# WELD A256: ORBITAL WELDING LEVEL 2

| Item | Value |
|---|---|
| Curriculum Committee Approval Date | 12/12/2012 |
| Top Code | 095650 - Welding Technology |
| Units | 3 Total Units |
| Hours | 108 Total Hours (Lecture Hours 36; Lab Hours 72) |
| Total Outside of Class Hours | 0 |
| Course Credit Status | Credit: Degree Applicable (D) |
| Material Fee | Yes |
| Basic Skills | Not Basic Skills (N) |
| Repeatable | No |
| Grading Policy | Standard Letter (S) |

## Course Description

Second-level advanced welding theory and practice covering the process of orbital gas tungsten arc welding, cleanroom procedures, piping blueprints and certification. Instruction includes safety, equipment use, and certification requirements. PREREQUISITE: WELD A100 or WELD A101 or WELD A140. ADVISORY: WELD A255. Transfer Credit: CSU.

## Course Level Student Learning Outcome(s)

1. Demonstrate proper safety procedures.
2. Produce quality welds for certification to industrial standards.

## Course Objectives

- 1. Demonstrate proper safety procedures.
- 2. Demonstrate basic setup procedures variables (amperage, voltage and orbit speed) to make a fusion weld on various diameter tubes.
- 3. Demonstrate welding procedures of orbital welding.
- 4. Calculate speed and heat variables for weld programs.
- 5. Demonstrate correct weld preparation of pipe and/or tubing.
- 6. Operate orbital welding equipment to produce acceptable welds.
- 7. Compare welds to industry standards.
- 8. Calculate measurements from blue prints.
- 9. Demonstrate proper clean room procedures.
- 10. Produce quality welds for certification.

## Lecture Content

I. Safety A. General safety rules B. Welding equipment safety C. Personal safety in welding II. Orbital Welding A. GTAW process B. Industrial applications 1. Micro-electronic industry 2. Food processing industry 3. Bio-pharmaceutical industry 4. Power piping industry III. Weld Profiles A. Acceptable criteria under applicable code B. Unacceptable criteria under applicable code IV. Qualification and Certification Procedures B. Weld Schedule Development –1 ½", 1 ¼", ½" and ¼" tubing 1. Non-programmable variables a. Tungsten length and geometry b. Tungsten Installation c. Setting weld gas flow rates 2. Programmable variables a. Creating a weld program b. Auto/Manual calibration c. Calculate: Tungsten length d. Calculate RPMs e. Calculate Amps f. Calculate start and stop times g. "Test" Run h. Trial Weld I. Weld Evaluation j. Schedule Modification C. Preparation of the Weld Joint 1. Cleaning and facing Pipe or Tubing 2. Installation of Pipe or Tube into weld head V. Clean Room Procedures A. Clean protocol 1. Human contamination 2. Proper Dress and undress 3. Guidelines and Rules while working in a clean room VI. Fabrication A. Piping Blue Prints B. Tables for "take off" 1. Calculate end to end measures from blueprints 2. Cut tube and or pipe to end to end dimension

## Lab Content

I. Safety A. General safety rules B. Welding equipment safety C. Personal safety in welding II. Orbital Welding A. GTAW process B. Industrial applications 1. Micro-electronic industry 2. Food processing industry 3. Bio-pharmaceutical industry 4. Power piping industry III. Weld Profiles A. Acceptable criteria under applicable code B. Unacceptable criteria under applicable code IV. Qualification and Certification Procedures B. Weld Schedule Development –1 ½", 1 ¼", ½" and ¼" tubing 1. Non-programmable variables a. Tungsten length and geometry b. Tungsten Installation c. Setting weld gas flow rates 2. Programmable variables a. Creating a weld program b. Auto/Manual calibration c. Calculate: Tungsten length d. Calculate RPMs e. Calculate Amps f. Calculate start and stop times g. "Test" Run h. Trial Weld I. Weld Evaluation j. Schedule Modification C. Preparation of the Weld Joint 1. Cleaning and facing Pipe or Tubing 2. Installation of Pipe or Tube into weld head V. Clean Room Procedures A. Clean protocol 1. Human contamination 2. Proper Dress and undress 3. Guidelines and Rules while working in a clean room VI. Fabrication A. Piping Blue Prints B. Tables for "take off" 1. Calculate end to end measures from blueprints 2. Cut tube and or pipe to end to end dimension

## Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- Lab (04)
- DE Live Online Lab (04S)

## Instructional Techniques

Lecture and demonstrations, co-operative learning groups. Students presentation of projects.

## Reading Assignments

textbook reading as assigned by instructor

## Writing Assignments

Written skill evaluation, written exams

## Out-of-class Assignments

Homework as assigned

## Demonstration of Critical Thinking

Competency-based skill evaluation and written exams

## Required Writing, Problem Solving, Skills Demonstration

Problem solving performance evaluation

## Eligible Disciplines

Welding: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience.

## Textbooks Resources

1. Required Galvery, William and Frank Marlow. Welding Essentials: Questions and Answers , 2nd ed. New York: Industrial Press, 2007