Los Angeles City Structural Welding Code – Steel (D1.1) Certification Practice Test (Sample)

Study Guide

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Questions

1. What are slag inclusions?

- **A. Gas Bubbles in the Weld**
- **B. Nonmetallic Solids Trapped in the Weld**
- **C. Oxidation on the Weld Surface**
- **D. Weld Bead Deformation**

2. What letter is represented by fillet welds?

- **A. A**
- **B. B**
- **C. C**
- **D. F**

3. Which type of welding wire is primarily used in FCAW?

- **A. Solid wire**
- **B. Flux-cored wire**
- **C. Routed wire**
- **D. Multi-core wire**

4. What numbers do shielding gases typically end with?

- **A. 1, 2, and 5**
- **B. 3, 4, and 6**
- **C. 0, 1, and 2**
- **D. 5, 6, and 7**

5. What does DC stand for?

- **A. Direct current**
- **B. Dynamic current**
- **C. Direct circuit**
- **D. Direct charge**

6. Deep penetrating electrodes typically end in which numbers?

- **A. 0 and 1**
- **B. 2 and 3**
- **C. 4 and 5**
- **D. 6 and 7**

7. What does DCEN mean?

A. Direct current, electrode negative

B. Dynamic current, electrode negative

C. Direct cable, electrode negative

D. Direct circuit, electrode negative

8. What is the AWS specification number for GMAW carbon steel electrodes?

A. A5.18

B. A5.20

C. A5.25

D. A5.30

9. What type of current type welding machines do SMAW and GTAW both use?

A. Direct current

B. Constant current

C. Alternating current

D. Intermittent current

10. What is a defining feature for electrodes that use the dragging manipulation technique?

A. They end in numbers 0 and 1.

B. They are typically low hydrogen electrodes.

C. They end in numbers 2, 3, 4, 5, 6, 7, and 8.

D. They are suitable for shallow penetration.

Answers

1. B
2. D
3. B
4. A
5. A
6. A
7. A
8. A
9. B
10. C

Explanations

1. What are slag inclusions?

A. Gas Bubbles in the Weld

B. Nonmetallic Solids Trapped in the Weld

C. Oxidation on the Weld Surface

D. Weld Bead Deformation

Slag inclusions are defined as nonmetallic solids that become trapped in the weld during the welding process. These inclusions can originate from the flux used during welding or from impurities within the base materials. When the molten metal solidifies, any slag that has not been properly removed can become embedded in the weld bead, leading to defects that can undermine the integrity and performance of the weld joint. In the context of welding, it is crucial to ensure that any slag is removed after each pass in processes that utilize flux, such as shielded metal arc welding (SMAW) and others. By doing so, welders can minimize the risk of inclusions, ensuring sound and high-quality welds that meet the necessary structural requirements. Understanding slag inclusions and controlling them is a vital aspect of maintaining weld quality and ensuring structural integrity in steel fabrication.

2. What letter is represented by fillet welds?

A. A

B. B

C. C

D. F

Fillet welds are represented by the letter "F" in welding terminology and related documentation. This designation is important because it provides a consistent way to refer to this specific type of weld, which is commonly used to join two pieces of metal at a right angle. Fillet welds are often used in structural applications because they are effective in joining parts without requiring extensive preparation of the base material. In terms of welding symbols, the use of the letter "F" helps differentiate fillet welds from other types of welds, such as groove welds or spot welds, which have their own specific designations. Understanding these symbols and classifications is essential for welders and engineers, as they ensure clarity and avoid confusion in welding plans and specifications. The other choices do not relate to common welding terminology for fillet welds, making "F" the only correct representation in this context.

3. Which type of welding wire is primarily used in FCAW?

A. Solid wire

B. Flux-cored wire

C. Routed wire

D. Multi-core wire

Flux-cored wire is specifically designed for flux-cored arc welding (FCAW) applications. This type of wire contains a core that is filled with flux material, which serves several important functions during the welding process. The flux generates a shielding gas when heated, protecting the weld from contamination by atmospheric gases, and it helps to stabilize the arc for improved weld quality. The use of flux-cored wire allows for excellent adaptability to various welding conditions and positions, making it a preferred choice for outdoor welding and in situations where wind could affect the shielding of the weld pool. Additionally, flux-cored wire can often be used with or without shielding gas, further enhancing its versatility in different environments. Other types of wires, such as solid wire, are not primarily used in FCAW because they do not contain the core flux that is essential for the process. Routed wire and multi-core wire are also not associated with FCAW, as they do not fulfill the specific characteristics needed for this welding technique. Thus, the correct answer clearly highlights the unique design and functionality of flux-cored wire in FCAW.

4. What numbers do shielding gases typically end with?

A. 1, 2, and 5

B. 3, 4, and 6

C. 0, 1, and 2

D. 5, 6, and 7

Shielding gases, which are essential in various welding processes to protect the weld pool from atmospheric contamination, typically have a designation that ends with the numbers 1, 2, and 5. This classification aligns with the American National Standards Institute (ANSI) and the specific identification standards for gases. For instance, argon is commonly designated as 100, helium as 200, and carbon dioxide as 300 in the context of shielding gases used in arc welding processes. These end digits indicate specific types of gases that are widely used in both MIG (Metal Inert Gas) and TIG (Tungsten Inert Gas) welding. Understanding the designation system is crucial for welders to select the appropriate gas for their specific welding application. Since proper shielding gas selection plays a significant role in the quality of the weld, knowledge of these designations helps ensure optimal results during the welding process.

