

Students please affix one of the self adhesive labels from your sheet of identification labels to this page. Make sure the edges of the label are within the boundaries of this box and that the affixed label does not obscure any other parts of this page. If you do not have a self adhesive identification label complete the following information.

Your Name: _____

Write your name as it appears on your name badge.

Your Participant Code: _____

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Write your participant code as it appears on your name badge.

Students: Please do not write or mark within this box.

Skill Activity Score: _____

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Judge's Initials: _____

2022 NATIONAL FFA AGRICULTURAL TECHNOLOGY AND MECHANICAL SYSTEMS CAREER DEVELOPMENT EVENT STRUCTURAL SYSTEMS

Please read and follow directions carefully! Use your time wisely!

GENERAL INFORMATION / DIRECTIONS:

Assume you are repairing a piece of agricultural equipment. While making the repair you are required to weld pipe to plate, plug a hole, and layout for two mounting holes to be drilled later. When welding you will use SMAW. This exercise represents this requisite skill.

PROCEDURES:

1. **Safety:** Because you are working in a welding area safety glasses must be worn at all times. A serviceable welding helmet with a shade ten (minimum) protective lens as well as leather gloves and long sleeves must be worn while welding.
2. Follow the provided plans to assemble, weld, and layout the required piece using the shielded metal arc welding (SMAW) process. You will complete one plug weld, one fillet weld, and layout two mounting holes.
3. Properly mark your completed assembly and turn it in to a contest official with this sheet.

Activity Score Sheet

Graded Items	Points	Score
1. Correct assembly (3), safety (1) and clean-up (1)	5	_____
2. Appearance —consistency in form from beginning to end of the weld; smooth face dimension showing uniform travel speed; dense ripples; free of slag, porosity or spatter	5	_____
3. Plug weld —weld is complete with complete penetration; free of slag, porosity or splatter, and surface free of arc strikes	5	_____
4. Fillet weld —good tie-in fusion, no undercutting or overlapping, weld metal tied to toe, free of undercut or overfill, correct size according to drawing, and surface is free of arc strikes	5	_____
5. Pressure test —The completed component is free of leaks when pressurized to 10 psi.	5	_____
6. Layout —layout marks are clearly punched, and in the correct location according to the drawings	5	_____
TOTAL POINTS: (Double check point total and enter at top.)	30	_____

WELDING PROCEDURE SPECIFICATION (WPS)

Company Name: National FFA CDE Welding process(es): SMAW Supporting PQR No.(s): AWS D9.1	Identification # Revision <u>001</u> Date <u>9/6/2022</u> By <u>Lund.R</u> Authorized By <u>Lund.R</u> Date <u>9/6/2022</u> Type Manual ☒ Semi-Automatic ☐ Mechanized ☐ Automatic ☐
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JOINT DESIGN: Plug Weld Type: Single ☒ Double Weld ☐ Backing: Yes ☐ No ☒ Backing Material: N/A Root Opening <u> </u> Root Face Dimension <u> </u> Groove Angle <u> </u> Radius (J-U) <u> </u> Back Gouging Yes ☐ No ☒ Method <u> </u>	Position <u>1G</u> ELECTRICAL CHARACTERISTICS General Characteristics <u> </u> Current AC ☒ DCEP ☐ DCEN ☐ Pulsed ☐ Other <u> </u> Tungsten Electrode (GTAW/PAW) Size: <u> </u> Type: <u> </u>
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BASE METALS Material Spec. <u>ASTM A36</u> Type or Grade <u> </u> Thickness: Groove <u>1/4"</u> Fillet <u> </u> Diameter <u>1/2" Diameter Plug Weld</u>	TECHNIQUE Stringer or Weave Bead <u> </u> Multi-pass or Single Pass (per side) <u> </u> Number of Electrodes <u> </u> Peening <u> </u> Inter-pass Cleaning <u>Slag Removed</u> Other <u>Plug weld subject to 10 psi pressure testing</u>
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FILLER METALS Specification <u>AWS 5.1 - E6011</u>	POSTWELD HEAT Temp <u> </u> Time <u> </u>
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SHIELDING Flux <u>High Cellulose Potassium</u> Gas <u> </u> Composition <u> </u> Electro-Flux (Class) <u> </u> Flow Rate <u> </u> Gas Cup Size <u> </u>	PREHEAT Preheat Temp., Min <u> </u> Inter-pass Temp., Min <u> </u> Max <u> </u>
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WELDING PROCEDURE

Pass or	Filler Metals		Current					
Weld Layers	Process	Class	Diam	Type & Polarity	Amps or Wire Feed Speed*	Volts*	Travel Speed*	Joint Details
	SMAW	E6011	1/8"	AC	80-120	-	-	See Attached

* N/A for manual process. These settings are not visible to the welder with the Hood Down

Figure 5.13—Welding Procedure Specification (WPS) Form

WELDING PROCEDURE SPECIFICATION (WPS)

Company Name: National FFA CDE Welding process(es): SMAW Supporting PQR No.(s) AWS D9.1	Identification # Revision <u>002</u> Date <u>9/6/2022</u> By <u>Lund.R</u> Authorized By <u>Lund.R</u> Date <u>9/6/2022</u> Type Manual ☒ Semi-Automatic ☐ Mechanized ☐ Automatic ☐
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JOINT DESIGN: Pipe to Plate Fillet Type: Single ☒ Double Weld ☐ Backing: Yes ☐ No ☐ Backing Material: N/A Root Opening <u>-</u> Root Face Dimension <u>1/4"</u> Groove Angle <u>-</u> Radius (J-U) <u>-</u> Back Gouging Yes ☐ No ☒ Method <u>-</u>	Position <u>2F</u> ELECTRICAL CHARACTERISTICS General Characteristics <u>-</u> Current AC ☒ DCEP ☐ DCEN ☐ Pulsed ☐ Other <u>-</u> Tungsten Electrode (GTAW/PAW) Size: <u>-</u> Type: <u>-</u>
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BASE METALS Material Spec. <u>ASTM A36</u> Type or Grade <u>-</u> Thickness: Groove <u>-</u> Fillet <u>1/4"</u> Diameter <u>-</u>	TECHNIQUE Stringer or Weave Bead <u>-</u> Multi-pass or Single Pass (per side) <u>Single Pass</u> Number of Electrodes <u>-</u> Peening <u>N/A</u> Inter-pass Cleaning <u>Slag Removed</u> Other <u>-</u>
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FILLER METALS Specification <u>AWS A5.1 - E7018</u>	SHIELDING Flux Low-Hydrogen Potassium, Iron Powder Flux <u>-</u> Gas <u>-</u> Composition <u>-</u> Electro-Flux (Class) <u>-</u> Flow Rate <u>-</u> Gas Cup Size <u>-</u>
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PREHEAT Preheat Temp., Min <u>-</u> Inter-pass Temp., Min <u>-</u> Max <u>-</u>	POSTWELD HEAT Temp <u>-</u> Time <u>-</u>
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WELDING PROCEDURE

Pass or	Filler Metals		Current					
Weld Layers	Process	Class	Diam	Type & Polarity	Amps or Wire Feed Speed*	Volts*	Travel Speed*	Joint Details
					*	*	*	See Attached
	SMAW	E7018	1/8"	AC	90-110	-	-	

* N/A for manual process. These settings are not visible to the welder with the Hood Down

Figure 5.13—Welding Procedure Specification (WPS) Form





