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Electricity Regulatory Authority
Ministry of Energy and Natural Resources

Internal House Wiring Rules and Regulations 2025

Electricity Regulatory Authority

Ministry of Energy and Natural Resources

Foreword

In accordance with Section 87 of the Electricity Act of Bhutan 2001, the Internal House Wiring Regulations (IHWR) 2016 was initially developed by the erstwhile Bhutan Electricity Authority (BEA) to provide a basic framework for ensuring the safe design and installation of electrical wiring in buildings. Over the years, with growing demand for electrification, urban development, and the increasing complexity in infrastructure development, the need to revisit and strengthen these provisions became evident.

The regulation underwent a thorough review where gaps and ambiguities in certain sections were identified. This revised version reflects a major update, informed by national priorities, stakeholder consultations, and international best practices. Notably, the amended Internal House Wiring Rules and Regulations (IHWRR) introduce a requirement for mandatory testing and inspection of internal house wiring by electrical firms or individuals approved by the Authority. This change is aimed at improving service quality, reducing electrical fire hazards, and supporting private sector participation in regulated electrical services.

The regulations now provide clear guidance for firm approval, monitoring, and enforcement. These measures are intended to enhance safety, promote transparency, and ensure that only qualified personnel undertake electrical installation works, whether in residential, commercial, or public areas.

This revised regulation represents a significant step towards enhancing electrical safety and regulatory clarity in Bhutan. I commend the efforts of all taskforce members, the ERA Secretariat, and our partner agencies for their unwavering commitment and collaboration throughout this important process.

I extend my sincere gratitude to all stakeholders who have contributed immensely to the development of this regulation. Your invaluable insights have been key to shaping this regulation and we look forward to your continued support as we commence its implementation.

Chairperson

Chairman
Electricity Regulatory Authority
Thimphu

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In exercise of the power vested by section 87 of the Electricity Act of Bhutan 2001, the Electricity Regulatory Authority (ERA) adopts the Internal House Wiring Rules and Regulations to ensure safe electrical installations in the premises:

CHAPTER 1
PRELIMINARY

Title and Commencement

1. These rules and regulations:

   (1) are the Internal House Wiring Rules and Regulations 2025; and

   (2) comes into force from May 30, 2025.

Scope

2. These rules and regulations shall apply to the:

   (1) owner;

   (2) certified electrician;

   (3) electrical firm; and

   (4) electrical installations in new premises, alterations to existing installations, and maintenance of low voltage electrical installations in all premises within the country.

Objective

3. These rules and regulations aim to ensure the safe installation, maintenance, testing, and inspection of internal house wiring in all premises to ensure that life, health, and property are protected whilst fulfilling the intended functions.

CHAPTER 2

INSTITUTIONAL ARRANGEMENT

4. These rules and regulations provide a coordinated institutional arrangement to facilitate effective collaboration among the regulatory authority, government agencies, and electricity supplier with clearly defined roles and responsibilities to ensure compliance, safety, and quality in the implementation and enforcement of the regulatory framework.

Ministry of Infrastructure and Transport

5. The Thromde or Dzongkhag or Gewog shall ensure:
   (1) the electrical installation is being carried out as per the provisions under the Bhutan Building Regulation (BBR) 2023;
   (2) issuance of construction permits upon verification of the connected load and confirmation of the certified electrician's credentials; and
   (3) monitoring of electrical installations during construction to guarantee quality assurance and uphold the safety standards of the building.

Bhutan Power Corporation Limited

6. The Bhutan Power Corporation Limited (BPC) before the release of the new power supply shall:
   (1) conduct electrical testing and inspection to ensure compliance with safety and operational standards; and
   (2) release the power supply upon fulfilling the required standards of the testing report.

Ministry of Education and Skills Development

7. The Bhutan Qualifications and Professionals Certification Authority (BQPCA) affiliated with the Ministry of Education and Skills Development (MoESD) shall ensure the certification of the electrician in the country.

Ministry of Industry, Commerce and Employment

8. The Bhutan Standard Bureau (BSB) under Ministry of Industry, Commerce and Employment (MoICE) shall ensure the development of national standards related to internal house wiring and facilitation of their implementation.

Ministry of Home Affairs

9. The Department of Local Governance and Disaster Management (DLGDM) under the Ministry of Home Affairs shall:
   (1) facilitate the formulation of hazard zonation for electrical fire; and
   (2) facilitate and coordinate electrical fire-related disaster response.

CHAPTER 3

ELECTRICAL INSTALLATION AND SUPPLY

Approval of Electrical Installation

10. The owner shall seek approval from the respective Thromde, Dzongkhag, or Gewog authorities on the proposed electrical wiring installation drawings and provide an estimate of the expected maximum electricity demand or contract load at the premises before the commencement of construction.
11. The owner shall obtain power clearance from the electricity supplier before the commencement of construction.

