



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

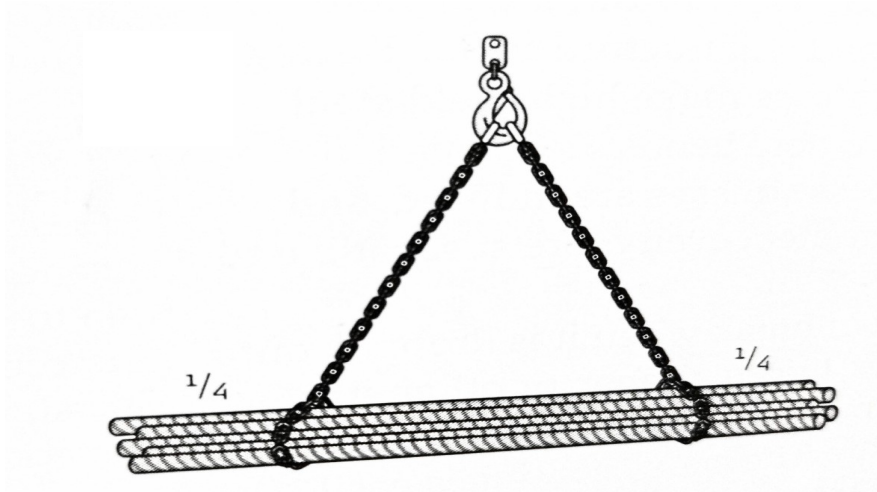
**CONCRETE STRUCTURES
NQF LEVEL 4**

22 November 2024

This marking guideline consists of 6 pages.

QUESTION 1

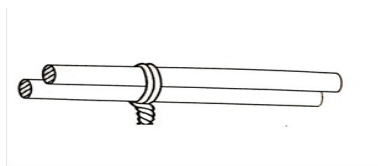
- 1.1 High yield steel. (1)
- 1.2 Because it will break✓ as it is easily damaged when dropped.✓ (2)
- 1.3 Epoxy coating. (1)
- 1.4 To protect the steel from rust. (2)
- 1.5

**MARK ALLOCATION**

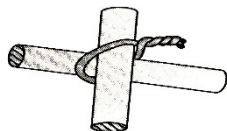
Correctness 3

Dimension $\frac{1}{4}$ Total $\frac{4}{4}$ (4)
[10]**QUESTION 2**

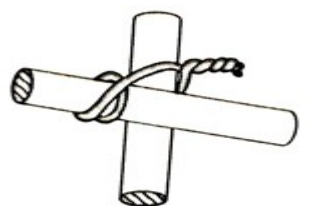
2.1



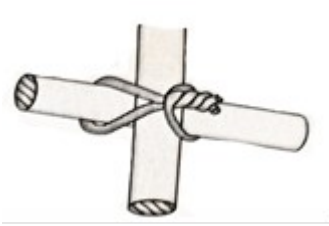
Splice



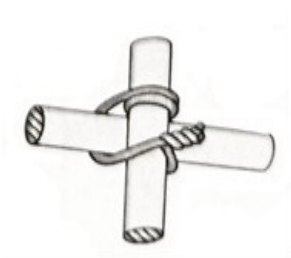
Slash



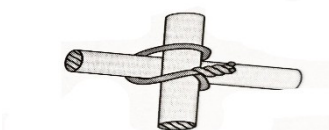
Ring slash



Crown



Ring hairpin



Hairpin

(6 × 2) (12)

- 2.2
- Hair-pin tie: Wrap the wire half way around one of the bars✓ on either side of the crossing. Tighten the wire squarely or diagonally around the crossing bar✓ and twist the ends together.✓
 - Ring hair-pin tie: Wind the wire completely around one of the bars,✓ then squarely across and halfway around the other,✓ either side of the crossing bars. Bring the ends of the wire together and twist either squarely or diagonally across the bar.✓
 - Crown tie: Wind the wire around the bars✓ in a figure of eight movement.✓ Tighten and twist the ends of the wire together.✓ (3 × 3) (9)
- 2.3 Black annealed wire,✓ bar tie twister✓ and tying wire nip.✓ (3)
- 2.4 Working with wire can be dangerous.✓ To prevent cutting yourself with plier ,or with a sharp end of wire, you should always wear gloves,✓ appropriate eye protection and proper protective boots.✓ (3)
- 2.5 The act makes clear that it is the employers duty✓ to provide protective gear to workers in certain working environment,✓ such as construction sites, where there is risk of personal injury.✓ (Any 2 × 1) (2)

