Arkansas CTE

Welding Technology: Grades 9, 10, 11, 12

Adopted 2014

Identify and demonstrate proper welding safety

1.1 Follow safe work practices and procedures in accordance to OSHA standards. Recommended Application/Activity Reference 00101-09 CCSS Standards CCTC Standards

1. Explain the idea of a safety culture and its importance in the construction crafts and the role of OSHA in job-site safety. 1.1.1
2. Recognize violations to OSHA's General Duty Clause found in 1926 CFR Subpart C. 1.1.2
3. Explain causes of accidents and the impact of accident costs. 1.1.3
4. Recognize safety hazards recognition and demonstrate risk assessment techniques. 1.1.4
5. Explain fall protection as well as ladder, stair, and scaffold procedures and requirements. 1.1.5
6. Demonstrate safe work procedures to use around electrical hazards. 1.1.6
7. Demonstrate the use and care of appropriate personal protective equipment (PPE). 1.1.7
8. Identify other construction hazards on your job site, including hazardous material exposures, environmental elements, welding and cutting hazards, confined spaces, and fires. 1.1.8
9. Explain the importance of hazard communications (HazCom) and Safety Data Sheets (SDSs). 1.1.9

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

1. Identify some common hazards in welding and proper PPE used in welding. 1.2.1
2. Demonstrate safety techniques for storing and handling compressed gas cylinders 1.2.2
3. Describe how to avoid welding fumes. 1.2.3
4. Explain some of the causes of accidents. 1.2.4
5. Explain how to avoid electric shock when welding. 1.2.5

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1.3 Recognize hazards and apply safety procedures required for materials handling.

1. Establish a pre-task plan prior to moving a load, and use proper material-handling techniques. 1.3.1
2. Demonstrate proper material handling methods. 1.3.2

Apply mathematical procedures to welding tasks

2.1 Apply basic mathematical procedures to related tasks. Recommended Application/Activity Reference 00102-09 Introduction to Construction Math CCSS Standards CCTC Standards

1. Add, subtract, multiply, and divide whole numbers, with and without a calculator. 2.1.1
2. Use a standard ruler, a metric ruler, and a measuring tape to measure. 2.1.2
3. Add, subtract, multiply, and divide fractions and decimals. 2.1.3
4. Convert decimals to percentages and percentages to decimals. 2.1.4
5. Convert fractions to decimals and decimals to fractions. 2.1.5

2.2 Investigate the metric system and apply its use to construction tasks.

1. Explain the metric system and its importance in the construction trade. 2.2.1
2. Recognize and use metric units of length, weight, volume, and temperature. 2.2.2

2.3 Apply geometry concepts to construction tasks.

1. Recognize basic shapes used in the welding industry. 2.3.1
2. Apply basic geometry to measure basic shapes. 2.3.2

Handling and care of industry tools

3.1 Safely use and maintain common and/or specialized hand tools. Recommended Application/Activity Reference 00103-09 Introduction to Hand Tools CCSS Standards CCTC Standards

1. Recognize and identify basic hand tools and their proper uses in the construction trade. 3.1.1
2. Visually inspect hand tools to determine if they are safe to use. 3.1.2

3.2 Safely use and maintain common and/or specialized power tools.

1. Identify power tools commonly used in the construction trades. 3.2.1
2. Demonstrate safe use of power tools. 3.2.2
3. Demonstrate how to maintain power tools properly 3.2.3

Demonstrate appropriate en

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4.1 Apply the basic soft skills of the industry trade which include reading, writing, listening, and speaking.

