



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

**PLUMBING
NQF LEVEL 4**

04 March 2024

This marking guideline consists of 6 pages.

QUESTION 1: BASIC BUILDING WORK AND BUILDING MANHOLES

- 1.1 A single-leaf wall is a continuous vertical section of a wall ✓ that is one masonry unit wide. ✓ (2)
- 1.2 1.2.1 Handling and Transportation
Precast manhole components are heavy, use an appropriate crane to lift and place them. The components must be kept in an upright position, as far as possible and they should be stacked in this way. ✓
Do not roll these components from one point to another. Use a crane to move them. ✓ (2)
- 1.2.2 Excavating the hole
When you dig the hole, the diameter of the hole must be at least 300 mm greater than the external diameter of the manhole components. ✓ Make sure the hole does not collapse. ✓ (2)
- 1.2.3 Before placing the concrete
Make sure the floor of the hole is level and free from debris before you place the concrete. ✓ The soil may be wet when you place the concrete but remove any standing water before placing the concrete. ✓ (2)
- 1.3 10 mm – 15 mm (1)
- 1.4 A half channel is a length of pipe that has an open section running lengthways along it. (1)
- [10]**

QUESTION 2: BELOW-GROUND DRAINAGE SYSTEMS

- 2.1 The builder/Architect/another responsible person. (1)
- 2.2 Rodding eyes are openings in drainage installation ✓ that allow access to the drainage system. ✓ (2)
- 2.3 2.3.1 Invert level RE 3
RE 3 = 20 000 ✓
 $500 + 26\,115 ✓ = 26\,615 ✓$ (3)
- 2.3.2 Invert depth RE 3 = $28\,100 ✓ - 26\,615 ✓$
 $= 1\,485 ✓$ (3)
- 2.4 The inspection chamber is an access point smaller than a manhole ✓ that allows us to inspect, test and maintain drains from the surface. ✓ (2)
- 2.5 Sand ✓ and fine gravel. ✓ (2)

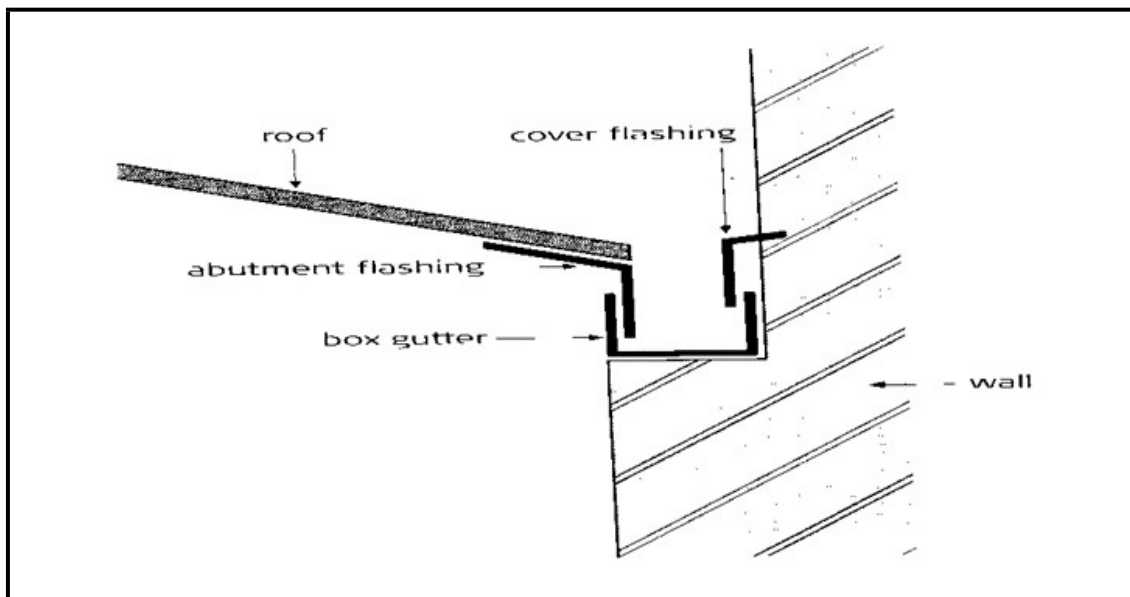
- 2.6 A flexible joint is a pipe joint that allows relative angular (radius) and longitudinal movements between adjacent pipes✓ without fracture or leaks happening.✓ (2)
- 2.7 Not more than 300 mm thick or 150 – 300 [It should be 200 mm thick]. (1)
- 2.8 Air test works by pumping compressed air✓ into the system when all the open ends are sealed.✓ The air pressure will drop too quickly✓ if there are leaks in the system.✓ (4)
- [20]**

