



WLD 34 - Pipe and Tube Welding

Catalog Description

Transfer Status: CSU

Prerequisite: WLD 50 and NCCER Level II Welding Qualification

Unit(s): 4.00

Lecture: 17.00 Contact hours/34.00 Out of class hours/51.00 Total hours/1.00 Unit(s)

Lab: 153.00 Contact hours/0.00 Out of class hours/153.00 Total hours/3.00 Unit(s)

Total: 170.00 Contact hours/34.00 Out of class hours/204.00 Total hours/4.00 Unit(s)

Course Description: This course covers shielded metal arc welding (SMAW), gas tungsten arc welding (GTAW), gas metal arc welding (GMAW), and flux core arc welding (FCAW) processes on several pipe systems. A variety of materials and configurations on sub critical pipe welding (pressure and power systems, cross-country transmission, pipeline welding and water transmission pipe welding) will be used. Special attention and performance standards for the qualifications will be used from the following codes: American Petroleum Institute (API), American Welding Society (AWS) and American Society of Mechanical Engineers (ASME).

Objectives

Upon successful completion of this course, the student should be able to:

1. Weld pipe and tube in 2G, 5G and 6G position using all the following processes: SMAW, GMAW, GTAW, and FCAW.
2. Apply qualifications procedures of the API, AWS, ASME codes for certification.
3. Follow procedures using the SMAW, GMAW, GTAW and FCAW welding processes meeting API, AWS, and ASME specifications for qualification of welding procedures and the welder.

Course Content

Topic Titles / Suggested Time Topic	
<u>Lecture</u>	
<u>Topics</u>	<u>Lec Hrs</u>
GMAW pipe welds	1.00
FCAW pipe welds	1.00
GTAW pipe welds – carbon pipe	1.00
SMAW pipe welds – stainless steel	1.00
GTAW pipe welds – low carbon and stainless steel pipe	1.00
Introduction and safety	2.00
Applications of welded pipe, tube and joint preparation	0.50
Standards and tests for welded pipe and tube	0.50
Pipe and tube test positions	0.50
Welder and weld procedure qualifications	0.50
SMAW pipe welds	1.00
Welding the root, hot pass, fill passes, and cover passes	1.00
Welding thin wall pipe	1.00
Welding in the 2G position	1.25
Welding in the 5G position	1.25
Welding in the 6G position	1.25
Pipe welding defects	1.25
Total Hours:	17.00

<u>Lab</u>	
<u>Topics</u>	<u>Lab Hrs</u>
Introduction and safety	1.00
Applications of welded pipe, tube and joint preparation	10.00
Standards and tests for welded pipe and tube	6.00
Pipe and tube test positions	10.00
Welder and weld procedure qualifications	6.00
SMAW pipe welds	10.00
Welding the root, hot pass, fill passes, and cover passes	12.00

Topics	Lab Hrs
Welding thin wall pipe	6.00
Welding in the 2G position	12.00
Welding in the 5G position	12.00
Welding in the 6G position	12.00
Pipe welding defects	6.00
GMAW pipe welds	10.00
FCAW Pipe welds	10.00
GTAW pipe welds - carbon pipe	10.00
SMAW pipe welds - stainless steel	10.00
GTAW pipe welds - low carbon and stainless steel pipe	10.00
Total Hours: 153.00	

Methods of Instruction

- A. Discussion
- B. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- C. Instructor Demonstrations
- D. Laboratory Experiments
- E. Lecture

Methods of Evaluation

- A. Exams/Tests
- B. Homework
- C. Lab Projects
- D. Lab Final/Mid-term Project

Examples of Assignments

Reading Assignments

1. Read module 2 and be prepared to discuss in class.
2. Read assigned AWS journal article and be prepared to discuss in class.

Writing Assignments

1. Write a 500-word essay explaining how the above AWS article can be implemented into the process and how it relates to the class.
2. Describe an order of operations for GTAW setup of a single vee open groove (SVOG) pipe welding joint.

Out-of-Class Assignments

1. Research the proper process for setting up SMAW equipment to weld on stainless steel pipe using manufactures publication.
2. Answer review questions for module 5.

Recommended Materials of Instruction

National Center for Construction Education and Research (NCCER). (2015). Welding Level Two. *Pearson Education INC, 5th*. 9780134163109.

Other Learning Materials

All tools listed in the Full-Time Welding Program Semester 2 tool list on the Butte College Welding Technology website.

Minimum Qualifications

Welding

Created/Revised by: Armitage, Chris

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