Agricultural Welding

Revised 12/2023

Purpose and Standards

To evaluate the contestant’s manipulative skills, general knowledge and professional presentation as these correlate to his/her preparation for employment in the broad field of welding (agricultural, industrial, or other).

Foundation Standards: Mathematics Algebra, 10, 13, 15 and Geometry 9, 10, 11. Technology 4.1, 4.2, 4.6. Problem Solving and Critical Thinking 5.1. Health and Safety 6.2, 6.4, 6.5. Ethics and Legal Responsibilities 8.3. Leadership and Teamwork 9.1, 9.2, 9.3.

Agricultural Mechanics Pathway Standards: B1.1, B1.2, B3.1-B3.3, B5.1-B5.5, B7.1-B7.5, B8.1-B8.4, B9.1-B9.7.

Scope of the Contest

Contestants will demonstrate their ability to perform jobs and skills that are reflective of those required in the welding industry. Specific competency areas will include the following:

|  |  |  |
| --- | --- | --- |
| Safety | \*Shielded Metal Arc Welding (SMAW) | \*Oxy Fuel Welding (OFW)  |
| Measurement | \*Gas Metal Arc Welding (GMAW) | \*Cutting Processes |
| Blueprint Reading | \*Flux Core Arc Welding (FCAW) |  Weld Testing/Inspection |
| Project Layout | \*Gas Tungsten Arc Welding (GTAW) |  |

*\*A minimum of three processes will be incorporated into the applied portion of the contest.*

The contest will consist of a four way rotation including the following events or contest areas:

* Welding Application – Hands on component
* Written Test – General knowledge component
* Weld Testing/Inspection – Evaluation/quality control component
* Job Portfolio/Application – Professional presentation component

Contestants

The team shall consist of three or four members. The scores of the three highest team members shall be used for the team score. All team members are eligible for individual awards.

If the number of teams eligible to compete at the State Finals contest exceeds the number the Contest Hosts feels they can safety accommodate, the State Finals Contest Host will hold a preliminary round and a final round. The preliminary round will be held Friday and the final round will be held the following day. All contestants will compete in the preliminary round, which will consist of the Written Test class with the top combined team scores propelling them into the final round.

The tiebreaker will first be the contestant’s individual scores beginning with highest individual, then second highest and so on. If a tie still persists, the welding symbols questions of the test will be used.

The contest host will announce the number of teams moving on to the final round no less than 14 days before the State Finals contest. Preliminary round scores will be added to the final round scores on Saturday.

Classes

|  |  |  |
| --- | --- | --- |
| Class | Individual Points | Team Points |
| Welding Application | 200 | 600 |
| Written Test | 100 | 300 |
| Weld Testing/Inspection | 50 | 150 |
| Job Portfolio/Application | 50 | 150 |
| Total | 400 | 1200 |

Breaking of Ties

1. In the Agricultural Welding Contest, individual or team ties will be broken on the basis of the highest individual or team score using the written test score.
2. If a tie still exists, the individual or team Welding Application will be used to determine the high individual or team.

Sub-contest Awards

Sub-contest awards will be given for high teams and individuals in the following areas: Welding Application, Written Test, Weld Testing/Inspection, and Job Portfolio/Application.