QUESTION 3: PLUMBING MAINTENANCE AND REPAIRS

- 3.1 A – Rod
B – Washer
C – Seat (3)
- 3.2 Water expands if it freezes. The expansion exerts as pressure on the pipe walling. (1)
- 3.3
- Shut down the water mains.
 - Remove the old jumper plate and washer.
 - Use a reaming tool to grind away any dirt build up that, may have collected on the seal of the tap.
 - Make sure the tap is fully opened.
 - Screw the tap base into position and make sure the washer is in position. (5)
- 3.4
- Hacksaw
 - Copper cutter (2)
- 3.5
- Cut the broken section out of the pipe.
 - Cut a new section of pipe that is about 10 mm shorter than the piece that you have removed.
 - Buy two new couplings.
 - Wind a special, thick plumber's tape around a new thread.
 - Smear an anaerobic pipe with sealant all around the inside of a coupling.
 - Gently screw the newly threaded pipe into the coupling. (6)
- 3.6 The pressure relief valve controls the pressure✓ coming into the geyser.✓ (2)
- 3.7 A plunger (1)
- [20]**

QUESTION 4: BOX GUTTERS AND CHIMNEY FLASHING

4.1



(6)

4.2

- Zinc
- Zinc alloy
- Aluminium alloy
- Copper
- Lead

(Any 3 × 1)

(3)

4.3

- Apply bituminous paint, alkali-resistant lacquer, or zinc chromate paint
- Use a moisture-proof membrane (DPM) such as plastic bitumen to impregnate paper or felt.

(2)

4.4

Stainless steel screws

(1)

4.5

Abutment flashing prevents rainwater from seeping in between the roof and brickwork or gutter to the inside of the building.

(1)

4.6

Soakers are pieces of metal that are used to waterproof between the wall ✓ and the roof covering. ✓

(2)

[15]

QUESTION 5: INSTALL A SOLAR WATER HEATER

- 5.1
- Sunlight enters the solar collector box through a glass cover.
 - When it reaches the black metal absorber plate inside the box, the sunlight turns to heat.
 - Insulation keeps this newly created heat from escaping.
 - Heat builds up and in turn heats the water in metal tubes, which are part of the collector and lie on top of the absorber plate.
 - This hot water then flows or is transported to a storage tank.
 - An additional traditional heater powered by electricity can be used to keep this hot water hot.
 - This uses less electricity than heating cold water. (Any 6 × 1) (6)
- 5.2 A solar water heater is a system that uses energy from the sun ✓ to produce hot water. ✓ (2)
- 5.3
- A – Flat plate collector
 - B – Pump
 - C – Drain back tank with internal heat exchanger
 - D – Hot water tank
 - E – Differential Controller
 - F – Sensor (6)
- 5.4
- 5.4.1 True
 - 5.4.2 False
 - 5.4.3 True
 - 5.4.4 False
 - 5.4.5 True
- (5 × 1) (5)
- 5.5 Because South Africa has a high number of sunny days every year. (1)
- 5.6
- The position of the collector relative to the movement of the sun.
 - Point the collector to the true North.
 - Tilt the collector at an angle above the horizon equal to the latitude of the site plus 10 degrees. (Any 2 × 1) (2)
- 5.7
- Plump the cold water from the house supply to the inlet of the solar storage tank.
 - Plump the outlet of the solar storage tank to the inlet of the conventional water heater.
 - Install valves and unions on the inlets and outlets of the tanks. (3)
- [25]**

QUESTION 6: BASIC BUSINESS CONCEPTS

6.1	Business Plan		(1)
6.2	• Cash • Cheque • Credit card • Debit card • Electronic bank transfer	(Any 3 × 1)	(3)
6.3	Cash flow is the movement of money that comes into a business as income✓ and going out as wages, materials etc.✓		(2)
6.4	An estimate		(1)
6.5	• Get into a shouting match with the customer. • Remove any materials or items that you have installed in the customer's home. • Overcharge a customer. • Charge for materials and items that were not used. • Be dishonest.	(Any 3 × 1)	(3)
			[10]
TOTAL:			100