higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

CIVIL AND STRUCTURAL STEEL WORK DETAILING
NQF LEVEL 2

XX FEBRUARY 2020

This marking guideline consists of 6 pages.

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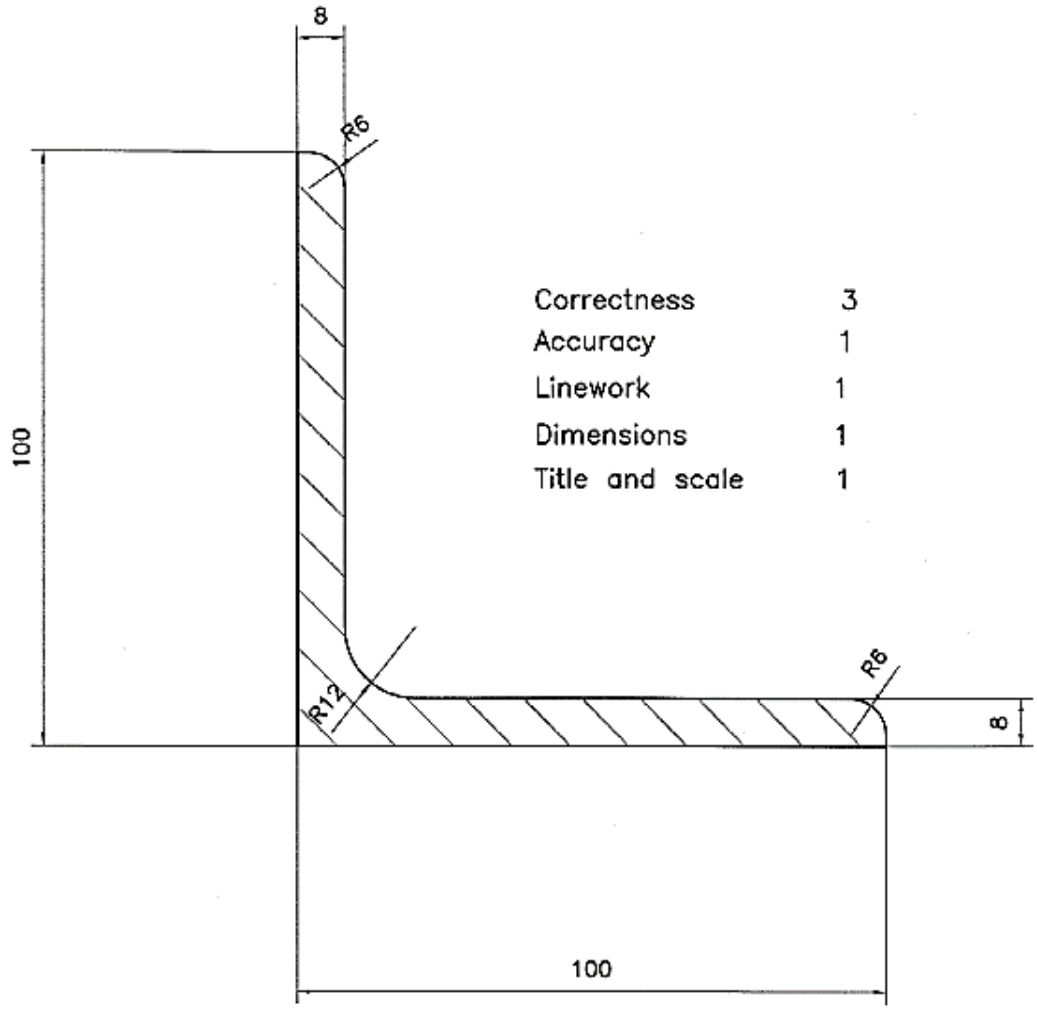
QUESTION 1: INTRODUCTION TO CIVIL AND STRUCTURAL STEEL WORK

1.1



RSA 100 x 100 x 8

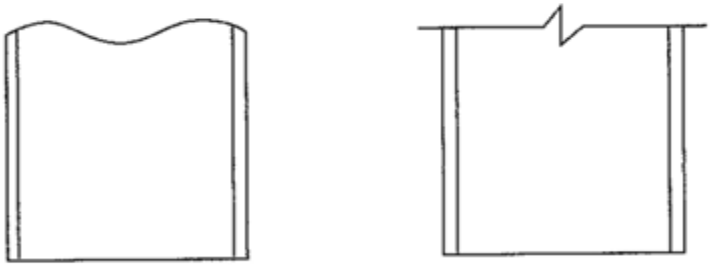
SCALE 1:1 (8)

1.2 1.2.1 H-channel
1.2.2 Square hollow section
1.2.3 T-section
1.2.4 Equal-angle leg profile
1.2.5 Channel

(5 × 1) (5)