Requirement of Host Institution

See equipment supplied by the host committee under Event Rules

Event Rules

1. Each qualifying contestant will compete in all four events.
2. Equipment supplied by the host committee:
	1. All necessary welding machines
	2. All consumables will be provided and contestants are required to utilize the provided materials
	3. All instructions and procedure sheets with drawings
	4. All materials for the host committee and judges
	5. A four-function calculator for the Job Application rotation
3. Equipment supplied by the contestant:
	1. All PPE (Personal Protective Equipment)
		1. Safety glasses (approved ANSI Z87 with side-shields)
		2. Hearing and or ear protection
		3. Welding helmet/face shield/goggles with appropriate #5 - #7 filter lenses for the OFC and OFW processes
		4. Welding helmet with appropriate #10 - #12 filter lenses for the AW processes
		5. Leather gloves with gauntlets
		6. Appropriate leather welding jacket
		7. Leather boots
	2. Tools
		1. Steel tape measure
		2. Steel ruler
		3. Combination square
		4. Rafter square/speed square
		5. Try square
		6. Depth gauge
		7. Fillet Gauge
		8. Calipers
		9. Protractor
		10. Compass
		11. Magnetic Square
		12. Soap Stone
		13. Chipping hammer
		14. Wire steel brush
		15. Locking welding clamp
		16. Locking pliers
		17. Adjustable end wrench
		18. Diagonal cutting pliers
		19. Welpers
		20. Metal file
		21. Scratch awl
		22. Oxy-fuel torch tip cleaner
		23. Cutting guide
		24. Flashlight
		25. Pen
		26. Pencil
		27. Marking pencil
		28. Cordless power tool with wire wheel only
4. Contest uniform will consist of the following:
	1. Black work pants – no synthetic materials
	2. Closed toed leather boots
	3. Long sleeve, button down, shite cotton shirt
	4. FFA Jacket \*
	5. FFA Tie \*
	6. Appropriate coveralls, leather work apron with sleeves, welding jacket, long sleeve shirt
	\*To be worn during check in ONLY with black pants, white long sleeve button down shirt, and leather boots and not during the contest.
5. Contestants must correctly use the welding equipment during the contest. Equipment set up and operation is essential to the welder’s ability to function in the workplace. Students are expected to be familiar with a variety of machines and to be able to set up machines for the given process. Contest personnel will be available to assist in unusual complications that may arise associated with equipment set up. If it is determined that the machine malfunctions beyond the contestants control, the contestant may be given the opportunity to redo that rotation at the contest host’s discretion with no penalty to their score.
6. At the time of the contest, plans and instructions will be provided to contestants.
7. Time limits will be set for each rotation and announced at the contest site.
8. The sponsoring school has the option to include safe work habits as part of the scorecard of up to 10% of the total points possible in that specific skill event. After a warning, the sponsoring school reserves the right to remove any contestant that violates accepted safety practices that endanger themself or others in the contest.
9. No unauthorized notes, printed materials, or tools may be used in any portion of the contest. Contestants found in violation will be disqualified from contest.
10. While the contest is in progress, contestants shall not communicate with anyone but the judges. Any observed communications other than with the judges may result in disqualification of the individual or team.
11. Completed projects will be evaluated visually and may include nondestructive and/or destructive testing.
12. Host site will provide all plans, tests and written documents no later than 2 weeks after the contest is completed to all participating teams.

Contest Area Descriptions:

1. Welding Application (200 points)
	1. *Overview*: Contestants will be supplied plan sets at the contest site which outline the hands-on portion of the contest. These plan sets will be basic, three view, shop drawings which incorporate welding symbols and procedures. Contestants will be required to interpret the drawings and weld symbols to configure their projects following the described welding symbols, procedures and measurements. Projects will be submitted at the end of the prescribed time period for evaluation by the judges. A total of four process areas will be completed scored at 50 points per process.
	2. *Welding Processes*: As outlined in the Contest Scope, there are six processes described as competency areas for the contestants. They are SMAW, GMAW, FCAW, GTAW, OFW and the Cutting Processes. The possible cutting processes include Plasma Arc Cutting (PAC), Oxy-fuel Cutting (OFC), and Air Carbon Arc Cutting/Gouging (CAC). Contestants will have projects which incorporate a minimum of three of the six processes. Cutting may comprise a maximum of one of the four required exercises. Rotations will be set up by the host committee.
	3. *Base Metals*: Contestants may weld mild steel, aluminum and/or stainless steel.
	4. *Filler Metals*: Contestants must be able to weld with a variety of filler metals that correspond to the proper welding process and base metals.
	5. *Welding Positions*: Contestants will weld in the flat (1G and 1F), horizontal (2G and 2F), vertical (3G and 3F) and overhead (4G and 4F) positions.
	6. *Possible Joint Configurations*: Joint configurations may include butt joints, corner joints, lap joints, edge joints, and/or tee joints that may include plate-to-plate, pipe-to-plate, pipe-to-pipe connections.
	7. *Possible Welds*: Contestants must be prepared to weld: bevel-groove welds, fillet welds, square groove welds, and /or v-groove welds.
	8. *Welding Equipment/Machines*: Welding equipment may be obtained from a variety of sources and may include transformer, transformer/rectifier, generators, and/or inverters.
2. Written Test (100 points)
	1. A written test shall include questions and/or problems from the following areas:

|  |  |
| --- | --- |
| 1. Safety | 10 points |
| 2. Shielded Metal Arc Welding (SMAW) | 10 points |
| 3. Oxy Fuel Welding (OFW) | 10 points |
| 4. Gas Metal Arc Welding (GMAW) | 10 points |
| 5. Flux Core Arc Welding (FCAW) | 10 points |
| 6. Gas Tungsten Arc Welding (GTAW) | 10 points |
| 7. Cutting Processes | 10 points |
| 8. Welding Symbols | 10 points |
| 9. Weld testing, inspection and metallurgy | 10 points |
| 10. Welder Certification | 10 points |

* 1. The test may be true-false and multiple choice in any combination. The test will be comprised of 50 questions valued at 2 points per question.
	2. The questions for the written test will come from the *Welding Skills* textbook written by Moniz. The latest two editions will be used.
1. Weld Testing/Inspection (50 points)
	1. *Overview*: Contestants will evaluate weld samples utilizing visual testing methods (VT). Weld samples will be evaluated and compared to sections of the AWS D1.1 code for acceptability or rejection. Weld samples and appropriate code sections will be provided by the host committee. Contestants will also need to be familiar with common nondestructive testing (NDT) methods. This contest area will be a practical lab exercise whereby the contestants visit stations and provide responses on an answer sheet provided by the host committee. This will consist of 25 questions valued at 2 points per question.
	2. *Nondestructive Testing (NDT):*  Contestants should be able to identify common NDT methods by photograph or real physical examples. The following methods may be included in this contest area: Visual Testing (VT), Dye Penetrant testing (PT), Ultrasonic Testing (UT), Radiographic Testing (RT) and Magnetic Particle Testing (MT). Questions will include both visual identification, as well as some basic knowledge questions about the testing methods.
	3. *Visual Testing (VT):* Contestants should be able to identify and measure the following surface indications: various forms of porosity, overlap/cold lap, undercut, cracks and inclusions. Upon identification, students should be able to measure these indications and reference the appropriate code section to determine whether the indication is an actual defect that would constitute rejection and repair. Code examples will be provided by the host committee and be based on the AWS D1.1 Structural Welding Code.
2. Job Portfolio and Application (50 points)
	1. *Overview*: All contestants will submit a digital job portfolio to the judging committee. The portfolio must be submitted to the contest host by 11:59 p.m. on the Wednesday immediately prior to the contest to allow ample time for the portfolios to be graded. Each contestant will submit his or her portfolio as a pdf. Any portfolios submitted in another format will be disqualified. Additionally, contestants will complete a sample job application onsite as one of the rotations.
	2. *Portfolios*: (35 points) Portfolios will consist of the following components: Title Page, Table of Contents, Letter of Introduction, Resume, Letter of Recommendation, and Supporting Evidence. All components must follow current, professional standards. Supporting Evidence will use the current FFA Proficiency Photo Pages. See rubric on page 7 for additional scoring information.
	3. *Job Application:* (10 points)A sample job application will be completed as one of the rotations at the contest site. These applications are intended to reflect the practice of handwriting an application as is found in many vocational/trade situations. Contestants should be able to write legibly and fully complete an application for employment. A 3”x5” card may be handwritten ahead of time to use as a reference during this rotation. The only supplemental information that may be written are: references names, addresses, phone numbers, place of employment address and place of employment phone number. See rubric below for additional scoring information.

