higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ENGINEERING FABRICATION – BOILER MAKING
NQF LEVEL 3

10 March 2020

This marking guideline consists of 5 pages.

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QUESTION 1

1.1 M
1.2 I
1.3 Q
1.4 G
1.5 N
1.6 C
1.7 J
1.8 H
1.9 O
1.10 A
1.11 R
1.12 S
1.13 T
1.14 E

(14 × 1) **[14]**

QUESTION 2

2.1 B
2.2 B
2.3 C
2.4 D
2.5 A
2.6 D
2.7 A
2.8 B

(8 × 1) **[8]**

QUESTION 3

3.1 3.1.1 Weld symbol – arrow side
3.1.2 Weld symbol – other side
3.1.3 Root opening
3.1.4 Groove angle
3.1.5 Finishing symbol

(5 × 1) (5)

3.2
- Aluminium
- Copper
- Brass
- Bronze

(Any 3 × 1) (3)

3.3 3.3.1 Jenny callipers/Odd-leg callipers (1)
3.3.2 A line is drawn parallel to the edge of a plate. (2)
3.3.3 The squareness of a workpiece is measured. (2)
3.3.4 The flatness of a surface of a workpiece is measured. (2)

[15]

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QUESTION 4

4.1
4.1.1 Feed cable (power, gas, wire)
4.1.2 Gas feed control
4.1.3 Wire reel
4.1.4 Voltage control
4.1.5 Ground/Earth cable

(5 × 1) (5)

4.2
- Weld in all positions
- Higher depositing rates
- Less operator skills
- Continuous welds
- Minimum post-weld cleaning
- Low cost

(Any 3 × 1) (3)

4.3
4.3.1 Angle joint (1)
4.3.2 Edge joint (1)

4.4
- Close the flowmeter to stop the shielding gas.
- Close the cylinder regulator.
- Purge the torch to release excess gas in the gas pipe.
- Turn off the wire feeder.
- Turn off the welding machine.
- Coil the cables and put it away safely.
- Unplug the machine. (7)

4.5
- Size of weld
- Type of weld
- Thickness of weld
- Dimensions of weld
- Penetration of weld
- Tolerances

(Any 3 × 1) (3)

4.6
- Coloured dye penetrant
- Fluorescent dye penetrant (2)

4.7
4.7.1 Adjust current setting.
4.7.2 Replace torch/fuse.
4.7.3 Change liner./Reset rollers.

(3 × 1) (3)
[25]

QUESTION 5

5.1 5.1.1 Given: Mt = 12 mm

$A_{lid} = \pi r^2$✓
$= \pi \times 770^2$
$= 1{,}863\ m^2 \rightarrow$✓

OR

$A_{lid} = \frac{\pi D^2}{4}$✓
$= \frac{\pi \times 1\,540^2}{4}$
$= 1{,}863\ m^2 \rightarrow$✓

$\therefore A_{lid} + A_{base} = A_{lid} \times 2$✓ (D of lid and base the same)
$= 1{,}863 \times 2$
$= 3{,}725\ m^2 \rightarrow$✓

$A_{cyl} = Circ_m \times h$✓
$= (\pi \times D_m) \times (2\,450 - 24)$
$= (\pi \times 1\,528) \times (2\,426)$✓
$= 4\,800{,}354 \times 2\,426$
$= 11{,}646\ m^2 \rightarrow$✓

$A_{TOT} = A_{lid} + A_{base} + A_{cyl}$
$= 1{,}863 + 1{,}863 + 11{,}646$✓
$= 15{,}372 m^2 \rightarrow$✓ (9)

5.1.2 Given: Mt = 12 mm

Inside diameter $= OD - (2 \times Mt)$✓
$= 1\,540 - 24$
$= 1\,516\ mm \rightarrow$✓

Inside height $= OH - (2 \times Mt)$✓
$= 2\,450 - 24$
$= 2\,426\ mm \rightarrow$✓

Volume $= \pi \times r^2 \times h$✓
$= \pi \times 758^2 \times 2\,426$✓
$= 4{,}379\ m^3 \rightarrow$✓

OR

Volume $= \frac{\pi \times D^2 \times h}{4}$✓
$= \frac{\pi \times 1\,516^2 \times 2\,426}{4}$✓
$= 4{,}379\ m^3 \rightarrow$✓

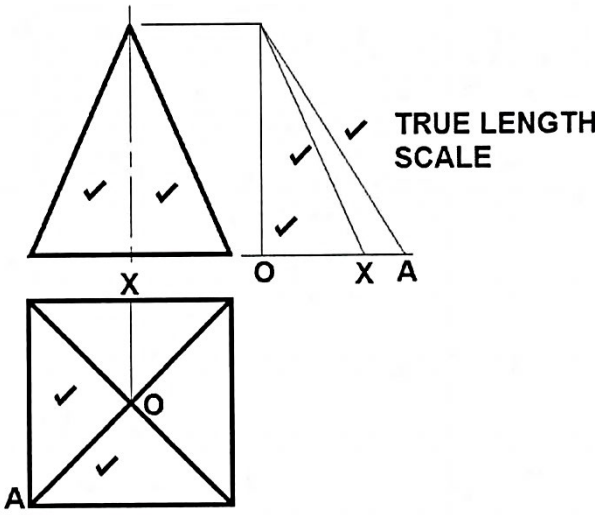
(mm/m may be used during calculations, but final answer in m^3) (7)

5.2
- Inspect tools for defects.
- Check accuracy of tools.
- Ensure conformance to standards. (3)

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QUESTION 6

6.1



(7)

6.2
- Never use instruments on rotating machinery.
- Be careful of electrical points during measuring.
- Be careful of workpieces that have just been cut as it can be hot.
- Be aware of workpieces with sharp edges.
- Work carefully with heavy objects that might fall.
- Use measuring tools only for its intended purposes. (Any 4 × 1) (4)

6.3
- Ensure that there is no oil on the floor.
- Observe safety procedures and signs.
- Wear all required PPE.
- Keep the work area clear. (Any 3 × 1) (3)

6.4
- Connecting pipes to transition pieces
- Connecting pipes to each other
- Connecting transition pieces with each other (Any 2 × 2) (4)

6.5 Pickling (1)

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TOTAL: 100

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