Montana SkillsUSA

Welding, Basic
(Secondary State Only)

PURPOSE:

To provide prevocational welding students in high school an opportunity to demonstrate skills in oxyacetylene and arc welding as a basic level.

CLOTHING REQUIREMENT:

Clean coveralls and/or protective leathers, leather work boots, leather gloves and safety glasses.

ELIGIBIILTY:

This contest is open to SkillsUSA members who have completed no more than 200 hours or welding in grades 9-12. Advisors must submit a written statement bearing their signature certifying that their students meet this requirement.

OBSERVER RULES:

Depending on the particular contest site arrangement used each year, observers may not be allowed in the contest area because of space and safety limitations. In the event observers are allowed, these rules apply:

EQUIPMENT AND MATERIALS:

Supplied by the contest committee:

a. All necessary welding equipment unless otherwise notified.
b. Instructions and technique sheets
c. All necessary information and furnishings for judges

Supplied by the contestant:

a. Welding Helmet (Quick-change hood is acceptable)
b. Welding Gloves
c. Safety Clothing (Leather jacket, sleeves, chaps recommended) (100% cotton coveralls are acceptable)
d. Leather Work Boots
e. Welding/Cutting Goggles
f. Safety Glasses **(mandatory) (if safety approved prescription glasses are used, they must have side shields or safety glasses/goggles to fit over prescription glasses)**
g. Chipping Hammer
h. Pliers
i. Tape Measure
j. Combination Square
k. Soap Stone

l. Wire Brush (stainless steel for best results)
m. Ear plugs
n. Metal stock prepared according to specifications issued in advance of the contest. (Each piece of metal stock must have the contestant's identification number stamped on one face.) **Failure to follow these instructions will put the contestant at an extreme disadvantage since no substitute pieces of stock will be furnished.**

RULES:

1. Contestants will be assigned numbers generated through the state SkillsUSA registration software in advance of the Montana SkillsUSA Leadership Conference. These numbers will be the only means of identifying contestants throughout the contest. **FOR SAFETY REASONS, PLEASE HAVE STUDENTS PLACE THEIR IDENTIFYING NUMBER ON THEIR BACK.**

2. Contestants must be on time for the orientation and the contests. Check the conference schedule for orientation and contest times.

3. Contestants will be given blue prints or job sheets explaining the tasks to be performed.

4. All rules of safety must be observed. At the contest committee's option, a written examination covering safety and proper procedures may be included as part of the contest.

5. Contestants will have to make all equipment adjustments.

6. Contestants will be assigned welding stations.

7. Ten minutes will be allowed for familiarization with welding equipment.

8. Welding will be evaluated visually and by tensile strength testing.

9. Types of welds to be assigned include, but are not limited to, the following:

ARC
a. Butt weld – flat, horizontal or vertical
b. Fillet weld – flat or vertical

OXYACETYLENE

a. Butt weld – flat, horizontal or vertical
b. Fillet weld
c. Cutting 3/8" stock

10. Contestants will be able to choose from the following electrodes and filler rods:

ARC: 1/8" and 5/32"
a. E6011
b. E6013
c. E7018

OXYACETYLENE - Copper clad steel (contestant rod size choice)

a. 1/16"
b. 1/8"

SAFETY

1. Demonstrate personal safety
2. Demonstrate general shop safety
3. Set safe parameters for all welding processes used

STANDARDS OF ACCEPTABILITY

a. **Contour –** The expressed face of the weld should be reasonably smooth and regular. There should be no overlapping or undercutting. The weld should conform to the required cross section for the size of the weld specified in the instructions.

b. **Extend of Fusion –** There should be complete fusion between the weld and base metal and full penetration to the root of the weld.

c. **Soundness –** The weld should contain no oxide particle or slag inclusion.

d. **Technique** will be observed by judges. Safe and proper procedures shall be observed at all times. A penalty may be assessed for infraction in the areas of general safety, set up and adjustment, lighting, and turning off torches, flame and rod angle, flame to puddle distance, rode and flame envelope relationship, electrode angle, arc length, travel speed and current setting.

JUDGING CRITERIA

Contestants will be evaluated on selected competencies bases on the following criteria.

ITEMS EVALUATED	**POSSIBLE POINTS (to be determined by the project, the contest chairs and the judges)**
Location & Position of materials	
Selection of filler rods & wire	
Selection of electrical current	
Contestant Performance Ability, Manual Skill, Speed and Accuracy	
Safety	
TOTAL	
Clothing Penalty	

Montana SkillsUSA
Welding, Combination
(Secondary and Postsecondary)

PURPOSE:

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

CLOTHING REQUIREMENT:

Clean coveralls and/or protective leathers, leather work boots, leather gloves and safety glasses.

ELIGIBILITY:

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

OBSERVER RULES:

Depending on the particular contest site arrangement used each year, observers may not be allowed in the contest area because of space and safety limitations. In the event observers are allowed, these rules apply:

a. A roped or marked area shall be designated for observers
b. No observer including SkillsUSA advisors shall be outside this area.
c. Observers shall not talk or gesture to contestants.
d. Judges shall penalize contestants if they accept assistance from observers.

(Observers should be warned before penalty occurs) Observers are not allowed in the assembly area.