- 2.6
- Splice: Are used to tie lap splices together.✓ Lap splices are joints used where two bars overlap.✓ A double wire is used.✓
 - Slash: Are probably ties that used most often.✓ They are used to tie together the area between main ties.✓ They are used in a slab on the bottom or top mat (finished reinforcement for slabs and bases.)✓
 - Ring slash: It is used to prevent a horizontal bar slipping down✓ and is good for wall.✓
- (3 × 2) (6)
[15]

QUESTION 3

- | | |
|------|---|
| 3.1 | J |
| 3.2 | A |
| 3.3 | H |
| 3.4 | I |
| 3.5 | B |
| 3.6 | C |
| 3.7 | E |
| 3.8 | D |
| 3.9 | F |
| 3.10 | G |
- (10 × 1) **[10]**

QUESTION 4

- 4.1
- Cool the mixing water by using well-crushed ice for part or all of the mixing water.
 - The ice particles have to be small enough to melt completely during the mixing process.
 - Cool the aggregate by shading the stockpile or wetting the stone.
 - Inject liquid nitrogen into the mix during mixing.
- (4)
- 4.2
- A stronger concrete to become more plastic and workable with less water.
 - High –range reduce or superplasticisers dramatically increase the concrete ability to flow without reducing its strength.
 - This is helpful for those jobs with limited access for concrete trucks where the concrete must be moved manually with shovels.
 - You can use water reducers in combination with retarders.
- (Any 3 × 2) (6)
- 4.3
- Set the mixer so that it is level
 - Do not overload the mixer
 - Replace worn blades
 - Regularly adjust the blade of pan mixers to operate in the right position
 - Run the mixer at the correct speed
 - Discharge the complete batch before starting the next batch
 - Clean the mixer thoroughly after each use
- (Any 5 × 1) (5)

- 4.4 The mixer capacity must suit the required output.✓ If possible, stones, cement, and sand should be fed into the mixer simultaneous as them promotes efficient mixing.✓ The concrete produce in this way is more uniform than that obtain when the ingredient is introduced one after the other,✓ if simultaneous feeding is not possible,✓ the common practice is to start with stone, then cement, then sand.

The water enters the mixer at the same time as the other material.✓ when this is not possible,✓ it is advisable to start the flow of water a little in advance of the other ingredient, the slump of the concrete is liable to vary within the batch. Admixture are generally added with the water.✓

The sequence of charging must be the same for all batches.✓ head packing can occur when the finer material is fed into the mixer first and become lodged in the head of the mixer.✓ (Any 5 × 1) (5)

- 4.5 4.5.1 Segregation :is the separation of the constituents of fresh concrete resulting in non-uniform proportions.

- 4.5.2
- Slump test: Shows how sloppy or stiff fresh concrete is. The more watery it is, the more it will slump.
 - It is a process of determining the workability of a concrete.

(Any 1 × 2)
(2 × 2)

(4)

- 4.6 Bleeding occurs when some of the mix water rises to the surface of concrete as the mould solid material settle.

(1)
[25]

QUESTION 5

- 5.1 5.1.1 Honeycombing.
5.1.2 Blowholes.
5.1.3 Grout runs.

(3 × 1)

(3)

- 5.2 5.2.1
- To smooth over the projections.
 - To smoothen nodules and ridges.

- 5.2.2
- Used for heavy chiselling of wood.
 - Used for chipping masonry.

- 5.2.3
- Knock off fins and runs.
 - cut off the ends to produce more sharp corners.

(3 × 2)

(6)

- 5.3 Glue

(1)
[10]

QUESTION 6

- 6.1
- Store buckets with lids.
 - Stack the buckets on top of each other.
 - Store them on top of a shelves.
 - Used and cleaned paint buckets that are very tough and these buckets are easily available.
 - They can be carried from one place to the other.
 - Do not overfill the buckets as they end up heavy to carry. (6)
- 6.2
- Timber panels.
 - Steel panel.
 - Plywood panel.
 - Wall forms. (4)
- [10]**
- TOTAL: 100**