higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

CONCRETE STRUCTURES
NQF LEVEL 4

17 November 2022

This marking guideline consists of 5 pages.

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QUESTION 1

1.1 B
1.2 A
1.3 D
1.4 C
1.5 F
1.6 E
1.7 H
1.8 G
1.9 J
1.10 I

(10 × 1) **[10]**

QUESTION 2

2.1

A: Slash tie:✓	Wrap the wire diagonally once around the two crossing bars with two ends on top.✓ Tighten and twist the ends of the wire together.✓
B: Ring slash tie:✓	Wrap the wire one and a half times around the vertical bar.✓ Wind the wire diagonally around thinly.✓ Tighten and twist the ends of the wire together.✓
C: Splice tie:✓	Fold the wire double and tighten around the overlapping bars.✓ Tighten and twist the ends of the wire together.✓
D: Hairpin tie:✓	Wrap the wire half one around one of the bar on either side of the crossing.✓ Tighten the wire squarely or diagonally around the crossing bar and twist the ends together.✓
E: Ring hair pin:✓	Wrap the wire completely around one of the bars then squarely across and halfway either side of the crossing bars.✓ Bring the ends of the wire together and twist either squarely or diagonally across the bar.✓
F: Crown tie:✓	Wind the wire around the bars in figure-of-eight movements.✓ Tighten and twist the ends of the wire together.✓

(19)

2.2
- The types of ties used and its position must be such that the required finished is achieved.✓
- Form ties and spacers left in position✓ must not spoil the desired appearance or affect the durability of the structure.✓
- The ends of wires must be neatly cut off and bent back✓ to make sure that the embedded portion✓ does not extend into the specified minimum cover.✓ It should terminate at a distance of not less than the specified minimum cover from the formed surface of the concrete.✓
- Ties cast into spacer blocks should not extend deeper into the spacer block✓ by more than half the depth of the spacer block.✓ The concrete covering the projecting ends✓ of ties or clamps must comply with specified concrete cover requirements.✓
- Reinforcement, including stirrups, links and tying wire, must not encroach into the specified cover.✓

(12)

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2.3
- Tying wire nips
- Bar tie twister (2)

2.4 Black annealed wire (1)

2.5 hammered/pressed (1)
[35]

QUESTION 3

3.1
- Ponding the exposed surfaces with water except where the temperature is below 5 °C
- Covering the cover with sand
- Continuously spraying the exposed surface with water
- Covering the concrete with waterproof or plastic sheeting firmly anchored at the edges
- Applying suitable curing compounds (Any 2 × 1) (2)

3.2
- Wash off mud, clay or any other dirt with water.
- Brush off any mill scale using a steel-bristle brush.
- Use an emulsifying agent to remove any oil or grease. (3)

3.3
- Allows smooth elimination of shuttering
- Minimises the occurrence of blowholes
- Supplies the recommended surface finish for the concrete member cast
- Minimises the loss of water from the concrete caused by absorption in timber forms
- Minimises seepage of water and moisture throughout curing of the concrete
- Safeguards the formwork and helps in reusing if possible
- Minimises cracks because of infernal restraints(Any reasonable correct answer) (5)
[10]

QUESTION 4

4.1 Drum-type mixer: The minimum√ is 1,5 min✓ and the maximum is 10 min.✓
Pan-type mixer: The minimum is 1 min✓ and the maximum√ is 6 min.✓ (5)

4.2
- Paste leaking through form face joints
- Bulging of the form face or any of the members supporting the formwork
- Movement or bulking of false work
- Settling of the false work sole plates
- Creaking or groaning sounds from any part of the formwork or false work
- Stretching or snapping of ties in wall columns
- Crushing of timber components against steel components
- When something gives during the placing and compacting process, the form will kick causing a part of the form face to be pushed outwards (Any 7 × 1) (7)

4.3
- Reduces the strength of concrete (1% of entrapped air reduces the concrete strength by about 5%)✓
- Reduces the durability of concrete✓ by making it more permeable✓ and less resistant to chemical attack which increases the likelihood of reinforcement corrosion✓
- Reduces watertigthness✓
- Reduces the bond between concrete and reinforcement✓
- Produces visual defects on the concrete surface, e.g. honeycombing and blowholes✓✓ (8)

4.4 4.4.1 Ease of flow related to the wetness or dryness of a mix (1)

4.4.2 Tendency to resist segregation and bleeding (2)

4.4.3 Unwanted individual cavities usually less than 10 mm on the surface of concrete (2)

[25]

QUESTION 5

5.1 Tendency of concrete to slowly move or deform permanently under the influence of stresses

5.2 Materials added to cement to increase the amount of cement produced

5.3 Substances added to plastic or other materials to make it soft or pliable – usually not intended to affect the properties of the final product after it hardens

5.4 Test sample of concrete formed into a cube, cured according to a standard procedure and then crushed to test the compressive strength of the concrete

5.5 Test used to determine the workability of a concrete

(5 × 2) **[10]**

QUESTION 6

6.1
- Fixed and free-standing shelving
- Fixed and free-standing racks
- Lockers
- Bins
- Drawers (5)

6.2 Store timber panels horizontally (flat) on a level base where the weight of the panel above helps the lower panel to stay flat.✓ It helps to reduce warping✓ by stacking the panels which is largely the cause of warping.✓ Cover the panels with waterproof sheets✓ to reduce evaporation of moisture from the timber.✓ (5)

[10]

TOTAL: 100

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