

**SAC: Welding****Contact: Matt Scott**[Mscott@pcc.edu](mailto:Mscott@pcc.edu), 503-614-7601

Critical thinking and problem solving are a constant in welding courses. Students turn plates of steel into intricate objects and weld them to AWS and industry standards. Each step in the making of an object presents challenges. From blueprint interpretation, cutting within a 1/16 of an inch tolerance, fit-up, and tack-up. Each student must apply knowledge of essential variables when making each weld, adjusting one or all depending on each result of each weld. Students must critically evaluate every action and are constantly making decisions and taking actions based on analysis. Students in the welding program must perform tasks, procedures, and processes with competence as defined by American Welding Society D1.1 code and industry standards.

For each course in the Welding Technology program there is a corresponding welding packet. These packets are furnished to the students in CD form. When a student enrolls in a welding class it is the student's responsibility to print the appropriate packet, complete the worksheets, and perform all work laid out in the packet. Within each packet are assignments designed to incrementally increase the skill of each student from project to project. The projects themselves are held to AWS D1.1 structural steel welding code and industry standards. Ultimately the student completes all projects, worksheets, and final exams for a given. In the example packet can be seen the grading rubric which is common to all lecture/lab welding classes. The completed packet, projects, written final, practical final and rubric give direct evidence of our students' critical thinking.

What is less clear is if we have indirect evidence of critical thinking. We will require additional brainstorming on this subject.

**Results:**

So here are my results for this past spring for my three WLD 113, Shielded Metal Arc Welding (E7018) II students.

Student #1 scored 16 out of 20 on the written exam and 47 out of 50 on the practical exam

Student #2 scored 15 out of 20 on the written exam and 37 out of 50 on the practical exam

Student #3 scored 17 out of 20 on the written exam and 48 out of 50 on the practical exam

I only had three students in WLD 113 this term, but I had tons of students in my other sections as we are open entry open exit. However, this is pretty representative of other classes too - so I think it would be a good sample.

I did ask for Jesus' permission to place his work on line and he agreed to it today. He also sign the standard PCC Release of Confidentially form today too so if that's acceptable you can put it on line. His work would go nicely with his picture in the PCC Foundation's annual report as he is one of our scholarship recipients....

At this point I think the way I "do business" is pretty solid with no major changes needed. I do review my packets on a term by term basis and make corrections as needed, but as far as major adjustments my system seems to be working pretty well.

16/20



WLD 113 Final Exam Answer Sheet

Name: Jessie

Date: 5/23/10

(a)	The current range for a given covered electrode depends mainly on its	
	1. diameter - (page 53 text)	11. d
	2. C	12. C
	3. d	13. C
(d)	CAC-A process can be used to cut stainless steel, aluminium, and steel. (pg 200) *	
	4. (text)	14. a
(Pg 484)	5. L	15. d
(d)	Porosity is often caused by improper welding techniques, surface contamination, and incompatibility with base metal.	
	6. C	16. d
	7. C	17. C
	8. d	18. d
	9. d	19. a
	10. a	20. C

## Grading Rubric for the WLD 113 Practical Exam

Name: JESUS

Date \_\_\_\_\_

*Hold Points are mandatory points in the fabrication process, which require the inspector to check your work. You will have the following hold points that you instructor will check*

