 - h. Combination square set
 - i. 10-foot (3.1 meters) steel tape measure
 - j. Fillet weld gauge-standard set

- k. 16-ounce (.45 kilogram) ball peen hammer
- l. Center punch
- m. 11R or 10-inch (254 millimeters) vise grips
- n. 6-inch (152 millimeters) side cutting pliers or diagonal cutting pliers
- o. 6-inch (152 millimeters) needle nose pliers- welpers permissible
- p. Chipping hammer with or without wire brush
- q. Stainless steel wire brush and carbon steel wire brush
- r. Ck website
- s. Compass
- t. Protractor
- u. Cold chisel
- v. 1 piece of tungsten 3/32" for welding stainless steel. - ends may be prepped before contest.
- w. 1 piece of tungsten 3/32" for welding aluminum. - ends may be prepped before contest.
- x. Friction lighter (striker) and tip cleaner.
- y. Resume to be handed in at orientation meeting, Failure to do so will result in a 10-point penalty.

Note: Your contest may also require a hard copy of your résumé as part of the actual contest. Check the Contest Guidelines and/or the updates page on the NYS SkillsUSA Web site:

<http://www.nysskillsusa.org/>

SCOPE OF THE CONTEST

The scope of the contest is defined by industry standards. All drawings, welding symbols and welding terms conform to the latest edition of the American Welding Society (AWS) standards.

Knowledge Performance

The contest will include a written knowledge exam that assesses welding, and associated topics including safety, math for welding, and print reading. It could also include a brief oral interview comprised of several questions before a group of contest committee members

Skill Performance

The skill performance assessment includes the completion of a steel project(s), aluminum project(s), stainless steel project(s), in various positions using a variety of filler metals. Contestants will be involved in a series of stations testing various aspects of welding.

Contest Guidelines

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 be documented as a warning. If the contestant is warned a second time, he or she will be disqualified as a contest participant.
2. As soon as the contestants enter the contest area – as defined by the surrounding tables - no communication between the contestants or between the contestants and anyone else, except as directed by a judge, contest coordinator or contest chair. Any such communication will result in the contestant being disqualified from that section of the contest. If any taped lines on the floor within the contest area are present, all contestants shall stay within the taped lines, will result in penalties as follows: First violation, disqualification of the nearest segment of the contest. Second violation disqualification as a contest participant.
3. Time limits will be established on the contest procedure sheets for all segments of the test.
4. Evaluation of the completed project will be judged visually. Nondestructive and/or destructive tests may be used to complete the project evaluation.
5. Welding and cutting instructions will be provided to the contestants and specified on the Welding Procedure Specifications (WPS) and prints provided in the welding booths and near cutting stations.
6. Welding equipment used in the contest may be obtained from a variety of manufacturers and may include transformers, rectifiers and/or inverters.

7. Filler metals will be detailed on the Welding Procedure Specification (WPS) and/or prints.
8. Welds will be evaluated visually utilizing a rating system as established by the NY chair/ committee. Nondestructive and/or destructive tests may be used to complete the project evaluation.
9. Final judging of the welded projects will be evaluated according to the difficulty of the assigned task and by utilizing the following visual inspection criteria: dimensional accuracy, including distortion; 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; and visual examination of the welds for cracks, undercut, overlap, crater fill, spatter, arc strikes, porosity, convexity and reinforcement.
10. Print assembly tolerance will be $\pm 1/16$ ” unless otherwise noted
11. If no print assembly dimensions are given to orient any project part, the part is to be approximately located based on the prints isometric view.

Standards and Competencies

W 1.0 — Identify safety standards on a test with a score of at least 75 percent and demonstrate safety and health practices of welders in accordance to ANSI Z49

- 1.1 Demonstrate proper use of equipment used for protection of personnel
- 1.2 Demonstrate proper use and inspection of equipment used for ventilation
- 1.3 Demonstrate Hot Work operation
- 1.4 Demonstrate working in confined spaces properly
- 1.5 Understand precautionary labeling

W 2.0 — Demonstrate an understanding of practical measurement with a test score of at least 75 percent

- 2.1 Identify basic metal-working tools used in measuring
- 2.2 Use visual measuring tools to accuracy of $1/32$ ”
 - 2.3 Employ the components of a combination square set
- 2.4 Use layout and marking tools as required

2.5 Determine wire feed speed

W 3.0 — Read and interpret blueprints with a test score of at least 75 percent

- 3.1 Apply information found in the information block of the drawing
- 3.2 Identify the basic views used in blueprints including assembly, detail and fit-up drawings
- 3.3 Identify common types of lines, abbreviations and symbols in accordance with national drawing standards (ANSI)
- 3.4 Identify basic welding symbols and components of a symbol (such as arrow, reference line, tail, size or length) in accordance with the current national welding symbol standard AWS A 2.4, current edition

W 4.0 — Produce welds using a Shielded Metal Arc Welding (SMAW) process to AWS QC1 0 standards

