higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PLUMBING
NQF LEVEL 3

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This marking guideline consists of 5 pages.

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QUESTION 1: COLD-WATER RETICULATION

1.1 Water meters are used to measure✓ the exact ✓ amount of water you use in a domestic house or a business property. (2)

1.2 An indirect cold water cistern can be referred to as a large storage tank which is positioned on top of a roof✓where it can provide an indirect water supply to the building in the event that the main water supply is temporally interrupted. ✓ (2)

1.3
- The type of material that will be used
- The recommended diameter of piping for the intended dwelling
- The number of meters of each type of pipe that will be needed
- The required fittings
- The values associated to the job
- Consideration of the most cost-effective and efficient installation for the specific dwelling. (6)

1.4 1.4.1 GMS pipes are measured across the inside of the pipes (1)

1.4.2 Copper pipes are measured across the outside of the pipes (1)

1.5
- Isometric drawings are drawn to scale.
- Isometric drawings make it easy to measure pipe works in pipe arrangements.
- When pipes change direction, it is easy to count the number of fittings.

(3 × 1) (3)

1.6 1.6.1 Stagnant water, is water that does not move and often starts to smell bad after a while. (1)

1.6.2 Pitting is structural damage, such as very small holes (which in some instances are not visible to the naked eye) that are formed in pipes which causes the pipe to leak. (1)

1.6.3 Friction loss refers to the slowing down of water that flows through a pipe due to the roughness on the inside of the pipe as well as the fittings. (1)

1.7 1.7.1 Flexible hangers, are hangers that provide constant support (1)

1.7.2 A rigid hanger, can be referred to as a rod hanger and stanchion with brackets or rollers. (1)

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QUESTION 2: HOT-WATER RETICULATION

2.1 A bill of quantities gives a detailed outline of the total quantities of pipe materials, pipe fittings and valves✓ required for a residential hot-water system.✓ Without it one would not know whether one has everything needed✓ or whether one is within the approved budget for the installation.✓ (4)

2.2
- Simple design
- Low maintenance costs
- Easy installation
- Require expansion piping through the roof
- No need for an extra supply tank
- Cheaper than other geysers (Any 5 × 1) (5)

2.3 There is danger of explosion✓ if the installation is not done properly ✓and therefore the pressure relief and vacuum breaker✓ has to be installed as safety measures. (3)

2.4 Expansion joints are joints which allows pipe work to expand and contract✓ in a longitudinal manner without being damaged or even leaking. ✓ (2)

2.5
- Cold water enters the geyser at the bottom.
- The geyser is heated by means of an element which switches on and off as the required temperature is reached.
- Hot-water outlets are at the top.
- When hot water is needed, a stopcock on the cold-water feed is opened.
- This cold water forces the hot water out at the top of the draw-off point.
- No expansion pipe is needed as the hot water draw-off serves as an expansion.
- No taps/valves may be installed on a hot-water draw-off pipe. (Any 6 × 1) (6)

[20]

QUESTION 3: ABOVE-GROUND DRAINAGE SYSTEMS

3.1
- Water closet: WC
- Urinal: U
- Bath: B
- Sink: S
- Shower: SW
- Washbasin: WB
- Bidet: BT (Any 5 × 2) (10)

3.2
- uPVC
- Earthen ware (vitrified clay)
- Cast iron
- Fibre cement (4)

3.3 Pipes are secured to a wall using pipe clips and pipe brackets. (1)

[15]

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QUESTION 4: SANITARY INSTALLATION

4.1 42 mm diameter✓ uPVC pipe✓ (2)

4.2
- Measure and mark out the position of the bath on the floor, as well as the position of the hole for the waste-discharge pipe.
- Find and mark out the position for the brick support.
- Bricks and mortar will be needed to build the brick supports.
- Build two courses of bricks on the edge along the marked-out length of the bath for the bedding under the bath.
- Fill the spaces between the brickwork with damp sand and cement mix for bedding.
- Secure a length of purlin or other rectangular timber against the wall for the bath to rest on.
- Place the bath on the bedding, ensuring that the one side of the bath rests securely on the purlin against the wall.
- Close the sides of the bath by building it up with the bricks and mortar.

(Any 5 × 1) (5)

4.3
- Electronically activated flushing device
- Junior urinal flush valve
- Storage cistern mounted against the wall, high above a slab or stall urinal (3)

4.4 When water from the sink splashes against it, the water will splash back or run back into the sink. Splashbacks are usually made of pressed stainless steel, but could be manufactured from any suitable material. Some sinks are fitted with an integral splashback made from sink material, e.g. pressed stainless steel, epoxy-coated fibreglass, marble or even granite. (4)

4.5 A water-closet pan is designed and manufactured with a built-in water-seal trap. (1)

[15]

QUESTION 5: RAINWATER SYSTEM

5.1
- Impact modified with UV stability
- White in colour and designed for high-impact performance and stability against harsh climatic conditions
- Corrosion-resistant so unaffected by coastal atmosphere and resistant to industrial pollution
- Lightweight so easy to transport and install
- Excellent flow characteristics that allow for low maintenance and trouble-free performance

(Any 4 × 1) (4)

5.2
- Cut a tarred rope about twice the circumference of the downpipe.
- Insert the tarred rope around the pipe at the joint.
- Carefully push the tarred rope so that it is wrapped around the pipe into the gap that exists between the spigot and socket joint.
- Use the right caulking tool to push the rope down the joint.
- The rope must form a type of gasket (seal) at the bottom of the joint.
- Fill the gap in the joint with appropriate sealing compound, such as Powermastik or Secomastic.
- Stop about 25 mm from the top of the joint.
- Fill this last space with a 1:2 cement-mortar mix.
- Ensure the sealing compound and the mortar mix are firmly pressed into the joint.
- Smooth off the excess mortar mix with a gauging trowel. (Any 8 × 1) (8)

5.3 A rainwater system is designed and installed to drain rainwater away from the building.✓ It also prevents rainwater from seeping or penetrating✓ into the inside of a building.✓ (3)

[15]

QUESTION 6: VENT-PIPE FLUSHING

6.1
1 − Vent pipe
2 − Frustum of a right cone
3 − Overlap or bead
4 − Base of the vent-pipe flashing
5 − Slope or angle of the roof
6 − Welt
7 − Frustum to be soldered onto the base of the vent-pipe flashing
(7 × 1) (7)

6.2
- Parallel-line method
- Radial-line method
- Triangulation-line method (3)

[10]

QUESTION 7: TRENCHING, EXCAVATION AND TRENCH SUPPORT

7.1 Excavating trenches can be very dangerous if the right safety procedures and the regulations as set out in the Occupational Health and Safety Act are not adhered to. For example: People can fall into excavations and become buried or trapped✓ due to the dislodgement of soil in the excavation.✓ Therefore, the sides of the excavation must be properly supported.✓ (3)

7.2 Setting out a trench to line and level means to prepare the drainage layout, the depth of the drain, the gradient and the dimensions of the drain according to the drawings. (2)

[5]

TOTAL: 100

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