higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

# MARKING GUIDELINE

## NATIONAL CERTIFICATE

## PLUMBING THEORY N1

**29 November 2023**

**This marking guideline consists of 7 pages.**

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## QUESTION 1: SAFETY AND HOUSEKEEPING

1.1 Good housekeeping means that there is a certain place for everything in its specified place. (1)

1.2
- Their portability in transport and erection.
- Their quick adjustment and erecting to the required height. (2)

1.3 Care
Ladders should be inspected at regular intervals.

Stored
Ladders should be kept in a dry place away from external weather conditions and hung horizontally on rungs fixed to the wall. (2)
**[5]**

## QUESTION 2: TOOLS AND MACHINES

2.1 To make grooved joints on sheet metal (1)

2.2
- Hinged pipe vice
- Chained pipe vice (2)

2.3 2.3.1
- To roll sheet metal into cylindrical shapes, e.g. gutters/cylinders.
- Specially grooved on one side, allows wire-edged articles to be rolled.

2.3.2 Used for cutting up to 6,35 mm thick mild steel plates✓ or metal rods up to 12,7 mm in diameter.✓

2.3.3 Used for flanging curved edges✓ when fixing bottoms to cylinder articles.✓

(3 × 2) (6)

2.4 To cool down the pipe and dies during friction of the threading process, to prevent the thread to break and to prevent damage to the cutting dies. (1)
**[10]**

## QUESTION 3: METALS AND MATERIALS

3.1
- Soft solder – lead and tin
- Hard solder – copper, zinc and silver (Any 1 × 1) (1)

3.2 Corrosion in pipes due to an electric cell. If two metals such as copper and zinc are placed side by side, the copper will absorb some of the electrons of the zinc.✓ An electric current will, therefore, flow electrons from one atom to another.✓ The electric current in this instance will flow zinc to the copper and gradually disintegrate.✓ (Any 3 × 1) (3)

3.3
- Copper
- Good conductor of heat
- Corrosion resistant
- It is light and easy to clean (4)

**[8]**

## QUESTION 4: SOLIDERING AND WELDING

4.1 Arc welding is a process in which the heat for welding is generated into an arc,✓ formed between the welding electrode✓ and the metal work piece.✓ (3)

4.2
4.2.1 Neutral flame: Equal quantities of oxygen and acetylene

4.2.2 Carburising flame: Excess of acetylene

4.2.3 Oxidising flame: Excess of oxygen

(3 × 1) (3)

4.3
- Never test for leaks with an open flame.
- Never direct the flame towards fellow workers.
- Ensure that dry powder or carbon dioxide fire extinguishers are readily available and that sand buckets are kept clean and free of combustible litter.
- Welding work areas should be well ventilated to elimenate fumes.

(Any 2 × 1) (2)

**[8]**

## QUESTION 5: COLD-WATER SUPPLY

5.1
- Capillary soldered joints
- Compression joints (2)