EQUIPEMENT AND MATERIALS:

1. Supplied by the contest committee:
   a. All necessary welding equipment
   b. Instructions and technique sheets
   c. All necessary information and furnishings for judges

2. Supplied by the contestant:
   a. Welding Helmet (Quick-change hood is acceptable)
   b. Welding Gloves
   c. Safety Clothing (Leather jacket, sleeves, chaps recommended) (100% cotton coveralls are acceptable
   d. Leather Work Boots
   e. Welding/Cutting Goggles

f. Safety Glasses **(mandatory) (if safety approved prescription glasses are used, they must have side shields or safety glasses/goggles to fit over prescription glasses)**
g. Chipping Hammer
h. Pliers
i. Tape Measure
j. Combination Square
k. Soap Stone
l. Wire Brush (stainless steel for best results)
m. Ear plugs

RULES:

1. Contestants will be assigned numbers generated through the state SkillsUSA registration software in advance of the Montana SkillsUSA Leadership Conference. These numbers will be the only means of identifying contestants throughout the contest. **FOR SAFETY REASONS, PLEASE HAVE STUDENTS PLACE THEIR IDENTIFYING NUMBER ON THEIR BACK.**

2. Contestants must be one time for the orientation and the contests. Check the conference schedule for orientation and contest times.

3. Contestants will be given blue prints or job sheets explaining the tasks to be performed.

4. Contestants will make all equipment adjustments.

5. Ten minutes will be allowed for familiarization with welding equipment.

6. All rules of safety must be observed. At the contest committee's option, a written examination covering safety and proper procedures may be included as part of the contest.

7. Welding machines in the GMAW (MIG) welding contest will be set by the contestant.

8. The GTAW (TIG) welding machines will be set at zero and contestants will make their adjustments.

9. Contestants will be assigned welding stations.

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

SAFETY

1. Demonstrate personal safety
2. Demonstrate general shop safety
3. Set safe parameters for all welding processes used

MEASUREMENTS

1. Use the measuring tools to accuracy of 1/16"
2. Use a combination square.
3. Use Steel rule and tape.
4. Use various layout tools.

PRINT READING

1. Use information found in the drawing information block.
2. Read and understand 3-view drawing.
3. Identify the basic views used in prints.
4. Identify common types of lines, abbreviations and symbols.

OXYFUEL CUTTING

1. Demonstrate safety attained when using cutting head.
2. Set up equipment for cutting with proper regulator.
3. Light and adjust flame and shut down oxyfuel.
4. Use a straight edge and soapstone for laying out a pattern.
5. Make a cut on mild steel.
6. Make a flame beveled cut on steel plate.

SHIELDED METAL ARC WELDING (SMAW)

1. Demonstrate safe practices in all welding positions.
2. Strike an arc.
3. Start, stop and restart a bead.
4. Construct a t-joint fillet weld using mild steel in flat, horizontal, vertical up and down, and overhead position.
5. Construct a single V-groove butt weld using mild steel in flat, horizontal, vertical up and down, and overhead position.
6. Layout, weld, cut and prepare coupons for test.

GAS TUNGSTEN ARC WELDING (GTAW)

1. Demonstrate procedures in GTAW on aluminum, stainless steel, and mild steel welding.
2. Construct a groove weld on aluminum in flat, horizontal, vertical and overhead position.
3. Weld a T-joint fillet on aluminum with filler rod on the flat, horizontal, vertical, and over had position.
4. Construct a butt joint on mild steel with filler rod in the flat horizontal, vertical and overhead position.
5. Construct a T-joint on mild steel with filler rod in the flat, horizontal and overhead position.
6. Make a butt joint on stainless with filler rod in the flat, horizontal, vertical, and overhead position.

GAS, METAL ARC WELDING (GMAW)

1. Set up and shut down GMAW for short arc and spray arc welding application.
2. Select and adjust electrode wire, wire feed speed, volts and amps.
3. Construct a T-joint fillet weld using ¼" mild steel in flat, horizontal, vertical up and down, and overhead position with short arc.
4. Construct a V-groove butt weld using ¼" mild steel in flat, horizontal, vertical, up and down, and overhead positions with short arc.
5. Construct a T-joint fillet with aluminum plate in the horizontal position with spray arc.
6. Construct a multiple pass T-joint fillet with aluminum in the vertical up position with spray arc.

A. All terms, definitions, and welding symbols will be in accordance with the current edition of American Welding Society Standard as of January prior to the SkillsUSA.

B. Welding equipment may be obtained from a variety of manufacturers and may include transformers, rectifies, and generators.

C. Filler metals will be compatible with the metals being welded and will be detailed on the contest technique sheet. Instructions to the contestant will define more specifically the filler metals that may be used.

D. The complete test assemblies will be judged visually, tensile tested and guided bend.

E. Time limits will be established on the contest technique sheets for all segments of the test. Failure to complete the project will result in no further judging.

JUDGING CRITERIA

Contestants will be evaluated on selected competencies based on the following criteria.

ITEMS EVALUATED	**POSSIBLE POINTS (to be determined by the project, the contest chairs and the judges)**
Location & Position of materials	
Selection of filler rods & wire	
Selection of electrical & gas pressure	
Contestant Performance Ability, Manual Skill, Speed and Accuracy	
Safety	
Bend Test	
General Bead Appearance and Dimensions	
Penetration	
TOTAL	
Clothing Penalty	