Rubric:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Job Application Form** | **10** | **9-10 Points*** No spelling and/or grammatical errors
* Neat and legible
* All sections are complete
* Follows instructions and uses proper employment format
* Contains relevant, descriptive information
* Consistent with Resume and Letter of Introduction
 | **7-8 Points*** Occasional spelling and/or grammatical errors
* Predominately neat and legible
* Many sections are complete
* Follows instructions and uses proper employment format
* Contains relevant information
* Generally consistent with Resume and Letter of Introduction
 | **5-6 Points*** Persistent spelling and/or grammatical errors
* Mostly neat and legible
* Most sections are complete
* Follows most instructions
* Lacks relevant information
* Mainly consistent with Resume and Letter of Introduction
 | **3-4 Points*** Frequent spelling and/or grammatical errors
* Mostly disorganized and illegible
* Many sections are incomplete
* Does not follow Instructions
* Lacks relevant Information
* Inconsistent with Resume and Letter of Introduction
 | **1-2 Points*** Constant spelling and/or grammatical errors
* Disorganized and Illegible
* Incomplete
* Does not follow Instructions
* Lacks relevant information
* Inconsistent with Resume and Letter of Introduction
 |

1. *Math Calculations: (5 points):* The Math Calculations will consist of five basic math problems, which could include addition, subtraction, multiplication and dividing whole numbers, fractions, and decimals. All math problems will relate to the welding industry. Host school will provide basic four-function calculators for every student in each rotation. Contestants may utilize their own four-function calculators however cell phone calculators are prohibited. Each calculation is worth 1 point.

Contest Reference Material

|  |  |
| --- | --- |
| The Procedure Handbook of Arc Welding, by Lincoln Electric Company, Cleveland, Ohio.[www.lincolnelectric.com](http://www.lincolnelectric.com) The Lincoln Electric Company22801 St. Clair Ave.Cleveland, OH 44117Phone: 216-481-8100 | AWS A3.0 (Terms and Definitions) and AWS A2.4 (Symbols), American Welding Society.[www.aws.org](http://www.aws.org) American Welding Society550 N.W. LeJeune RoadMiami, Florida 33126Phone: 800-443-9353 or 305-443-9353  |
| The Educational Instructor’s Package, by Miller Electric Manufacturing Co.[www.millerwelds.com](http://www.millerwelds.com)Miller Electric Manufacturing Co. 1635 W. Spencer St.P.O. Box 1079Appleton, WI 54912-1079Phone: 920-734-9821 Miller. | Welding Skills, by Moniz[www.atplearning.com](http://www.atplearning.com)American Technical Publishers10100 Orland Parkway #200Orland Park, IL 60467Phone: 708-957-1100 |
| AWS D1.1 Structural Welding Code SteelSection 6 - Inspectionwww.aws.org American Welding Society550 N.W. LeJeune RoadMiami, Florida 33126Phone: 800-443-9353 or 305-443-9353  | AWS A2.4 Standard Symbols for Welding, Brazing, and Nondestructive Examinationwww.aws.org American Welding Society550 N.W. LeJeune RoadMiami, Florida 33126Phone: 800-443-9353 or 305-443-9353  |