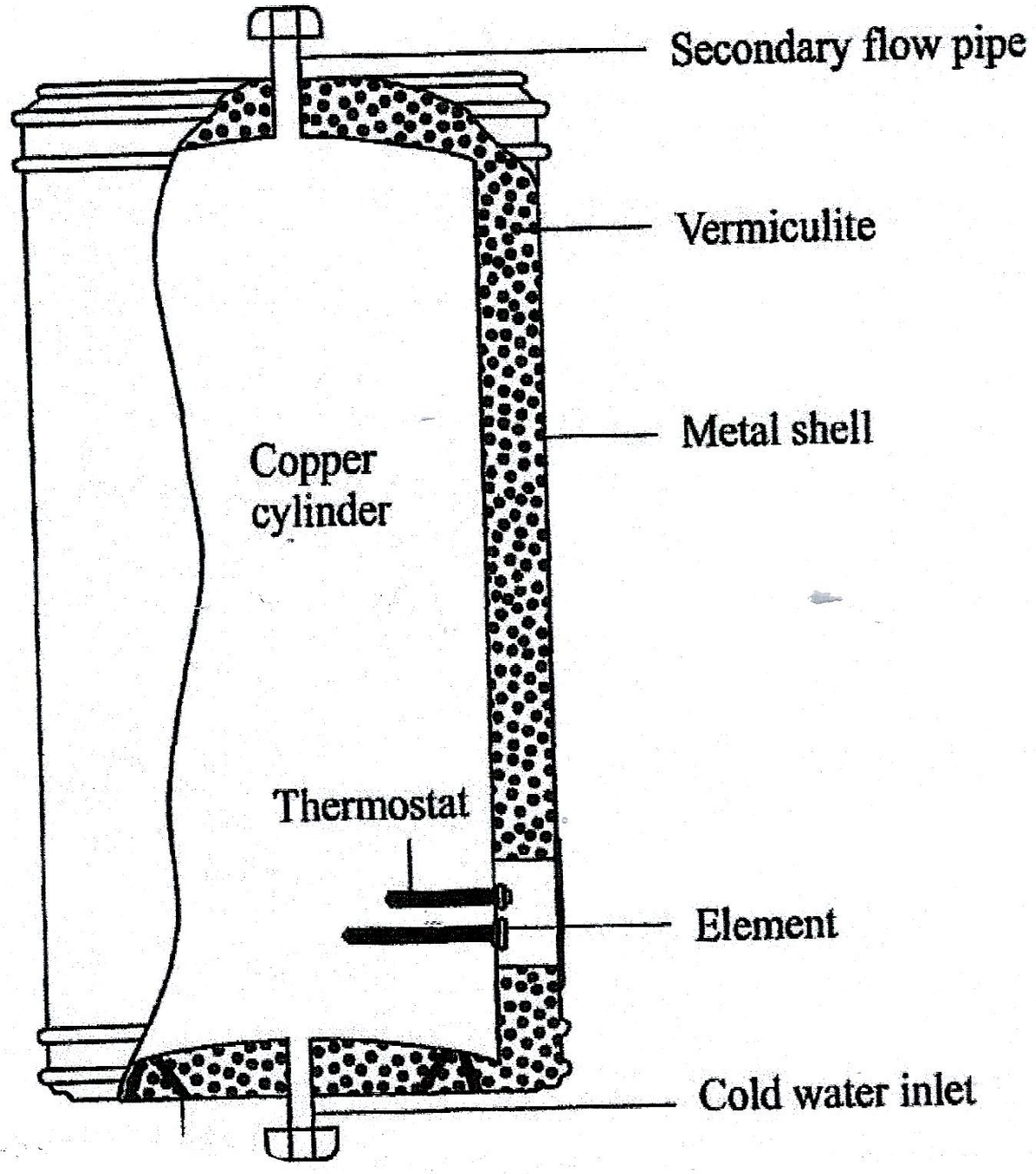
5.2
- A full-way valve is operated by turning a wheel for opening or closing. The stop cock is operated by turning a crutch for opening or closing.✓
- A full-way valve has a solid wedge which fits into a machined shaft to cut off water flow.✓ The stop cock has a washer that is pushed onto a machined seat to cut the water flow.✓
- When opened, the full-way has a clear way equal to the bore of the pipe rendering a full flow of water through the valve.✓ The water flow through the stop cock changes direction and is also reduced. This hampers the flow of the water.✓
- The full-way valve may be installed any way around.✓ A stop cock may not be installed any way around.✓ The direction of the flow through a stop cock is indicated by an arrow on the side of the body.✓ (8)

5.3
- It will remove residual oxide.
- It will prevent the reformation of oxide.
- It will promote "wetting" and assists capillary action.
- It will readily flow out of the joint as solder flows in. (Any 2 × 1) (2)

5.4
5.4.1 T-piece
5.4.2 Reducer
5.4.3 Reducing brush
5.4.4 M & F bend
5.4.5 Elbow

(5 × 1) (5)
**[17]**

**QUESTION 6: HOT-WATER SUPPLY**




**[12]**

## QUESTION 7: DRAINAGE

7.1
- Earthen ware (vitrified clay)
- uPVC
- Cast iron
- Fiber cement (4)

7.2 Holds sewerage solids while it decomposes naturally✓ or anaerobic process.✓ (2)

7.3
- Closed-coupled suite
- A low-level suite
- A high-level suite (3)

7.4
7.4.1 Flushing valve
7.4.2 Sink
7.4.3 Cover level
7.4.4 Bath
7.4.5 Soil vent pipe
(5 × 1) (5)

7.5
- They disconnect the WC pan from the supply pipe
- They provide a measured amount of water for each flushing
- They reduce the pressure in the pipe (3)

7.6
- At a point within 1,5 m from the connection to the point of disposal
- At the head of the drains
- Within every 25 m on a straight run of a drain
- At the head of any branch drain longer than 6 m
- On a stub stack in a closed drainage system (Any 3 × 1) (3)

**[20]**

## QUESTION 8: METALS AND MATERIALS

8.1 To join two sheet metal parts (1)

8.2
- It is light
- Does not need to be painted
- The surface is smooth and water will flow easily (3)

8.3
- Overlap joint
- Riveted joint
- Grooved joint
- Soldered joint (4)

8.4
- Parallel-line method
- Radial-line method
- Triangulation-line method (Any 2 × 1) (3)

**[11]**

## QUESTION 9: CALCULATIONS

9.1 Intensity of pressure = Head ✓of water
= 2 × 9,8✓
= 19,6 KPa✓

Total pressure = Intensity of pressure✓ × Area acted upon
= 19,6 × 7,5 × 6✓
= 882 KPa✓ (5)

9.2 Length × Width × Height✓
L × W × H✓
2 × 2 × 2✓
8 m²✓ (4)

**[9]**

**TOTAL: 100**

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