higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

WELDING
NQF LEVEL 2

XX February 2020

This marking guideline consists of 7 pages.

Copyright reserved

QUESTION 1

1.1
1.1.1 D
1.1.2 E
1.1.3 A
1.1.4 B
1.1.5 C

(5 × 1) (5)

1.2
- Warn where certain actions are prohibited
- Inform employees where personal protective equipment must be worn
- Point out hazards that may not be immediately spotted or obvious
- Draw attention to health and safety hazards
- Provide general information and directions
- Indicate where emergency equipment is located (Any 5 × 1) (5)

[10]

QUESTION 2

2.1
2.1.1 scratching technique or tapping technique
2.1.2 tapping technique or scratching technique
2.1.3 dragging
2.1.4 surface
2.1.5 arc

(5 × 1) (5)

2.2
2.2.1 An earth clamp is attached to the workpiece or workbench to complete the electrical circuit to ensure that electricity can flow.

2.2.2 An electrode is used to generate an arc which melts and joins two metals together.

2.2.3 An electrode holder is used to hold the electrode comfortably at different angles during the job.

2.2.4 A welding machine is a power source that changes the main power supply into usable energy for welding.

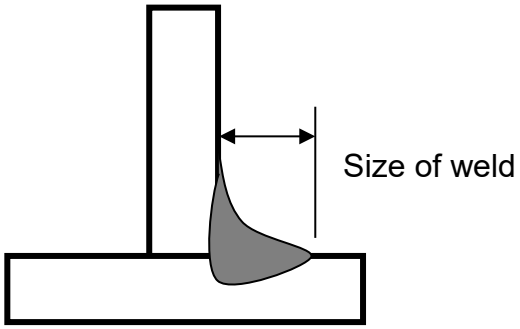
(4 × 1) (4)

2.3
- Not using screens to protect fellow workers working around the area
- Faulty wiring causing serious electrical shock
- Cables not properly placed causing a tripping hazard
- Hot electrodes not placed in a safe area causing fires or injury
- Insufficient lighting in the area where work is done
- Insufficient ventilation in a confined area where work is done
- Not demarcating the work area with relevant signage, fencing or danger tape (Any 4 × 1) (4)

2.4 2.4.1 Preheating is the process where a metal or joint of a metal is heated to a specific temperature before welding is performed.✓ The reason for heating the metal is to prevent any cracks during the welding process.✓ Preheating is a continuous process but the heat from the welding is sufficient on the metal.✓ Welding codes and workplace procedures are specified if preheating is required to determine the temperature before welding can commence.✓ (4)

2.4.2 Slow cooling is a method used to reduce residual stresses.✓ It is commonly done by burying the workpiece in clean sand, using a special wrapping insulating material or putting it in the heated furnace and lowering the temperature so that the residual stresses of the welding in the workpiece can be reduced.✓ (2)

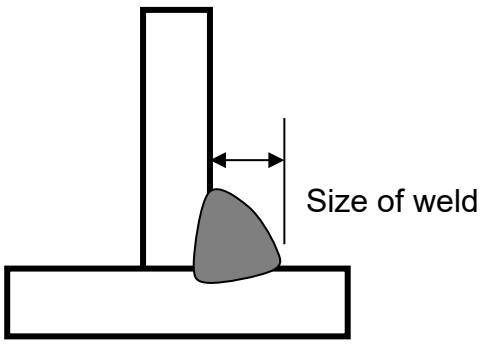
2.5 2.5.1



CONCAVE WELD

(1 for label + 2 for drawing)

2.5.2



CONVEX WELD

(1 for label + 2 for drawing)

(2 × 3) (6)

[25]

QUESTION 3

3.1
- Pocket rule
- Straight edge
- Weld-size gauge
- Magnifying glass (4)

3.2
A – Toe crack
B – Weld-metal crack
C – Weld-interface crack
D – Root-surface crack
E – Root crack
F – Under-bead crack

(6 × 1) (6)
[10]

QUESTION 4

4.1 4.1.1 275 kPa (1)

4.1.2 Size 2 (1)

4.1.3
- Oxygen pressure 207 kPa
- Acetylene pressure 20 kPa (2)

4.1.4 20 kPa (1)

4.1.5 40 mm thick plate (1)

4.1.6 Set the oxygen pressure to 207 kPa and the acetylene pressure to 20 kPa.✓ Change the nozzle to size zero.✓ Light up the torch and set to a neutral flame.✓ The torch is ready to cut the plate to size. (3)