5. What does DC stand for?

A. Direct current

B. Dynamic current

C. Direct circuit

D. Direct charge

In the context of welding and electrical engineering, "DC" stands for direct current. Direct current is a type of electrical current where the flow of electric charge is unidirectional, meaning it flows consistently in one direction. This is particularly important in welding processes, as the stability and consistency of the power supply can significantly impact the quality of the weld. Using direct current in welding offers several advantages, such as better arc control and the ability to produce cleaner welds with less spatter. Additionally, DC welding is suited for a variety of welding applications, including both ferrous and non-ferrous materials, making it a popular choice among welders. The other terms listed do not accurately describe the concept related to welding and electrical circuits. Dynamic current and direct circuit do not have defined meanings within the context of welding, while direct charge misrepresents the terminology used to describe electrical current. Understanding the correct terminology is crucial for effective communication in welding and ensuring the application of proper techniques and equipment.

6. Deep penetrating electrodes typically end in which numbers?

A. 0 and 1

B. 2 and 3

C. 4 and 5

D. 6 and 7

Deep penetrating electrodes are primarily characterized by their design and specifications that facilitate effective welding in thicker materials. In the context of the American Welding Society (AWS) specification system, electrodes that provide deep penetration, such as those used in processes like SMAW (Shielded Metal Arc Welding), often have designations that begin with the numbers 0 and 1. These designations correspond to the specific characteristics of the electrode, including the type of coating and the welding position for which they are suited. Typically, electrodes ending in 0 and 1 are designed for deeper penetration, making them ideal for situations where adequate fusion needs to occur in thicker section steel. The focus on these electrode classifications is crucial when selecting the appropriate electrode for a specific welding application, especially in structural welding scenarios where the integrity of the weld and the material is of utmost importance. Thus, the answer reflects a fundamental understanding of electrode classifications in structural welding practices.

7. What does DCEN mean?

A. Direct current, electrode negative

B. Dynamic current, electrode negative

C. Direct cable, electrode negative

D. Direct circuit, electrode negative

DCEN stands for Direct Current Electrode Negative. This term is fundamental in welding as it describes the polarity of the electrical current used during the welding process. In DCEN, the flow of electricity is directed from the electrode to the workpiece, which affects how heat is generated during the welding operation. When using DCEN, the workpiece receives a greater percentage of the arc's heat compared to the electrode. This can be beneficial in various welding applications, as it allows for better penetration of the weld into the base material, making it a favorable setting for welding thicker materials or for certain types of welding procedures. Understanding DCEN is crucial for welders as it influences weld quality, heat input, and overall welding performance.

8. What is the AWS specification number for GMAW carbon steel electrodes?

A. A5.18

B. A5.20

C. A5.25

D. A5.30

The AWS specification number for GMAW (Gas Metal Arc Welding) carbon steel electrodes is indeed A5.18. This specification outlines the requirements and classifications for solid and flux-cored carbon steel electrodes used in GMAW processes. Understanding this specification is essential for ensuring the correct selection of materials for welding applications, as it provides critical information on the composition, mechanical properties, and intended use of the electrodes. The other specifications mentioned do not pertain to GMAW carbon steel electrodes. For instance, A5.20 addresses the requirements for GMAW electrodes for stainless steel, while A5.25 covers specifications for electroslag weld metal. A5.30 relates to submerged arc welding. Each specification corresponds to different materials and processes, demonstrating the importance of using the appropriate code for specific welding methods and materials in structural applications.

9. What type of current type welding machines do SMAW and GTAW both use?

A. Direct current

B. Constant current

C. Alternating current

D. Intermittent current

The correct answer is that both Shielded Metal Arc Welding (SMAW) and Gas Tungsten Arc Welding (GTAW) predominantly use constant current welding machines. Constant current machines maintain a steady current output even as the arc length varies. This is particularly important for both SMAW and GTAW processes because they rely on maintaining a stable arc to ensure good weld quality and control over the heat input during the welding operation. In SMAW, the operator typically moves the electrode along the joint, which can change the distance from the base metal to the electrode; having a constant current helps manage changes in arc length effectively. Similarly, in GTAW, the use of a tungsten electrode requires precise heat control, which is facilitated by a constant current supply. Understanding the role of current type is crucial for selecting the right equipment and ensuring the desired welding characteristics, which include penetration, bead appearance, and minimizing defects.

10. What is a defining feature for electrodes that use the dragging manipulation technique?

A. They end in numbers 0 and 1.

B. They are typically low hydrogen electrodes.

C. They end in numbers 2, 3, 4, 5, 6, 7, and 8.

D. They are suitable for shallow penetration.

Electrodes that employ the dragging manipulation technique typically feature a numbering system where they end in the digits 2, 3, 4, 5, 6, 7, and 8. This specific designation reflects the design and functionality of the electrodes suited for this technique. In the dragging technique, the operator maintains a consistent angle and distance from the workpiece, allowing for controlled heat and penetration, which is essential for creating a strong weld. The numbers corresponding to these electrodes indicate their intended use with different materials and applications, particularly when working with horizontal or flat surfaces. Understanding the characteristics of electrodes and their associated manipulation techniques is vital for achieving the desired weld quality and integrity. This is why familiarity with the electrode designation system is crucial for welders, ensuring they select the appropriate materials based on the welding method and environmental conditions.