

**MINISTRY OF LABOUR, INDUSTRIAL
RELATIONS AND EMPLOYMENT**

**GUIDELINES
ON
ELECTRICAL SAFETY AT
WORKPLACES**

**Occupational Safety &
Health Inspectorate**

These guidelines should be used with approved standards:

A – General Requirements

1. Electrical installations, whether permanent or temporary, need to be properly designed, erected, maintained and periodically tested by competent persons only.
2. Any addition and/or alteration, temporary or permanent, shall be made to an existing installation, only after it has been ascertained by a competent person:-
 - (i) that the ratings and the condition of any existing equipment and installations which will have to carry any additional load is adequate for the altered circumstances; and
 - (ii) that the earthing arrangements and any other protective measures are also adequate.
3. All electrical installations shall have updated drawings to provide necessary information related to the type and composition of circuits (size of conductors and type of wiring), isolating, switching and protective devices.
4. Any electrical apparatus which, in normal use requires operation by any person shall be installed so that adequate access and working space are afforded for its operation, without electrical hazard.

5. Adequate lighting shall be provided at all electrical equipment on which or near which work has to be done in circumstances which may give rise to danger.
6. To prevent danger when working on electrical installations, safe work procedures need to be prepared and safe work practices be strictly adhered to.

B - Conductors

7. All electrical conductors shall be sufficient in size and current-carrying capacity for the purposes for which they are intended to be used.
8. All conductors and cables shall be of such construction so as to withstand any risk of mechanical damage to which they may be liable in normal conditions of service, and/or shall be adequately protected against such damage.
9. All electrical conductors, including those forming part of equipment, need to be:-
 - (i) insulated,
 - (ii) further effectively protected, where necessary, and
 - (iii) so placed and safeguarded so as to prevent danger.
10. All electrical cables shall be clearly identified throughout their whole length and properly labelled so as to prevent any danger.

C – Installations

11. Any electrical installation, alteration or extension thereto, on a construction site, shall be under the charge of a responsible person. The name and the phone number of the responsible person shall be conspicuously displayed.
12. All equipment and conductors need to be so constructed, installed, maintained, inspected and tested as to prevent danger.
13. All equipment need to be so arranged as to facilitate its operation, inspection, maintenance and access to its connections.
14. Low voltage circuits need to be separated from extra-low voltage circuits.
15. Electrical services and non electrical services shall not be installed in the same conduit, ducting or trunking.
16. All exposed conductive parts shall be connected by protective conductors individually, in groups or collectively to an earth electrode or electrodes.
17. In a system where one of the conductors is connected to earth, no single-pole switch shall be placed in that conductor or any branch thereof, other than a link for testing purposes.
18. Every installation shall be divided into circuits to facilitate safe operation, inspection, testing and maintenance to avoid danger in case of fault.

19. Every wiring system shall either be installed where it will not be exposed to rain, dripping water, steam, condensed water or accumulation of water or be of a type designed to withstand such exposure.
20. Metallic enclosures, conduits, clips and their fixing exposed to damp situations and to weather shall be of corrosion-resisting material and finish.
21. All equipment and metalwork of wiring systems exposed to weather, corrosive and/or explosive atmospheres, flammable surroundings or other adverse conditions shall be so constructed or protected as may be necessary to prevent danger arising from such exposure.

D – Isolating, Protective and Switching devices

22. Every circuit shall be protected against overcurrent by means of a device of adequate breaking capacity and suitably located.
23. Every overload protective device shall be capable of breaking the maximum prospective overload current at the point of installation.
24. All protective, isolating and switching devices shall be so arranged and identified to clearly indicate their purposes.
25. Every protective device shall be of such construction as to prevent danger from overheating, arcing or the scattering of hot metal or other substance when it comes into operation.

26. Where overload protective devices may be operated by persons other than skilled or instructed persons, they shall be designed or installed so that it is not possible to modify the setting or the calibration of their overcurrent releases without a deliberate act.
27. Residual current devices shall be installed to disconnect all the phase and neutral conductors of the circuit.
28. Residual current devices shall be tested on a regular basis should be tested as per manufacturers' instructions to ensure their good functioning.
29. Every fuse shall be either constructed and installed in such manner or protected by a suitable switch so as to enable ready renewal of the fuse element without danger.
30. Fuses which are likely to be removed or replaced whilst the circuit they protect is energized, shall be of a type such that they can be removed or replaced without danger.
31. Every switching device intended to be used for breaking under load shall be of such construction as to prevent danger when breaking the load at the point of installation.
32. Effective means, suitably located, shall be provided for cutting off and isolating all voltage from every part of a system as may be necessary to prevent danger.
33. Isolating devices shall be suitably placed and be of the appropriate type for their intended use. They shall be provided

with a means of locking off in the open position to prevent any equipment from being unintentionally energized.

