higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

INSTALLATION RULES
(First paper)

6 April 2021

This marking guideline consists of 6 pages.

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QUESTION 1: OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS NO 85 OF 1993

1.1 An employer or user shall provide free of charge✓ and maintain in good condition such protective equipment as may be necessary to prevent incident,✓ for use by person engaged in working on or in close proximity to live electrical machinery or dead electrical machinery that might become live.✓ (3)

1.2
- Light fitted with a substantial handle which is made of nonhygroscopic, nonconductive material (1 × 2)
- All live metal parts or parts which may become live owing to a faulty circuit are completely protective against accidental contact (1 × 2)
- Lamp protected by means of substantial guard firmly fixed to insulated handle (1 × 2)
- Cable-in is such that insulation can withstand rough use (1 × 1) (7)

[10]

QUESTION 2: SANS 10198-2 OF 2004: THE SELECTION, HANDLING AND INSTALLATION OF ELECTRIC POWER CABLES OF RATING NOT EXCEEDING 33 KV

2.1
- Ambient air temperature
- Soil temperature
- Thermal resistivity of soil
- Depth of burial
- Layout and grouping of cables

(5 × 1) (5)

2.2
- Map or plan showing all power cable routes✓
- Full description of each cable✓
- Maximum earth fault current that could occur and total fault clearance time✓✓
- Detail of earthing arrangements at the supply end and at the load end✓ (5)

[10]

QUESTION 3: SANS 10292 OF 2001 – EARTHING OF LOW VOLTAGE (LV) DISTRIBUTION SYSTEM DEFINITIONS AND ABBREVIATIONS

3.1 At electrical potential to earth

3.2 Service connection cable in which one conductor serves as both neutral and earth

3.3 Electrical apparatus under control of consumer on consumer's premises

3.4 So connected to earth as to ensure, at all times, an immediate discharge of all electrical energy, without danger

3.5 AC or DC voltage that does not exceed 1000 V

3.6 Protective (earth) conductor that is electrically separated from neutral conductor

3.7 Conductor functioning as both protective (earth) conductor and neutral conductor

3.8 Point at which electricity is supplied to any premises as determined by supplier

3.9 Arrangement whereby neutral of supply transformer is earthed

3.10 Person who supplies or contracts to supply or agrees to supply, electricity to consumer

(10 × 1) **[10]**

QUESTION 4: SANS 10142-1 OF 2017: SPECIAL INSTALLATIONS OR LOCATIONS: CARAVAN PARKS, MOBILE HOMES AND MARINAS

- 230 V single-phase or 400 V three-phase AC.✓
- Must comply with SANS 60309-1 and SANS 603092 and have a SIX-clock earthing position.✓✓
- One socket outlet serving one caravan site.✓
- Not more than SIX socket outlets grouped together (to reduce tripping of earth leakage protection).✓
- Distribution housing providing a degree of✓ protection of at least IP 44 in accordance with SANS 60529-1✓, this degree of protection shall not be reduced when plug is inserted.✓
- Unless a safety supply, it must be protected at each distribution housing by earth leakage protection device with rated earth leakage tripping current not exceeding 30 MA.✓✓

[10]

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QUESTION 5: SANS 10142-1 OF 2017: SPECIAL INSTALLATIONS OR LOCATIONS: MEDICAL LOCATION

- Escape routes.✓ (1)
- Exit signs.✓ (1)
- Location for switchgear and control gear for emergency alternate supply and for main distribution boards for normal power supply and for safety power supply services.✓✓ (2)
- Rooms in which essential services are intended. In each room at least one luminaire shall be supplied from the safety power supply source.✓✓ (2)
- Rooms of group 1 medical locations. In each room at least one luminaire shall be supplied from the safety power supply source.✓✓ (2)
- Rooms of group 2 medical locations. A minimum of 50% of the lighting shall be supplied from the safety power supply source.✓✓ (2)

[10]

QUESTION 6: SANS 10142-1 OF 2017 SPECIAL INSTALLATIONS OR LOCATIONS: ALTERNATIVE SUPPLIES

6.1	6.1.1	as near as possible		
	6.1.2	distribution board		
	6.1.3	protection		
	6.1.4	threshold value		
	6.1.5	inverter UPS		
	6.1.6	overcurrent protective		
	6.1.7	alternative supply unit		
			(7 × 1)	(7)
6.2	6.2.1	main supply		
	6.2.2	harmonic current		
	6.2.3	thermal rating		
			(3 × 1)	(3)