1. Interpret information and instructions presented in both verbal and written form. 4.1.1

2. Communicate effectively in on-the-job situations using verbal and written skills. 4.1.2
3. Communicate effectively on the job using electronic communication devices. 4.1.3

4.2 Develop interpersonal skills that are needed to succeed in the welding industry.

1. Explain the role of an employee in the construction industry. 4.2.1
2. Demonstrate critical thinking skills and the ability to solve problems using those skills. 4.2.2
3. Demonstrate knowledge of computer systems and explain common uses for computers in the construction industry. 4.2.3
4. Apply effective relationship skills. 4.2.4
5. Recognize and report on workplace issues such as sexual harassment, stress, and substance abuse. 4.2.5

Demonstrate proper welding techniques

5.1 Demonstrate the processes of cutting, trimming, and shaping metals utilizing the oxyfuel process. Recommended Application/Activity Reference 29102-09 Oxyfuel Cutting CCSS Standards CCTC Standards

1. Identify and explain the use of oxyfuel cutting equipment. 5.1.1
2. Set up oxyfuel equipment. 5.1.2
3. Light and adjust an oxyfuel torch. 5.1.3
4. Shut down oxyfuel cutting equipment. 5.1.4
5. Disassemble oxyfuel equipment. 5.1.5
6. Change cylinders. 5.1.6
7. Perform oxyfuel cutting:
Straight line and square shapes
Piercing and slot cutting
Bevels
Washing
Gouging 5.1.7
8. Operate a motorized, portable oxyfuel gas cutting machine. 5.1.8

5.2 Demonstrate the processes of piercing, cutting, and gouging metal utilizing the plasma arc cutting process.

1. Explain the plasma arc cutting processes. 5.2.1
2. Compare plasma arc cutting equipment. 5.2.2
3. Prepare and set up plasma arc cutting equipment. 5.2.3
4. Use plasma arc cutting equipment to make various types of cuts. 5.2.4
5. Properly store equipment and clean the work area after use. 5.2.5

5.3 Demonstrate the use of Carbon Arc Cutting-Air (CAC-A) equipment, its operations, and its use for cutting and gouging metals

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1. Demonstrate the air carbon arc cutting (CAC-A) process and equipment. 5.3.1
2. Select and install CAC-A electrodes. 5.3.2

3. Prepare the work area and CAC-A equipment for safe operation. 5.3.3
4. Use CAC-A equipment for washing and gouging activities. 5.3.4
5. Perform storage and housekeeping activities for CAC-A equipment. 5.3.5
6. Make minor repairs to CAC-A equipment. 5.3.6

5.4 Prepare various base metals to conform to the appropriate welding codes.

1. Clean base metal for welding or cutting. 5.4.1
2. Identify and explain joint designs uses and considerations. 5.4.2
3. Mechanically bevel the edge of a mild steel plate. 5.4.3
4. Thermally bevel the end of a mild steel plate. 5.4.4
5. Select the proper joint design based on a welding procedure specification (WPS) or instructor direction. 5.4.5

Interpret and appropriately use industry and welding symbols, drawings, and specifications

6.1 Interpret and draw welding symbols on specifications, drawings, and welding procedure specifications. Recommended Application/Activity Reference 29201-09 Welding Symbols CCSS Standards CCTC Standards

1. Interpret parts of a welding symbol. 6.1.1
2. Interpret fillet and groove weld symbols. 6.1.2
3. Read welding symbols on drawings, specifications, and welding procedure specifications. 6.1.3
4. Interpret welding symbols from a print. 6.1.4

6.2 Read and interpret assembly and detailed blueprints (prints).

1. Interpret a welding detail drawing. 6.2.1
2. Identify lines, material fills, and sections. 6.2.2
3. Demonstrate object views. 6.2.3
4. Interpret and use dimensioning. 6.2.4
5. Explain notes and bill of materials. 6.2.5
6. Interpret basic elements of a welding detail drawing. 6.2.6
7. Sketch or draw a basic welding drawing. 6.2.7

6.3 Interpret construction drawings, recognize classifications of drawings, and use drawing dimensions.

1. Recognize and identify basic construction drawing terms, components, and symbols 6.3.1
2. Relate information on construction drawings to actual locations on the print 6.3.2
3. Classify construction drawings. 6.3.3
4. Interpret and use drawing dimensions. 6.3.4