



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

**WELDING
NQF LEVEL 2**

17 November 2022

This marking guideline consists of 7 pages.

INSTRUCTIONS TO MARKERS

1. Mark all the questions.
 2. Follow the answers according to the numbering system used in this question paper.
 3. Use only a red pen.
 4. Put your ticks and crosses neatly and legibly.
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QUESTION 1

1.1	1.1.1	C		
	1.1.2	E		
	1.1.3	B		
	1.1.4	H		
	1.1.5	D		
			(5 × 1)	(5)
1.2	1.2.1	Weld all round		
	1.2.2	Fillet joint		
	1.2.3	Weld size OR leg length		
	1.2.4	Grinding finish		
			(4 × 1)	(4)
1.3	Oxy-acetylene welding			(1)
				[10]

QUESTION 2

2.1	• Down hand flat • Horizontal • Vertical up/down • Overhead	(Any 1 × 1)	(1)
2.2	• E6013✓ – general welding✓ • E7018✓ – vertical up high-tensile steel✓ • E6010✓ – scaled deep-penetration steel welding✓	(Any other 2 × 2)	(4)
2.3	• Enables deep penetration✓✓ • Gives wider welds✓✓ • Quality welds • Consistent arc • Prevents electrode fusion on work piece	(Any 2 × 2)	(4)
2.4	2.4.1 • Chipping hammer,✓ used to remove slag.✓ • Steel brush✓ removes small particles of slag that hinder conductivity.✓	(Any other 2 × 2)	(4)
	2.4.2 • Screw type • Spring loaded	(Any 1 × 1)	(1)

2.5 2.5.1

(Labelling 2 × 1)
(Sketch 1 × 1)

(3)

- 2.5.2
- Provides good contact with electrode holder. ✓✓
 - Allows electric conductivity.

(Any 1 × 2)

(2)

2.6

- 2.6.1
- Flux material good at deoxidising on a weld
 - Less fumes
 - Slag is easily controlled

(Any 1 × 2)

(2)

- 2.6.2
- Rectifier machine – air cooled ✓
 - Transformer machine – oil cooled ✓
 - Rectifier is made with a good number of electronic components ✓
 - AC machine uses a transformer with no moving parts. ✓
 - Rectifier is light and portable
 - Transformer is heavy

(Any other 2 × 2)

(4)

[25]**QUESTION 3**

- 3.1
- 3.1.1 Pressure gauge
- 3.1.2 Cylinder connection
- 3.1.3 Acetylene-hose connection
- 3.1.4 Contents gauge OR cylinder pressure gauge OR pressure gauge.

(4 × 1)

(4)

- 3.2 Use leakage-test solution. ✓ Apply on fitting; bubbles denote leakage spot. ✓

(2)

- 3.3
- Leakage causes fire hazard.
 - Fire can destroy or burn down workshop.
 - Fires damages equipment.
 - Fire hazards kill.
 - An explosive atmosphere is created.

(Any other 4 × 1)

(4)

[10]

QUESTION 4

- 4.1 4.1.1 Joint preparation with an edge cut at an angle
- 4.1.2 Cutting tip produces a loud sound when gases explode on tip and flame extinguishes and reignites at the tip
- 4.1.3 Lines that are formed on metal being cut and denotes speed of cut and quality
- 4.1.4 Minimum temperature at which metal start to ignite to a flame
- 4.1.5 Operation of deflating gas out of the hoses
- (5 × 2) (10)
- 4.2 • Avoid carrying lighters in pocket.
- Check acetylene cylinder key if it is inserted in its position.
- Observe the cracking of cylinders.
- Keep fire extinguishers available.
- Keep cylinders in an upright position. (Any other 4 × 1) (4)
- 4.3 • Select suitable nozzle size.
- Set gauges to correct pressure.
- Light the torch and preheat the edge.
- Pull the cutting lever and move the torch at constant motion.
- Keep draglines uniform throughout. (Any other 5 × 1) (5)
- 4.4 • Chemical hazards cause skin diseases
- Exposure to metal oxides
- Ensure good ventilation; suffocation leads to death
- Fuel leakages can result in deaths when the torch is lighted
- Loss of equipment and burnt down workshop (Any other 2 × 2) (4)
- 4.5 • Acetylene is unstable and can explode; store in upright position.
- Protect with pressure-release device.
- Chain the cylinders.
- Keep cylinders away from direct sunlight.
- Store cylinders in well-ventilated area.
- Ensure hoses have no leaks. (Any other 2 × 1) (2)

[25]

QUESTION 5

- 5.1 5.1.1 Electrode wire✓ – is filler material on the joint.✓
- 5.1.2 Shielding gas – provide protection✓ from atmospheric contamination.✓
- OR
- 5.1.3 Electrical conductor✓ – to allow for the welding arc electricity or feeding the wire feed roller trigger. ✓
- 5.1.3 Contact tube✓ – passage for direct wire.✓
- OR
- 5.1.4 Contact tube✓ - transfer the electricity for the welding arc✓
- 5.1.4 Gas nozzle✓ – directs shielding gas on the weld pool.✓ (Any 4 × 2) (8)
- 5.2 Prevents atmospheric contamination of the weld pool. ✓✓ (Any other 1 × 2) (2)
- 5.3 5.3.1
-
- (Labelling 3 × 1)
(Sketch globular for × 1) (4)
- 5.3.2 Electrode extension or allowance from nozzle tip (2)
- 5.4
- Incorrect tension on feed rolls may hinder movement of wire.
 - Incorrect connection of electrical cables may hinder striking of arc.
 - Closed gas-flow meter valves result in non-shielded weld pool.
 - Apply correct wire speed and gas-flow settings for quality weld.
 - Use correct size electrodes to have smooth wire movement.
- (Any other 2 × 2) (4)
- [20]**

QUESTION 6

6.1	• Clean the joints from rust oil or grease. • Clamp work pieces in position. • Preheat the metal all round. • Heat the joint to dull red temperature. • Heat filler and dip it in borax flux. • Melt filler on joint to flow into joint by capillary action. • Allow metal to cool and clean flux residuals.	(Any other 3 × 1)	(3)
6.2	• Equipment failure • Poor quality weld • Damage to brazing outfit • Injury due to explosion • Difficult to control braze bead • Wrong braze-joint specification	(Any other 3 × 1)	(3)
6.3	6.3.1 • Uses hand gloves • Uses dark glasses for eye protection • Uses gas-fume extractors	(Any 2 × 1)	(2)
	6.3.2 • Wear scalp cap • Wear suit that covers neck • Wear shoulder yoke	(Any other 2 × 1)	(2)
			[10]
TOTAL:			100