[10]

QUESTION 7: SANS 10142-1 OF 2017: COMPLIANCE

7.1 Any notices, labels or rating plates shall be durable,✓ not removable except by determined and deliberate action.✓ The inscriptions shall be legible and indelible.✓ Details of the topics can be found in the relevant subclause of TABLE 4.2. ✓ (4)

7.2

Topic
Position of concealed distribution board
Switch-disconnectors for distribution boards and sub-distribution boards
Identification of ring circuits
Identification of incoming and outgoing circuits of distribution boards
Warning labels on distribution boards
Position of readily accessible earthing terminal for other services
Alterations or changes to a distribution board
Series-connected (cascaded) systems
Standard socket-outlets not on 30 mA earth leakage or with a rated tripping current higher than 30 mA.
Socket-outlets powered from a safety supply or on dimmer control
Circuit controlled by circuit-breaker
Load and line markings on circuit-breakers used as switches
Main switch-disconnectors in the case of multisupplies
Disconnecting devices with remote control
Disconnecting devices other than switch-disconnectors
Maximum permissible current rating of fuse-protected circuits
Earthing terminal for other services
More than one phase or circuit in an enclosure

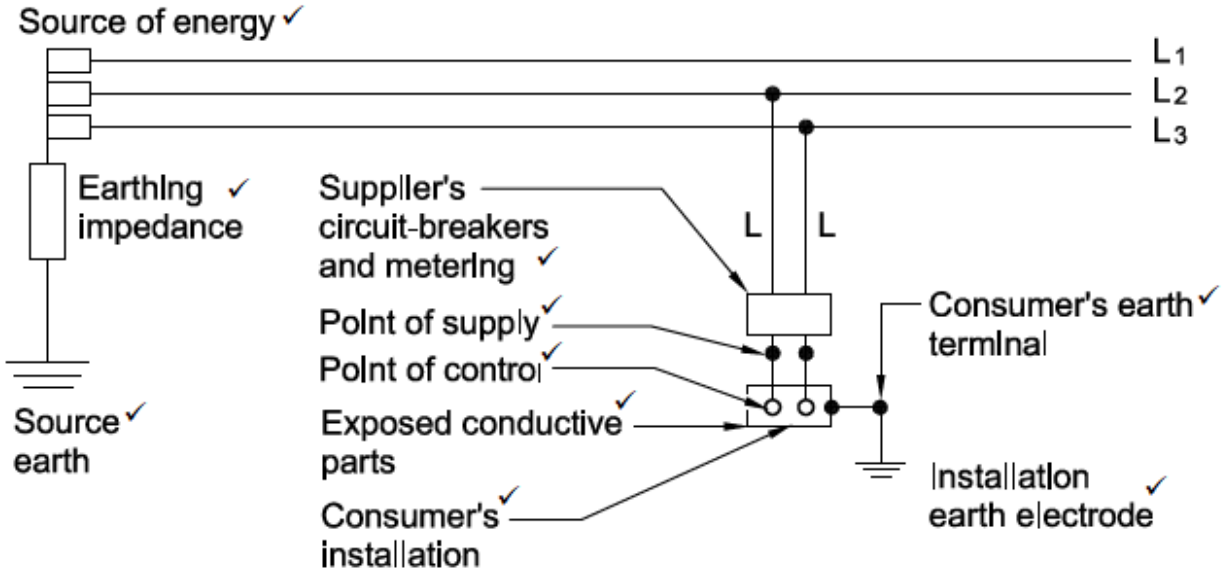
(Any 12 × ½) (6)
[10]

QUESTION 8: SANS 10142-1 OF 2014: ANNEX E: RECOMMENDED BENDING OF CABLES

8.1 d≤10
8.2 10<d≤25
8.3 25<d≤40
8.4 40<d
8.5 3d
8.6 4d
8.7 6d
8.8 8d
8.9 10d
8.10 15d

(10 × 1) **[10]**

QUESTION 9: SANS 10142-1 OF 2017: ANNEX J: ELECTRICITY SUPPLY SYSTEM



[10]

QUESTION 10: SANS 10142-1 OF 2017: ANNEX M: AUTHORITY FOR ISSUING TEST REPORT AND CERTIFICATE OF COMPLIANCE

10.1 True
10.2 False
10.3 True
10.4 False
10.5 False
10.6 True
10.7 True
10.8 False
10.9 True
10.10 True

(10× 1) **[10]**

TOTAL: 100

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