** **Ag Welding Contest Portfolio Rubric**

**Contestant Name**

**School**

**Total Points**

**/35**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Points** | **Max Points** | **Exemplary** | **Effective** | **Acceptable** | **Developing** | **Poor** | **Missing** |
| Title Page |  | **2** | **2 Points*** Student Name
* Chapter Name
* Advisor Name
* Contest Name
* Contest Location
* Date of Contest
* All above information centered
 |  |  |  | **1 Point*** Missing any information in column one
* Additional graphics added to the page
* Spelling and/or grammatical errors found
 | **0 points** |
| Table of Contents |  | **2** | **2 Points*** Proper format and must include:
	+ Letter of Introduction
	+ Resume
	+ Letter of Recommendation
	+ Supporting Evidence #1
	+ Supporting Evidence #2
	+ Supporting Evidence #3
 |  |  |  | **1 Point*** Missing any information in column one
* Does not follow proper Table Of Contents format
 | **0 points** |
| Letter of Introduction |  | **10** | **9-10 Points*** Properly addressed to a local business
* No spelling and/or grammatical errors
* Unique, detailed letter which is well-stated, clear and concise
* Correctly reflects attached resume
* Visually appealing and follows business format
* Contains a valid signature
 | **7-8 Points*** Properly addressed to a local business
* Occasional spelling and/or grammatical errors
* Descriptive letter with advanced vocabulary
* Often aligns with attached resume
* Frequently follows business format
* Contains a valid signature
 | **5-6 Points*** Attempts to properly address to a local business
* Regular spelling and/or grammatical errors
* Generic letter with basic vocabulary
* Mostly aligns with attached resume
* Mostly follows business format
* Contains a valid signature
 | **3-4 Points*** Improperly addressed
* Frequent spelling and/or grammatical errors
* Vague letter with elementary vocabulary
* Often contradicts attached resume
* Makes an attempt to follow business format
* Contains a valid signature
 | **1-2 Points*** Not addressed to a local business
* Constant spelling and/or grammatical errors
* Purpose of letter is unclear
* Continuously contradicts attached resume
* Does not follow business format
* Contains no signature
 | **0 points** |
| Resume |  | **10** | **9-10 Points*** No spelling and/or grammatical errors
* Visually appealing
* Has consistent fonts, titles, spacing and formatting
* Logically and chronologically organized
* Follows Business Format
 | **7-8 Points*** Occasional spelling and/or grammatical errors
* Visually appealing
* Has nearly consistent fonts, titles, spacing and formatting
* Logically but not chronologically organized
* Follows Business Format
 | **5-6 Points*** Regular spelling and/or grammatical errors
* Attempts visual appeal
* Attempts consistent fonts, titles, spacing and formatting
* Inconsistent logical and chronological organization
* Makes An Attempt To Follow Business Format
 | **3-4 Points*** Frequent spelling and/or grammatical errors
* Lacks visual appeal
* Fonts, titles, spacing and formatting are often different
* Disorganized
* Makes An Attempt To Follow Business Format
 | **1-2 Points*** Constant spelling and/or grammatical errors
* Lacks visual appeal
* Fonts, titles, spacing and formatting are inconsistent
* Disorganized
* Does Not Follow Business Format
 | **0 points** |
| Letter of Recommendation |  | **2** | **2 Points*** Dated current letter of recommendation within the last year
* Author of letter is not related to contestant
* Letter is relevant to the welding and/or construction industry
* Contains a valid signature
 |  |  |  | 1 Points* Does not contain a date
* Date printed is beyond one year from the contest date
* Letter content is regarding a topic not relating to the welding and/or construction industry
* Does not contain a valid signature
 | 0 Points* Author is related to contestant
 |
| Supporting Evidence #1 |  | **3** | **3 Points*** Supporting evidence includes one photograph.
* Picture is clear, of high quality and taken in the landscape position
* The page uses the current state proficiency photo page template
* Contains a well written description less than 500- characters which contains no spelling and/or grammatical errors and uses technical, advanced vocabulary to describe what is occurring in the photograph
 |  | **2 points*** Supporting evidence includes one photograph.
* Picture is mostly clear and taken in either the landscape or portrait orientation
* The Page uses the current state proficiency photo page template
* Contains a basic description less than 500-characters which contains regular spelling and/or grammatical errors, and some technical, advanced vocabulary to describe what is occurring in the photograph
 |  | 1 Point* Supporting evidence includes one photograph.
* Picture is blurry and difficult to see. It is taken in either the landscape or portrait orientation
* The page uses the current state proficiency photo page template
* Contains a vague description less than 500- characters which contains constant spelling and/or grammatical errors and uses technical, advanced vocabulary to describe what is occurring in the photograph
 | 0 Points* The current State Proficiency photo page is not used
 |
| Supporting Evidence #2 |  | **3** |  |  |
| Supporting Evidence #3 |  | **3** |  |  |

Disqualifications:

* File is sent in a format other than a PDF
* One contestant’s portfolio is sent in multiple files

Comments/Recommendations:

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