Points Possible	Hold Points	Instructor's Evaluation
5 points	<b>Blueprint Interpretation and Material Cut List</b> 5 points = 0 errors, all parts labeled and sized correctly 3 points = 1 error in part sizing and/or identification 2 points = 2 errors or more rework required (max points)	5
10 Points	<b>Using the orthographic drawing convert it to an isometric sketch</b>	11
10 points	<b>Material Layout and Cutting (Tolerances +/- 1/16")</b> 10 points Layout and cutting to +/- 1/16" Smoothness of cut edge to 1/32" 7 points Layout and cutting to +/- 1/8" Smoothness of cut edge to 1/16" 5 points (Rework required max points) Layout and cutting to +/- 3/16" Smoothness of cut edge to 3/32"	10
10 points	<b>Fit-up and Tack weld (Tolerances +/- 1/16")</b> 10 points Tolerances +/- 1/16" Straight and square to +/- 1/16" 7 Points Tolerances +/- 1/8" Straight and square to +/- 1/8" 5 Points (Rework required - Max points) Tolerances +/- 3/16" Straight and square to +/- 3/16"	10
15 points	<b>Weld Quality</b> Subtract 1 point for each weld discontinuity, incorrect weld size and incorrect spacing sequence.	12
35 points	<i>Minimum points acceptable. This equates to the minimum AWS D1.1 Code requirements.</i>	
<b>Total Points</b>		48/50

