

Welding Core: Gas Tungsten Arc Welding (GTAW)

Course Outcome Summary

Course Information

Description

Through classroom and/or lab/shop learning and assessment activities, students in this course will: explain the gas tungsten arc welding process (GTAW); demonstrate the safe and correct set up of the GTAW workstation; relate GTAW electrode and filler metal classifications with base metals and joint criteria; build proper electrode and filler metal selection and use based on metal types and thicknesses; build pads of weld beads with selected electrodes and filler material in the flat position; build pads of weld beads with selected electrodes and filler material in the horizontal position; perform basic GTAW welds on selected weld joints; and perform visual inspection of GTAW welds.

Types of Instruction

Instruction Type

Credits

3

Competencies

1. **Explain the gas tungsten arc welding process (GTAW)**

Properties

Domain: Cognitive Level: Synthesis

You will demonstrate your competence:

o through an instructor-provided written or oral evaluation tool

Your performance will be successful when:

- o you differentiate between types and uses of current
- o you identify the advantages and disadvantages of GTAW
- o you identify types of welding power sources
- o you identify different components of a GTAW workstation
- o you describe basic electrical safety

2. **Demonstrate the safe and correct set up of the GTAW workstation**

Properties

Domain: Cognitive Level: Application

You will demonstrate your competence:

- o in a lab or shop setting
- o using a GTAW workstation

Your performance will be successful when:

- o you demonstrate proper inspection of equipment
- o you demonstrate proper use of PPE
- o you demonstrate proper placement of workpiece connection
- o you check for proper setup of equipment
- o you inspect area for potential hazards/safety issues
- o you troubleshoot GTAW equipment and perform minor maintenance

3. Relate GTAW electrode and filler metal classifications with base metals and joint criteria

Properties

Domain: Cognitive Level: Analysis

You will demonstrate your competence:

- o through a written or oral examination

Your performance will be successful when:

- o you identify electrode classifications
- o you explain the AWS electrode and filler metal nomenclature
- o you determine proper electrode and filler metal for given joint based on material and position of weld
- o you determine proper type of electrodes to be used in a variety of industry applications

4. Build proper electrode and filler metal selection and use based on metal types and thicknesses

Properties

Domain: Psychomotor Level:

You will demonstrate your competence:

- o in a lab or shop setting
- o using GTAW equipment
- o using appropriate tools

Your performance will be successful when:

- o you use safety hazard precautions and PPE
- o you properly prepare the tungsten electrode profile relative to base material
- o you perform weld using GTAW process appropriate to electrode size and filler metal size
- o you select the proper electrode and filler metal type and size relative to metal size, type and thickness
- o you select the proper electrode and filler metal type and size based on material specifications
- o you use tools appropriate for the task

5. Build pads of weld beads with selected electrodes and filler material in the flat position

Properties

Domain: Psychomotor

You will demonstrate your competence:

- o in the lab or shop setting
- o using GTAW equipment

Your performance will be successful when:

- o you use safety hazard precautions and PPE
- o you demonstrate proper equipment setup and troubleshooting
- o you create a pad of beads using GTAW process
- o your weld exhibits proper uniformity and profile

6. Build pads of weld beads with selected electrodes and filler material in the horizontal position

Properties

Domain: Psychomotor

You will demonstrate your competence:

- o in the lab or shop setting

- o using GTAW equipment

Your performance will be successful when:

- o you use safety hazard precautions and PPE
- o you demonstrate proper equipment setup and troubleshooting
- o you create a pad of beads using GTAW process
- o your weld exhibits proper uniformity and profile

7. Perform basic GTAW welds on selected weld joints

Properties

Domain: Psychomotor

You will demonstrate your competence:

- o in the lab or shop setting
- o using GTAW equipment
- o using appropriate tools

Your performance will be successful when:

- o you conduct proper base metal preparation
- o you use safety hazard precautions and PPE
- o you demonstrate proper equipment setup and troubleshooting
- o you perform fillet weld in flat position
- o you perform a fillet weld in horizontal position
- o you perform a groove weld in a flat position
- o you perform a groove weld in a horizontal position
- o you use tools appropriate for the task

8. Perform visual inspection of GTAW welds

Properties

Domain: Psychomotor

You will demonstrate your competence:

- o in the lab or shop setting
- o using proper inspection tools

Your performance will be successful when:

- o you identify common visual discontinuities and defects on welds
- o you determine causes of discontinuities and defects of welds
- o you inspect welds for pass/fail ratings according to industry standards
- o you use tools appropriate for the inspection