4.2
- After cutting the workpiece, release the cutting lever.
- Shut the acetylene valve on the cutting torch.
- Shut the oxygen valve on the cutting torch.
- Shut the acetylene and oxygen gas-cylinder valves.
- Purge the oxy-acetylene system by opening the torch valves until the gauges are at zero.
- Release the gas-regulator knobs. (6)

4.3
A – X-bevel cutting
B – Square cutting
C – V-bevel cutting
D – K-bevel cutting
E – Y-bevel cutting

(5 × 1) (5)

Copyright reserved

4.4 Ensure that the oxy-acetylene flame on the cutting torch is set to a neutral flame.✓ Hold the cutting torch at the required angle and move the torch to heat the workpiece that needs to be cut.✓ Hold the flame slightly above at the starting point of the line until you see a bright red spot on the workpiece.✓ Press the cutting lever slowly until the oxygen flame has pierced the metal and sparks occur beneath the workpiece.✓ Hold the cutting lever down and move the torch forward at the required speed until the workpiece is cut completely.✓ (5)

[25]

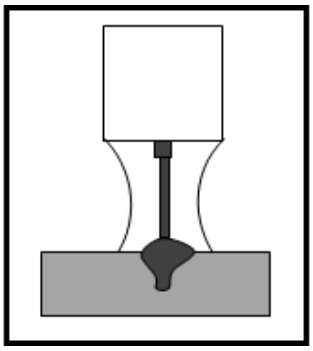
QUESTION 5

5.1
- Welding consumables must be stored in a dry, weather-proof and cool storage facility.
- Welding consumables must be stocked on pallets or racks.
- Welding consumables must be protected against dust and surface contaminations.
- Welding consumables must be repacked in their original packages if not used for three days or longer.
- Welding consumables must be stored in an ambient conditions of temperature and humidity.
- Welding consumables that are opened and can still be used must be kept in a sealed wire-feeder unit or packed away in leather or canvas covers.

(Any 5 × 1) (5)

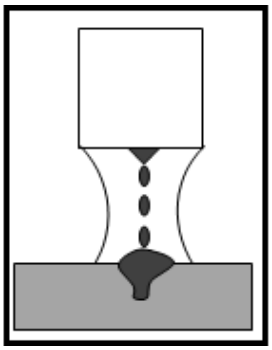
5.2 Manufacturing drawings indicate exactly how the assembly process is done, how the weld must be prepared, the welding parameters (gas, wire size, setting of the amps, etc.) and the sequence in welding.✓ Welding symbols specified on the drawings also play a vital role in the type of welding to be carried out by the welder.✓ Ensure that all procedures and specifications are adhered to.✓ (3)

5.3 5.3.1



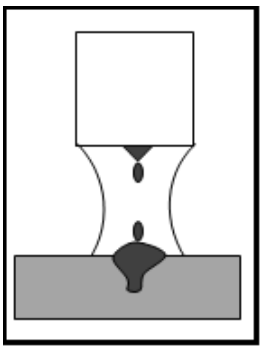
SHORT-CIRCUIT TRANSFER
(1 for label + 2 for drawing)

5.3.2



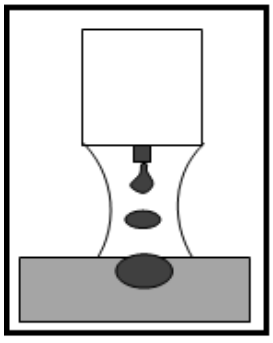
SPRAY TRANSFER
(1 for label + 2 for drawing)

5.3.3



PULSE-SPRAY TRANSFER
(1 for label + 2 for drawing)

5.3.4



GLOBULAR TRANSFER
(1 for label + 2 for drawing)
(4 × 3) (12)
[20]

QUESTION 6

6.1 6.1.1 Brazing is the process of joining two metals using a filler rod that is heated above melting point and spread between the metals.

6.1.2 Capillary action is the process that enables liquids to flow in narrow spaces without the help of external forces.

6.1.3 Flux is a chemical compound in the form of granules, powder liquid or paste that is applied to the joint surface during gas brazing.

(3 × 2) (6)

6.2 6.2.1 The tension test according to QW – 150 specifications is used to determine the ultimate strength of the groove-weld joints.

6.2.2 The notch-toughness test according to QW – 171 specifications is used to determine the notch toughness of brazing.

(2 × 2) (4)
[10]

TOTAL: 100

Copyright reserved