higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

WELDING
NQF LEVEL 2

27 NOVEMBER 2023

This marking guideline consists of 5 pages.

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QUESTION 1

1.1 A
1.2 B
1.3 C
1.4 C
1.5 D
1.6 D
1.7 B
1.8 C
1.9 C
1.10 A

(10 × 1) **[10]**

QUESTION 2

2.1 A – Base metal
B – Deposited weld metal
C – Solidified slag
D – Molten weld pool
E – Shielding envelope/Shield
F – Core wire
G – Flux covering on electrode
H – Molten metal
I – Depth of penetration (9 × 1) (9)

2.2
- Hydrogen cracking
- Severe porosity
- Poor appearance
- Rust (4)

2.3 Electrodes must be baked in an oven prior to welding. (2)

2.4
- Fire
- Electrocution
- Incorrect set-up procedure
- Unsafe use of power tools (4)

2.5
- Has complete penetration been obtained?
- Is the texture of the metal consistent and smooth?
- Has splatter occurred?
- Are the dimensions of the weld the same as those on the drawing?
- Has complete fusion been obtained between the base metal and the filler metal?
- Are there signs of undercutting?
- Are there any visual defects on the weld? (Any 6 × 1) (6)

[25]

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QUESTION 3

3.1
- A mixture of oxygen and acetylene gas is ignited to produce a flame that burns at a very high temperature.
- The edges of the metal are held together and heated to melting point with the hot flame.
- The melting edges fuse together.
- The flame is removed.
- As the metal cools and solidifies, the parts are joined together.
- Filler wire is used to aid in the fusing process. (6)

3.2 The flashback arrestor prevents the flame from entering the cylinder if it burns back into the hose.✓ If the flame enters the cylinder, it can explode and cause serious damage to anyone or anything close by.✓ (2)

3.3
- Step 1: Clean the work area and remove obstacles that prevent free movement.
- Step 2: Secure cylinders tightly in the upright position.
- Step 3: Remove all flammable substances from the work environment.
- Step 4: Ensure that a proper fire extinguisher is present in the work environment.
- Step 5: Ensure that you will be welding on a surface that can take the heat generated by the flame without igniting. (5 × 1) (5)

3.4 A
- Undercut
- Fill the notch by welding a thin filler wire into it (2)

B
- Incomplete penetration
- Apply a back weld to the joint
- Cut out the weld and reweld the parts (3)

C
- Incomplete fusion
- Cut out the weld and reweld the parts (2)

[20]

QUESTION 4

4.1
- Excellent welding qualities
- Jet transfer of metal in all positions, without spatter
- High efficiency
- An excellent bright appearance of the welded joint with a smooth surface
- High mechanical properties of built-up metal
- Low content of diffusion hydrogen in the weld, which ensures a very low possibility of cracks during application (6)

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4.2
- Suitable for welding most metals and alloys
- No slag formation during welding
- Can be used in all-positional welding
- Can be used to join very thin base metals
- Welder can see both the arc and the weld pool during the process
- Leaves a good weld bead appearance
- Has a low heat input (Any 5 × 1) (5)

4.3
- Lack of penetration
- Incomplete fusion or cold lap
- Porosity
- Undercutting
- Cracking
- Arc blow
- Slag inclusion (7)

4.4 4.4.1
- Must not be stored in direct sunlight because cylinders are under pressure
- Stored in an upright position and fastened to the wall
- Valve must be closed completely to prevent leakage (3)

4.4.2
- Stored in dry conditions
- Avoid contact with water (2)

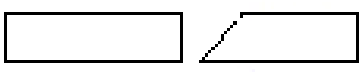
4.4.3
- Plastic bags can be used for storage to prevent surface contamination
- Stored in places that are free of dust, scale, oil, grease and moisture (2)

[25]

QUESTION 5

5.1
- Leather shoes or boots
- Full-length pants or overalls
- Flame-resistant long-sleeve jacket
- Leather gloves
- Welding helmet
- Safety glasses
- Bandana or skullcap (Any 5 × 1) (5)

5.2 5.2.1



✓✓

5.2.2



✓✓

5.2.3  ✓✓

5.2.4  ✓✓

(4 × 2) (8)

5.3 material thickness✓

$$\text{Amperage} = \frac{\text{material thickness}✓}{0{,}0254✓} = \frac{5✓}{0{,}0254✓}$$

= 196,85 A✓ (5)

5.4
- There will be too much splatter.
- The weld quality will be very low. (2)

[20]

TOTAL: 100

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