The following rules are for the state contest only. Students/Teams that qualify for the national contest need to adhere to the rules and guidelines for that national contest. The rules can be found in the Skills USA Championships Technical Standards available from SkillsUSA Publication Sales. For both state and national contests, you should also watch for contest updates sent from the Wisconsin SkillsUSA state office. For national contests, you can find contest updates at the national SkillsUSA website.

WELDING

PURPOSE

To evaluate each contestant's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of welding.

GENERAL REGULATIONS

People entering this contest must follow all rules listed below as well as the **"General Regulations"** of the Wisconsin Skills Championships. The "General Regulations" can be found at: http://www.skillsusa-wi.org/wordpress/?page_id=130. You will be held accountable for knowing and following all rules and guidelines of the Wisconsin Skills Championships.

CLOTHING REQUIREMENT

Contestants must provide their own personal welding safety apparel. Protective welder's clothing including welder's hat or skullcap, no *Ball caps* allowed, leather cape with sleeves and bib or leather coat, leather gauntlet welding gloves (for other than GTAW), leather welding gloves for GTAW, high-top (6" minimum height) leather shoes (steel-toed safety shoes are recommended), and welder's helmet. All outer clothing must be of fire-resistant material such as wool, cotton, or denim. Safety glasses must be worn at all times during the contest. Industrial quality safety glasses with side shields or safety goggles (prescription glasses can be used only if equipped with side shields; otherwise they must be covered with goggles). **NOTE:** No athletic type shoes may be worn by contestants in this event. Inappropriate clothing which may present a safety risk may disqualify the contestant.

Neither the host facility nor the SkillsUSA Welding Technical Committee accepts any responsibility for lost or damaged personal equipment or property.

ELIGIBILITY

Open to active SkillsUSA members enrolled in Career and Technical Education programs with welding as the occupational objective.

EQUIPMENT AND MATERIALS

1. The following will be supplied by the technical committee:
   a. All necessary welding equipment, tools, and materials not listed under paragraph two (2) below.
   b. All instructions and procedure sheets with drawings
   c. All necessary information and furnishings for the judges and technical committee
2. Tools and materials to be supplied by the contestant:

a. All personal protective equipment as stated in "Clothing Requirement" above.
b. The host contest facility will provide welding power sources (machines), electrodes, and basic welding related equipment for the contest such as pliers, chipping hammers, and wire brushes. Contestants may furnish these items on their own.
c. In addition, contestants may bring a toolbox containing other common welding items (i.e. soap stone, square, wire side cutters, punch, tape measure, fillet gage (optional), file, marker, right angle magnets, cold chisel, copper backing plate, calculator)

SPECIFIC RULES FOR CONTEST PARTICIPANTS

1. Contestants must correctly use the welding equipment during the contest. The contest chair or process coordinator may stop a contestant at any time if they deem a contestant's actions to be hazardous to either themselves or others. Such stoppage may disqualify the participant from that section of the contest. If a contestant is warned a second time of a safety violation, he or she may be disqualified from the entire contest.
2. All terms, definitions, and welding symbols will be in accordance with the current editions of ANSI/AWSA 3.0 (Terms & Definitions) and ANSI/AWSA 2.4 (Symbols).
3. Evaluation of completed projects will be based on visual inspection.
4. Welding and cutting operations will be specified in drawings and procedure sheets provided to the contestants.

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 SkillsUSA Championship Technical Committee. **NOTE:** Items marked with an asterisk (*) should be considered essential tasks.
   a. Safety
   *1. Demonstrate personal safety
   *2. Demonstrate general lab safety
   *3. Demonstrate gas electrical and chemical safety
   *4. Identify components of fire triangle
   *5. Demonstrate knowledge of proper actions to be taken in an emergency
   b. Measurements
   1. Identify basic metal working tools used for measuring
   *2. Use visual measuring tools to accuracy of 1/32 of an inch
   *3. Employ the components of a combination square set
   4. Read precision measuring tools to nearest .001"
   *5. Use steel rule and tape
   *6. Use various layout and marking tools as required
   *7. Determine wire feed speed as indicated on a drawing
   c. Blueprint Reading
   *1. Use information found in the drawing information block
   *2. Read and understand 3 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. 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 mild steel.
*5. Select correct tip size and gas pressure for severing mild steel.
6. Prepare mild steel for cutting.
*7. Properly light, adjust flame, and shut down oxygen fuel equipment.
*8. Use a straight edge and soapstone for laying out a pattern.
*9. Make a cut on mild steel in flat position.
10. Make a bevel cut (45-degree angle) on mild steel plate in flat position.

