

Advanced Gas Tungsten Arc Welding (GTAW) for Ferrous and Nonferrous Metals Level II

Module 12, Task 6	Course of Study Crosswalk:	AGTAW2 2-4																					
Module	Advanced Gas Tungsten Arc Welding (GTAW) for Ferrous and Nonferrous Metals Level II																						
Task / Topic	Construct beads in flat position with and without filler material on plain carbon steel, aluminum and stainless steel metal																						
Content Standard	The student will: <ul style="list-style-type: none"> • Demonstrate proper welding techniques for carbon steel. • Demonstrate proper welding techniques for aluminum. • Demonstrate proper welding techniques for stainless steel. 																						
Evaluation	Given GTAW equipment and necessary supplies, the student will make welds in the flat position with and without filler material on carbon steel, aluminum and stainless steel. Beads without filler metal will be straight and uniform. Beads with filler material will be straight with uniform width and a slightly crowned finish and will be fused into base metal. Welds should also meet requirements of AWS QC-10.																						
Resources (Materials, Equipment, Technology)	GTAW AC/DC welding machine Tungsten electrodes for welding carbon steel, aluminum and stainless steel Shielding gas ER 705-X (plain carbon steel), ER 3XX (stainless steel), ER4043 (aluminum) filler material Personal safety equipment Carbon steel, aluminum, stainless steel base metal																						
Lesson Length																							
Instructional Method																							
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Assessment Strategy																							
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Module 12, Task 6

Classroom Theory (*Procedures/Activities/Learning Experiences*)

1. Discuss principles of operation.
 - a. arc
 - b. filler metal and torch manipulation
2. Explain how to select correct polarity.
 - a. DC straight for carbon steel and stainless steel
 - b. AC for aluminum
3. Discuss electrodes used in GTAW.
 - a. type
 - b. size
 - c. preparation
4. Explain high frequency.
 - a. "off" or "start only" for DC straight or AC with balanced wave
 - b. "continuous" for unbalanced AC
 - c. High frequency intensity
 1. use as little as possible and still get good arc cleaning
 2. too little HF will not give good arc cleaning
 3. too much HF can interfere with electrical equipment
5. Describe filler material used in GTAW.
 - a. type
 - b. size
6. Explain shielding gas used in GTAW.
 - a. type of gas to be used
 - b. gas flow setting
 - c. too little gas will not give adequate shielding
 - d. too much gas will cause turbulence resulting in weld contamination
7. Describe base metal preparation.
 1. type of base metal
 2. dimensions
 3. method of cutting to be used
 4. surface preparation for welding
8. Describe welding techniques.
 - a. torch angle
 - b. filler metal angle
 - c. filler metal manipulation
 - d. speed of travel
9. Explain appearance of finish beads.
 - a. fused with base metal
 - b. uniform ripples
 - c. height of bead
 - d. width of bead

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Module 12, Task 6

Lab Demonstration (*Procedures/Activities/Learning Experiences*)

1. Set machine
 - a. polarity
 1. DC positive for carbon and stainless steel
 2. AC for aluminum
 - b. amperage
 - c. post purge
 - d. high frequency
 1. "off" or "start only" for DC straight or AC with balanced wave
 2. "continuous" for unbalanced AC
 - e. high frequency intensity; start at the middle setting
 - f. gas flow rate; about 20 C.F.H. is a good starting point
 - g. tungsten electrode
 1. select correct electrode
 2. insert along with correct collet and collet body into torch
 3. set at correct stickout
2. Position base metal as specified.
3. Make a bead without filler material
 - a. lower head
 - b. activate remote control and strike the arc
 - c. torch should have about a 90 degree work angle and about a 20 degree travel angle
 - d. hold electrode as close as possible without touching base metal
 - e. form a puddle about one electrode diameter wide
 - f. after puddle is formed, slowly move across the plate, keeping a constant bead width
4. Make a bead with filler material
 - a. lower hood
 - b. activate remote control and strike the arc
 - c. filler should be held at an angle of about 20 degrees from base metal with no side angle
 - d. hold the electrode as close as possible to base metal without touching weld puddle
 - e. torch should be moved smoothly along the plate while dipping the filler material into the leading edge of the puddle
 - f. the weld bead should be about one electrode diameter in width for carbon and stainless steel and about three electrode diameter width for aluminum
 - g. bead should have a convex surface

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Module 12, Task 6	Provision for Individual Differences
Extension	
Remediation	
Accommodation	
Modification	
Definitions and Suggested Modifications <u>Attention Deficit Disorder</u> <u>Autism</u> <u>Deaf-Blindness</u> <u>Deafness/Hearing Impairment</u> <u>Emotional Disturbance</u> <u>Mild Intellectual Disability</u> <u>Orthopedic Impairment</u> <u>Specific Learning Disability</u> <u>Speech or Language Impairment</u> <u>Tourette's Syndrome</u> <u>Traumatic Brain Injury</u> <u>Visual Impairment</u>	