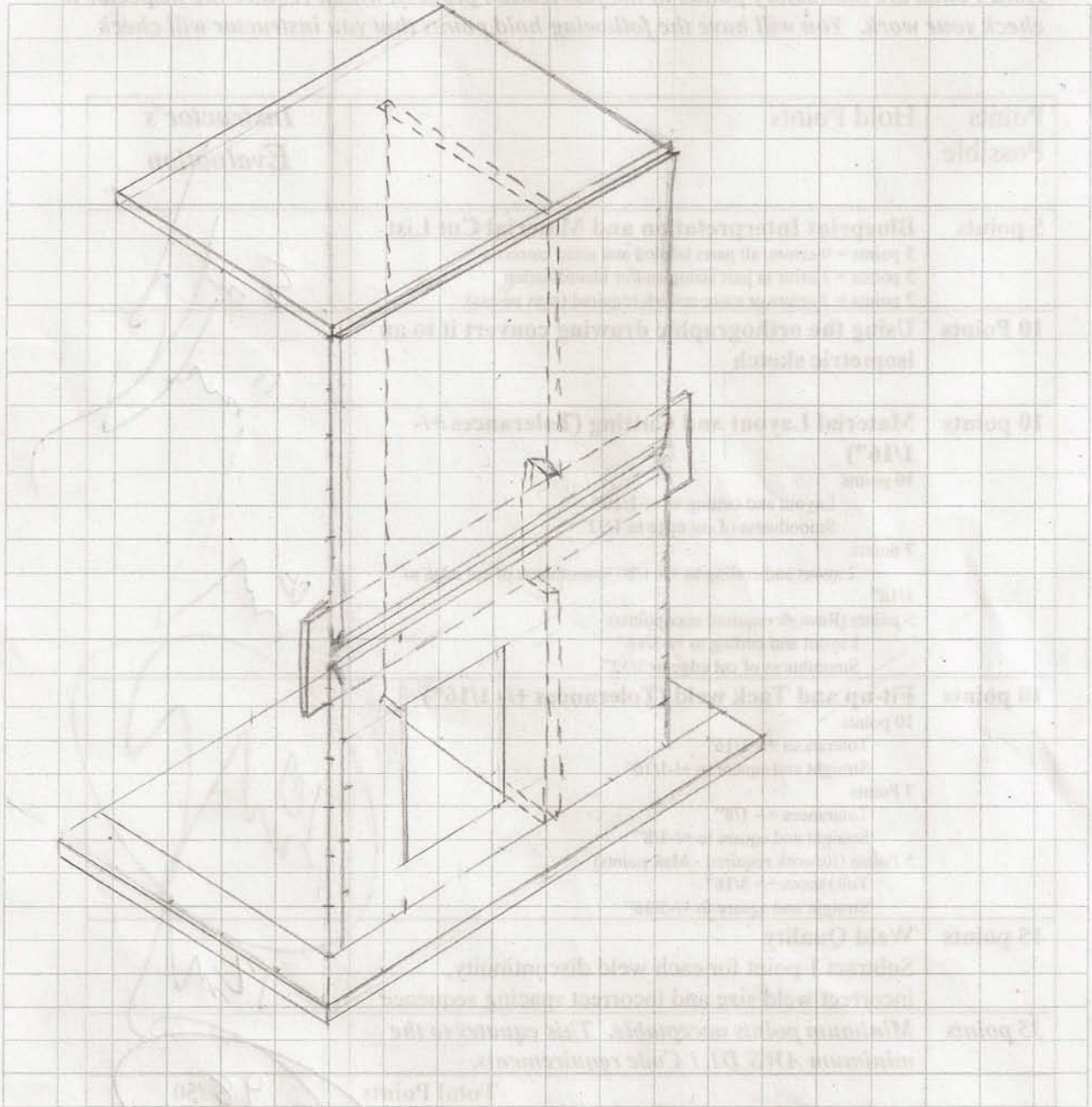
9/16/09

53  
Matt Scott

WLD 113 Isometric Drawing

Name: Jesus Ramirez

Date: 9/16/09



9/16/09

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Matt Scott

Note: each of these exams includes elements of Bloom's Taxonomy

### *Final Exam*

#### **Part One**

This portion of the final exam is a closed book test. Consult with your instructor to determine items that you may need to review. Once you determine that you are ready for the exam request a copy from your instructor. Complete the exam and write all answers on the answer sheet. Once completed, return the exam to your instructor and return to the lab for further instructions.

### *Study Guide*

#### **Safety**

- **Oxyacetylene safety**
- **SMAW safety**
- **Hand Tool Safety**

#### **SMAW and OAC Processes**

- **Power source specifics**
  - **Polarity**
  - **Current out put**
  - **Arc blow**
- **AWS electrode classification**
- **OAC and CAC-A**
  - **Theory of cutting**
  - **Flame types and equipment set-up**
  - **Safety**

#### **Welding Defects (types and causes)**

#### **Welding Symbols and Blueprints**

- **Orthographic views**
- **Isometric views**
- **Welding symbol**
  - **Weld symbols**
  - **Reference line**
  - **Tail**

#### **Math and Math conversions**

- **Adding and subtracting fractions**
- **Reading a tape measure**
- **Metric conversions**

*WLD 113 Final Exam Answer Sheet*

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

**Part Two**

This portion of the exam is a practical test where you will fabricate and weld a weldment from a “blue print”. The evaluation of this portion of the exam will be based on the Rubric. You will have two class period to construct and weld the project. When completed return the print with the weldment to the instructor.





*Grading Rubric for the WLD 113 Practical Exam*

Name: \_\_\_\_\_ Date \_\_\_\_\_

***Hold Points are mandatory points in the fabrication process, which require the inspector to check your work. You will have the following hold points that you instructor will check***

<b>Points Possible</b>	<b>Hold Points</b>	<b><i>Instructor's Evaluation</i></b>
<b>5 points</b>	<b>Blueprint Interpretation and Material Cut List</b> 5 points = 0 errors, all parts labeled and sized correctly 3 points = 1 error in part sizing and/or identification 2 points = 2 errors or more rework required (max points)	
<b>10 Points</b>	<b>Using the orthographic drawing convert it to an isometric sketch</b>	
<b>10 points</b>	<b>Material Layout and Cutting (Tolerances +/- 1/16")</b> 10 points Layout and cutting to +/-1/16" Smoothness of cut edge to 1/32" 7 points Layout and cutting to +/- 1/8" Smoothness of cut edge to 1/16" 5 points (Rework required max points) Layout and cutting to +/-3/16" Smoothness of cut edge to 3/32"	
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<b>15 points</b>	<b>Weld Quality</b> Subtract 1 point for each weld discontinuity, incorrect weld size and incorrect spacing sequence.	
<b>35 points</b>	<b><i>Minimum points acceptable. This equates to the minimum AWS D1.1 Code requirements.</i></b>	
	<b>Total Points</b>	<b>/50</b>

*WLD 113 Isometric Drawing*

Name: \_\_\_\_\_

Date: \_\_\_\_\_

