Welding Core: Gas Metal Arc Welding (GMAW)

Course Outcome Summary

Course Information

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

Types of Instruction

Instruction Type | Credits
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 | 3

Competencies

1. **Explain gas metal arc welding process (GMAW).**
   - **Properties**
     - Domain: Cognitive  Level: Synthesis
   - **You will demonstrate your competence:**
     - through an instructor-provided written or oral evaluation tool
   - **Your performance will be successful when:**
     - you describe different modes of transfer
     - you differentiate between types and uses of current
     - you identify the advantages and disadvantages of GMAW
     - you identify types of welding power sources
     - you identify different components of a GMAW station
     - you describe basic electrical safety

2. **Demonstrate the safe and correct set up of the GMAW workstation.**
   - **Properties**
     - Domain: Cognitive  Level: Application
   - **You will demonstrate your competence:**
     - in the lab or shop setting
     - using a GMAW workstation
   - **Your performance will be successful when:**
     - you demonstrate proper inspection of equipment
     - you demonstrate proper use of PPE
     - you demonstrate proper placement of workpiece connection
     - you check for proper setup of equipment
     - you inspect area for potential hazards/safety issues
     - you troubleshoot the GMAW equipment and perform minor maintenance
3. **Correlate GMAW electrode classifications with base metals and joint criteria**
   
   **Properties**
   Domain: Cognitive   Level: Analysis
   
   **You will demonstrate your competence:**
   o through a written or oral instructor-provided evaluation tool
   
   **Your performance will be successful when:**
   o you explain the AWS electrode nomenclature
   o you determine proper electrode 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
   o you identify proper electrode storage and handling
   o you identify consumables

4. **Demonstrate proper electrode selection and use based on metal types and thicknesses**
   
   **Properties**
   Domain: Cognitive   Level: Application
   
   **You will demonstrate your competence:**
   o in the lab or shop setting
   o using GMAW equipment
   
   **Your performance will be successful when:**
   o you identify consumables for various electrode sizes
   o you select the proper electrode type and size relative to metal size, type and thickness
   o you select the proper electrode type and size based on material specifications

5. **Build pads of weld beads with selected electrodes in the flat position**
   
   **Properties**
   Domain: Psychomotor   Level:
   
   **You will demonstrate your competence:**
   o in the lab or shop setting
   o using GMAW equipment
   
   **Your performance will be successful when:**
   o you implement safety procedures and PPE
   o you implement proper equipment setup
   o you use the proper metal transfer
   o you create a pad of beads using GMAW
   o your weld exhibits proper uniformity and profile

6. **Build pads of weld beads with selected electrodes in the horizontal position**
   
   **Properties**
   Domain: Psychomotor
   
   **You will demonstrate your competence:**
   o in the lab or shop setting
   o using GMAW equipment
   
   **Your performance will be successful when:**
   o you implement safety procedures and PPE
   o you implement proper equipment setup
   o you use the proper metal transfer
   o you create a pad of beads using GMAW
7. **Produce basic GMAW welds on selected weld joints.**

   **Properties**
   Domain: Cognitive  Level: Synthesis
   
   You will demonstrate your competence:
   o in the lab or shop setting
   o using GMAW welding equipment
   o using appropriate tools
   
   Your performance will be successful when:
   o you implement safety procedures and PPE
   o you implement proper equipment setup
   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. **Conduct visual inspection of GMAW welds**

   **Properties**
   Domain: Cognitive  Level: Application
   
   You will demonstrate your competence:
   o in the lab or shop setting
   o using appropriate 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 appropriate tools for inspection