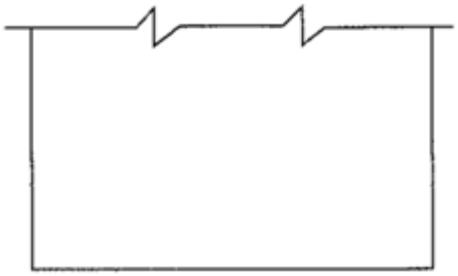
1.3
- Total protection because every part is covered with zinc
- Less maintenance
- Lower first cost
- Lowest long-term cost because it lasts much longer than other coatings
- Long life
- Reliable
- Ease of inspection
- Can protect small items
- Use in mass production
- The layer is thin and corrosion resistant (Any 6 × 1) (6)

1.4 1.4.1



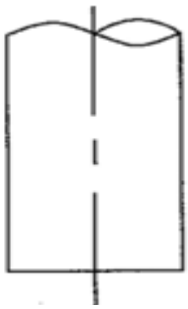
(4)

1.4.2



(2)

1.4.3



(2)

1.5 1.5.1 A general arrangement drawing is a smaller scale drawing✓ showing the entire structure or piece of equipment.✓ (2)

1.5.2 It means that the drawing is 25 times smaller than the actual object or structure. (1)

1.6 An erection mark is given to an item so that the item can be identified✓ and erected in the right position✓ during erection✓ on the construction site. (3)

1.7
- Highest strength-to-weight ratio of any other building material
- It is fire resistant
- Steel is inorganic – It will not rot, crack or creep
- Simplified foundation construction
- It produces less scrap and waste
- The scrap is 100% recyclable

(Any 5 × 1) (5)

1.8 Dimensions in a drawing keep the drawings accurate, complete,✓ clear and legible.✓ (2)

[40]

QUESTION 2: STRUCTURAL STEEL WORK AND REINFORCED CONCRETE

2.1 Steel is used if the structure has to withstand tension forces✓ whereas concrete is stronger in withstanding compression forces.✓ (2)

2.2 2.2.1 Plastic yielding refers to the failure of a material to go back to its original form after deformation/stretching.

2.2.2 Elastic yielding refers to when a member deforms under stress but returns to normal when the load is removed.

(2 × 2) (4)

2.3
- Forging
- Rolling
- Extrusion
- Drawing (4)

2.4 A rolling mill is a device used for forming steel sections into various shapes.✓ This can be done while the steel is either hot or cold.✓ The specific shape is obtained from rolling steel sections through various stages of different shapes.✓ With each pass in the mill, the section begins to take shape.✓ (4)

2.5 Serial size refers to the size of steel groupings used to define steel sections with similar profiles.(Example: 127 x 76 x 13) (2)

2.6 To increase, strength,✓ load capacity✓ and rigidity✓ (3)

2.7
- Durable
- Compatible
- Cost effective
- Can be made watertight
- Used in massive or slender structures
- Setting and hardening at ordinary temperatures
- Can set and harden under water
- Fire resistant
- Resistant to compressive force
- Resistant to chemical attacks
- Resistant to bad weather conditions (Any 5 × 1) (5)

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2.8 2.8.1 Materials are added to a concrete mix to increase its strength or even the colour.

2.8.2 Additives that slow down the combination of cement with water and lengthen the setting time of concrete. It is used in hot weather conditions.

2.8.3 Added to change the colour of concrete without affecting the volume or strength of the concrete. It can be in powder or liquid form.

(3 × 2) (6)

2.9 2.9.1 J
2.9.2 I
2.9.3 H
2.9.4 G
2.9.5 F
2.9.6 D
2.9.7 B
2.9.8 C
2.9.9 A
2.9.10 E

(10 × 1) (10)
[40]

QUESTION 3: BOLTS IN STRUCTURAL STEEL WORK

3.1
- Grade 4.8
- Grade 8.8
- Grade 10.9
- High-strength friction grip bolts (Any 3 × 1) (3)

3.2 3.2.1 True
3.2.2 False
3.2.3 True
3.2.4 True
3.2.5 True
3.2.6 False

(6 × 1) (6)

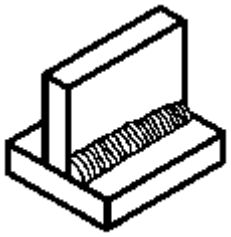
3.3 High-strength friction grip bolts (1)
[10]

QUESTION 4: WELDING SYMBOLS AND JOINTS

4.1
- Type of weld
- Size of weld
- Profile of weld
- Extent of weld
- Final finish of weld
- Position of weld (Any 4 × 1) (4)

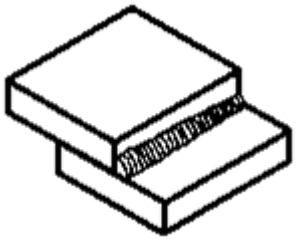
4.2 Supplementary welding symbols give specific information about a welding process and are never used on their own.✓ They complement basic welding symbols.✓ (2)

4.3 4.3.1



T-joint✓ correct weld✓

4.3.2



Lap joint✓ correct weld✓

(2 × 2) (4)
[10]

TOTAL : 100

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