- 4.1 Demonstrate safety procedures for SMAW
- 4.2 Demonstrate ability to correctly set up SMAW power sources, related welding equipment and do basic process and equipment troubleshooting for welding of carbon steel and/or stainless steel
- 4.3 Select correct type of electrode based on carbon steel and/or stainless steel plate (1/4" to 1/2" thickness)
- 4.4 Prepare carbon steel and/or stainless steel for welding

W 5.0 — Produce welds using a Gas Metal Arc Welding (GMAW) process to AWS QC1 0 standards

- 5.1 Demonstrate correct safety procedures for GMAW
- 5.2 Demonstrate ability to correctly set up GMAW power sources, related welding equipment and do basic process and equipment troubleshooting
- 5.3 Identify short circuiting, globular, spray and pulsed transfer welding of carbon steel, stainless steel and/or aluminum
- 5.4 Select correct type of filler metal, type of shielding gas, amperage and voltage based on carbon steel, stainless steel and/or aluminum sheet and/or plate (1/16" to 3/8" thickness)
- 5.5 Prepare the carbon steel, stainless steel and/or aluminum for welding

W 6.0 — Produce welds using a Fluxed Cored Arc Welding (FCAW) process to AWS QC1 0 standards

- 6.1 Demonstrate correct safety procedures for FCAW
- 6.2 Demonstrate ability to correctly set up FCAW power sources, related welding equipment and do basic process and equipment troubleshooting
- 6.3 Select correct type of filler metal, type of shielding gas, amperage and voltage based upon carbon steel and/or stainless steel sheet and/or plate (1/16" to 3/8" thickness)
- 6.4 Prepare stainless steel and/or carbon steel for welding

W 7.0 — Produce welds using a Gas Tungsten Arc Welding (GTAW) process to AWS QC1 0 standards

- 7.1 Demonstrate safety procedures for GTAW
- 7.2 Demonstrate ability to correctly set up GTAW power sources, related welding equipment and do basic process and equipment troubleshooting for regular and pulsed welding of aluminum, stainless steel and/or carbon steel
- 7.3 Select the correct type of tungsten and/or filler metal based on aluminum, stainless steel or carbon steel sheet and/or plate (1/16" to 1/4" thickness)
- 7.4 Prepare aluminum, stainless steel and/or carbon steel for welding

W 8.0 — Produce cut materials using an Oxygen Fuel Cutting (OFC) process to AWS QC1 0 standards

- 8.1 Demonstrate safety procedures for OFC
- 8.2 Demonstrate ability to correctly set up the OFC equipment for cutting and do basic process troubleshooting

W 9.0 — Produce cut materials using a Plasma Arc Cutting (PAC) process to AWS QC1 0 standards

- 9.1 Demonstrate safety procedures for PAC
- 9.2 Demonstrate ability to correctly set up the PAC power sources, related cutting equipment and do basic process and equipment troubleshooting
- 9.3 Set up and shut down equipment for cutting carbon steel, stainless steel and/or aluminum

W 10.0 — Demonstrate knowledge of visual inspection with a test score of at least 75 percent

- 10.1 Examine and measure undercut

- 10.2 Examine and measure porosity
- 10.3 Measure fillet size
- 10.4 Examine and measure weld reinforcement
- 10.5 Determine acceptability of welded samples in accordance with provided acceptance criteria

- positions
- 11.11 Weld a 2" to 8" diameter, schedules 40 to 80 pipe, single/multiple pass V-groove weld in the 2G, 5G and 6G positions
- 11.12 Lay out, weld, cut and prepare coupons for evaluation

W 11.0 — Demonstrate knowledge of welding positions and terminology

- 11.1 Start, stop and restart stringer beads in the flat, horizontal, vertical up and down and overhead positions
- 11.2 Weld a pad with a multiple pass weld in the flat, horizontal, vertical up and down and overhead positions
- 11.3 Weld a lap joint with a single pass, fillet weld in flat, horizontal, vertical up and down and overhead positions
- 11.4 Weld a lap joint with a multiple pass, fillet weld in the flat, horizontal, vertical up and down and overhead positions
- 11.5 Weld a T-joint with a single pass, fillet weld in the flat, horizontal, vertical up and down and overhead positions
- 11.6 Weld a T-joint with a multiple pass, fillet weld in the flat, horizontal, vertical up and down and overhead positions
- 11.7 Weld a butt joint with a single pass square groove weld in the flat, horizontal, vertical up and down and overhead positions
- 11.8 Weld a butt joint with a partial joint penetration, single pass, double V-groove weld in the flat, horizontal, vertical up and down and overhead positions
- 11.9 Weld a butt joint with a multiple pass V-groove weld in the flat, horizontal, vertical up and down and overhead positions
- 11.10 Weld a butt joint with complete joint penetration, multiple pass, double groove weld in the flat, horizontal, vertical up and down and overhead