34. Every switch, switch fuse, circuit breaker and isolating link shall be:-
- (i) constructed, placed and protected so as to prevent danger.
 - (ii) provided with a proper handle insulated from the system and arranged so as not to expose the operator to any danger.
 - (iii) constructed and installed in such manner so that when in the OFF position it cannot give rise to danger.
 - (iv) so constructed and installed so as not to give rise to danger from arcing.
35. All single-pole switches shall be installed in the phase conductor only.

E – Plugs and Socket outlets

36. Every plug and socket outlet shall be of the non-reversible type, with provision for the connection of a protective conductor, where necessary.
37. Socket outlets supplying power to portable equipment shall be located in an easily accessible position.
38. Socket outlets of the shuttered type need to be used in all installations.
39. Plugs must not have any pin exposed to touch whilst an associated pin is engaged in a socket outlet.

40. Socket outlet mounted vertically on a wall or other structure, shall be fixed at a suitable height to reduce the risk of mechanical damage to plug, socket outlet and flexible cords during insertion, use or withdrawal of the plug.

F – Electric Motor

41. Every electric motor shall be provided with adequate control equipment including means of protection against overcurrent in the motor.
42. Every motor circuit shall be controlled by an effective switch or switches for starting and stopping. The switch or switches shall be so placed as to be readily accessible and easily operated.
43. Where a machine is driven by an electric motor, such efficient means, suitably located, shall be provided for either stopping the machine or switching off the electric motor as may be necessary to prevent any danger.
44. Every electric motor shall be equipped with such efficient means so that when stoppage occurs by reason of a fluctuation in a voltage or failure supply of electricity the motor will not restart automatically in circumstances whereby unexpected restarting is likely to cause danger.

G – Portable apparatus

45. Appropriate flexible cables or flexible cords shall be used to supply power to portable equipment.
46. Portable apparatus operating at a voltage exceeding extra low voltage shall have its flexible wires connected to the system either by effective permanent joints or by properly constructed connectors.
47. Portable apparatus operating at a voltage exceeding extra low voltage shall be protected against earth leakage current liable to cause danger.
48. Portable electrical equipment shall be used only for the purpose for which it was intended and in an environment for which it was designed and constructed so as to prevent danger.

H – Terminations and Joints

49. Every electrical joint and connection shall be of proper construction and design as regards conductivity, insulation, mechanical strength and protection.
50. Terminations and joints shall be appropriate to the size and type of conductor with which they are to be used.
51. Terminations and joints shall be suitably insulated for the voltage of the circuits in which they are installed.
52. Appropriate cable couplers shall be used for connecting together two lengths of flexible cable or flexible cord.

53. Cable glands shall be used to securely retain without damage the outer sheath or armour of the cables shall be shrouded and earthed with an earthing ring.

I - Switchboard

54. Every switchboard shall be constructed and installed so that:-

- (i) there is adequate access to any component which has to be adjusted or handled.
- (ii) every bare conductor is protected against accidental short circuit liable to cause electrical hazard.

55. Every switchboard having a bare conductor liable to become live and normally exposed so that it is possible for a person to make accidental contact with live part shall be adequately enclosed or fenced so as to prevent electrical hazard.

56. For any work to be carried out in an enclosed or fenced area in which there is a switchboard having a bare conductor liable to become live and normally exposed so that it is possible for a person to make accidental contact with the live part, a permit to work duly signed by an authorised person is required with proper lockout and tag out procedures.

57. Adequate precautions shall be taken either by earthing or other suitable means to prevent any metal part, other than current-carrying conductors, enclosing or supporting any such conductors from becoming live.

58. When work has to be carried out on any conductor, equipment or switchboard, adequate precautions shall be taken, including the prevention of any conductor or apparatus from becoming accidentally live, so as to prevent danger.
59. A danger notice shall be placed at every enclosed or fenced area in which there is a switchboard having a bare conductor liable to become live and normally exposed so that it is possible for a person to accidentally come into contact with live metal.

J – Personal Safety -Protective Equipment and tools

60. Screens, mats and insulating boots, gloves or other protective equipment shall be provided and maintained in good condition for use where necessary to prevent any risk of injury.
61. Every person working on a system shall make proper use of any protective equipment provided for protection against electrical hazard.
62. No person shall use worn out or otherwise defective tools.
63. Every person shall ensure that correct, properly insulated and regularly tested tools and equipment are used for the job he is required to perform to prevent any danger.
64. Every person who is provided with a protective equipment shall :-

- (i) wear the equipment at all times where there is a risk of bodily injury against which the equipment affords protection.
- (ii) report forthwith to his/ her employer the loss, destruction and other defects in the protective equipment.

K - Substation

65. Every substation shall be:-

- (i) of proper construction and design.
- (ii) maintained in a dry condition.
- (iii) well illuminated and ventilated to prevent danger.
- (iv) under the responsibility of an authorised person.
- (v) kept closed under lock and key.

66. Access to any part of a substation where electrical danger is liable to arise shall be restricted to authorised competent persons.

67. A danger notice shall be placed and displayed in a visible position at the entrance to every part of a substation.