e. 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. Set up and shut down equipment for welding of stainless steel.
6. Select correct type of filler metal and size of electrode based on material to be welded.
*7. Prepare material for welding.
*8. Start, Stop and restart stringer beads on steel in flat, horizontal, vertical up and down, and overhead positions.
*9. Construct a T-joint fillet weld using mild steel in flat, horizontal, vertical up and down, and overhead position.
*10. Construct a single V-groove butt weld using mild steel in flat, horizontal, vertical up and down, and overhead position.
*11. Layout, weld, cut and prepare coupons for evaluation.
12. Test prepared coupons.

f. 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 trouble shooting.
3. Correctly identify base metal prior to welding.
*4. Set up and shutdown equipment for regular and pulsed welding of aluminum, stainless steel, and/or carbon steel.
*5. Select the correct size and type of tungsten and/or filler metal based on material to be welded.

*6. Prepare material for welding.
7. Start, Stop and restart stringer beads on aluminum, stainless steel and carbon steel sheet/plate in the flat, horizontal, vertical up and down, and overhead positions.
*8. Construct a groove weld on aluminum in the flat, horizontal, vertical up and down and overhead positions.
*9. Weld a T-joint fillet on aluminum with filler rod on the flat, horizontal, vertical up and down and overhead position.
*10. Construct a butt joint on mild steel with filler rod on the flat, horizontal, vertical up and down and overhead position.
*11. Construct a T-joint on mild steel with filler rod in the flat, horizontal, vertical and overhead position.
*12. Make a butt joint on stainless with filler rod in the flat, horizontal, vertical and overhead position.
*13. Construct a T-joint on stainless with filler rod on the flat, horizontal, vertical and overhead position.

g. 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 to basic process and equipment troubleshooting.
3. Correctly identify base metal prior to welding.
*4. Set up and shut down GMAW for short arc and spray arc welding application.
*5. Select correct type of filler metal and size of electrode, type of shielding gas, wire feed speed, and voltage based on material to be welded.
*6. Properly prepare material for welding.
*7. Construct a T-joint fillet weld using mild steel in flat, horizontal, vertical up and down, and overhead position with short arc.
*8. Construct a V-groove butt weld using mild steel in flat, horizontal, vertical up and down, and overhead position with short arc.
*9. Construct a T-joint fillet with aluminum plate in the horizontal position with spray arc.
*10. Construct a multiple pass T-joint fillet with aluminum in the vertical up position with spray arc.

2. Welding equipment may be obtained from a variety of manufacturers and may include transformers, rectifiers, and/or inverters.
3. Filler metals will be compatible with the metals being welding and will be detailed on the contest procedure sheet. Instructions to the contestants will define more specifically the filler metals that may be used.
4. Time limits--Time limits will be established on the contest procedure sheets for all segments of the test. Failure to complete the project will result in no further judging.
5. Judging Criteria - Contestants will be evaluated on selected competencies based on the following criteria:

Evaluation:

1. All welds to be evaluated according to AWS D1.1 Structural Steel Code.
2. Contestants will be evaluated, in part, on safety with regard to appropriate dress and safe conduct in the lab. Proctors will note any unsafe dress and/or conduct and points may be deducted from the contestants welding score.
3. Contestants will supply a typed resume` to the evaluators at the time of the briefing session. Points will be deducted from the contestants score for not providing a typed one (1) page resume`.
4. The weldment(s) will count for 90% of final score.
5. The written exam will count for 10% of final score.

Judges guide for rating individual welds (scale of 1 – 10)

9 - 10 points	Exceptional quality in all aspects
7 -8 points	Quality weld including attention to correct machine setting and manipulative skills
5 - 6 points	Minimum acceptable weld quality
3 - 4 points	Acceptable only on a limited basis - skill needs upgrading
1 - 2 points	Below normal standard required on a product basis or product area basis
0 points	Totally unacceptable or weld was not performed

Aspects of judging criteria:

- personal and lab safety
- accuracy in reading weld print and placement of materials
- accuracy in machine settings and operation; manual skill, speed, accuracy
- selection of filler rods and wire
- setting of electrical current and gas pressures
- overall appearance of weld; free of visible defects
- ripple pattern
- bead size and contour
- penetration
- undercut
- reinforcement
- porosity
- slag inclusions
- cracking of weld
- tie-ins, craters
- written test
- typed one (1) page resume`