Arkansas CTE

Gas Metal Arc Welding: Grades 10, 11, 12

Adopted 2014

Identify and demonstrate welding safety

1.1 Understand the hazards of welding and develop the proper attitude toward safety.

1. Identify some common hazards in welding and identify proper PPE used in welding. 1.1.1
2. Describe how to avoid welding fumes, how to avoid electric shock when welding and some of the causes of accidents. 1.1.2

1.2 Develop proper techniques and attitudes toward safe materials handling.

1. Identify and explain uses for material safety data sheets. 1.2.1
2. Explain safety techniques for storing and handling cylinders. 1.2.2
3. Describe proper material handling methods. 1.2.3

Demonstrate a knowledge of welding materials and metals

2.1 Compare and contrast the physical characteristics, mechanical properties, classification systems, and weldability of common metals and alloys.

1. Identify and explain the composition and classification of base metals. 2.1.1
2. Explain and demonstrate field identification methods for base metals. 2.1.2
3. Compare the physical characteristics and mechanical properties of metals. 2.1.3
4. Compare forms and shapes of structural metals. 2.1.4
5. Explain metallurgical considerations for welding metals. 2.1.5

2.2 Demonstrate and explain preheating, interpass temperature control, and postheating procedures to preserve weldment strength, ductility, and weld quality.

1. Explain and demonstrate how to preheat metals. 2.2.1
2. Describe maintaining interpass temperature. 2.2.2
3. Demonstrate postweld heat treatment of metals. 2.2.3
4. Determine the effects of welding on metal. 2.2.4

Identify and apply welding techniques: GMAW and FCAW

3.1 Identify and properly use the required equipment for gas metal arc welding and flux-cored arc welding.

1. Explain and demonstrate gas metal arc welding (GMAW) and flux cored arc welding (FCAW) safety. 3.1.1
2. Identify the characteristics of welding current and power sources. 3.1.2
3. Demonstrate and explain the use of GMAW and FCAW equipment:
Spray transfer
Globular
Short circuiting 3.1.3
4. Explain the use of GMAW and FCAW shielding gases and filler metals 3.1.4
5. Set up GMAW and FCAW equipment and identify tools for weld cleaning. 3.1.5

3.2 Perform fillet and open V-groove welds on carbon steel plate using gas metal arc welding (GMAW) and flux-cored arc welding (FCAW) processes in various positions.

1. Perform GMAW-S (short-circuit) multiple-pass fillet welds on carbon steel plate coupons in multiple positions, using solid or composite wire and shielding gas. 3.2.1
2. Perform GMAW-S (short-circuit) multiple-pass V-groove welds on carbon steel plate coupons in multiple positions (with or without backing), using solid or composite wire. 3.2.2
3. Perform GMAW spray fillet and V-groove welds on carbon steel plate coupons in multiple positions (with or without backing), using solid or composite wire and shielding gas. 3.2.3
4. Perform FCAW multiple-pass fillet welds on carbon steel plate coupons in multiple positions, using flux cored wire and, if required, shielding gas. 3.2.4
5. Perform FCAW multiple-pass V-groove welds on carbon steel plate coupons in multiple positions (with or without backing), using flux cored wire and, if required, shielding gas. 3.2.5