Technical Standards, Materials, and Workmanship

12. Upon receiving approval for the electrical wiring installation drawings and power clearance, the owner shall:
    (1) ensure that all electrical installation works are carried out in accordance with the approved drawings and are consistent with the principles contained in the Bhutan Building Regulation 2023 and the amendment part thereof;
    (2) engage only a certified electrician to carry out the installation works;
    (3) ensure all materials used in the electrical installations are of good quality and installed as per the standards prescribed in BTS: 272:2019 and the amendment part thereof;
    (4) ensure that earthing is carried out as prescribed in the BTS: 272:2019 and the amendment part thereof;
    (5) ensure that earthing for exposed metallic parts of an installation and appliances, as well as extraneous metallic parts in a premise, are carried out for safety reasons, and protection system requirements, and provide a path for electrical discharge;
    (6) ensure that all parts of an electrical installation are sufficiently sized and rated to safely carry out the function for which they are required as prescribed in the BTS: 272:2019 and the amendment part thereof;
    (7) ensure that all parts of an electrical installation are insulated appropriately to the function they serve, in consideration of the expected operating environment, to prevent danger;

(8) ensure that the connection and wiring of the main bus bar and bus bar chamber follow the color coding specified in BTS 272:2019 and the amendment part thereof; and

(9) ensure that the completed installation is inspected and tested prior to energization.

Initial Inspection and Testing of Electrical Installation

13. Every new electrical installation including the alterations, shall, on completion and before being energized, be tested and inspected by the electricity supplier.

14. Inspection and testing shall include the following tests:

    (1) Insulation Resistance Test;

    (2) Polarity Test of Switch;

    (3) Earth Continuity Test; and

    (4) Earth Electrode Resistance Test.

15. The insulation resistance test shall be carried out as per the standards and process prescribed in the BTS: 272:2019 and the amendment part thereof.

16. The polarity test of the switch shall be carried out as per the standards prescribed in the BTS: 272:2019 and the amendment part thereof.

17. The earth continuity test shall be carried out as per the standards prescribed in the BTS: 272:2019 and the amendment part thereof.

18. The earth resistance measurement shall be carried out by an approved earth testing apparatus as per the standards prescribed in the BTS: 272:2019 and the amendment part thereof.

19. All equipment used for testing shall conform to the standards prescribed in the BTS: 272:2019 and the amendment part thereof or to applicable international standards where such specifications are not available in the BTS: 272:2019.

20. Only a certified electrician shall carry out the initial testing and inspections of the electrical wiring installation of the premises.

21. The testing and inspection report shall be provided to the owner by the electricity supplier.

CHAPTER 4

ROUTINE INSPECTION AND TESTING

22. The owner shall carry out the routine inspection and testing of electrical wiring installations at the intervals specified by the Authority in Section 24 of these rules and regulations.

23. The routine inspection and testing shall be recorded and shall include the following tests:

    (1) Insulation Resistance Test;
    (2) Polarity Test of Switch;
    (3) Earth Continuity Test; and
    (4) Earth Electrode Resistance Test.

24. The period of routine inspection and testing for different premises is as follows:

Type of premises	**Period of inspection and testing**
Cultural Heritage sites (Dzong/Monasteries/Temples)	Every five (5) years from the first inspection and testing
Domestic (Residential, Offices, etc.)	Every ten (10) years from the first inspection and testing
Commercial (Hotels, Malls, Cinema Halls, Tents, Glamping, Stores)	Every ten (10) years from the first inspection and testing
Public (Schools, Hospitals, Parks, Swimming pools, etc.)	Every five (5) years from the first inspection and testing

25. The routine inspection and testing shall be carried out by the electrical firm (s) or a certified electrician approved by the Authority, subject to terms and conditions prescribed by the Authority.

26. The Authority shall issue the guideline for the approval of the electrical firm (s) and certified electrician.

27. The scope of works shall be defined in the guideline or other directives issued by the Authority.
28. The approved electrical firm (s) and the certified electrician shall comply with the standards prescribed in BTS: 272:2019 and the amendment part thereof.
29. The approved electrical firm (s) and the certified electrician shall provide a test certificate to the owner of the premises following the fulfillment of the requirements of the inspection and testing.

Reporting and Monitoring

30. The approved electrical firm (s) and the certified electrician shall submit periodic inspection and testing reports to the Authority in the manner and frequency prescribed by the Authority. The Authority shall monitor the performance of approved firms to ensure compliance with terms and conditions.

Charges

31. The charges for the services provided by the electrical firm (s) and the certified electrician shall be approved by the Authority.

Alteration

32. The owner shall not undertake any alteration to an electrical installation without obtaining prior approval for the revised electrical wiring drawing from the respective Thromde, Dzongkhag, or Gewog authorities.

CHAPTER 5
INSTALLATION REQUIREMENT

Lighting

33. All lighting installations shall conform to the requirements of BTS: 272:2019 and the amendment part thereof.
34. The normal mounting height for switches shall conform to BTS: 272:2019 and the amendment part thereof.

Cables

35. All cables used for the electrical installation shall conform to BTS: 272:2019 and the amendment part thereof.
36. The Polyvinyl Chloride (PVC) and rubber-insulated stranded copper or equivalent conductor shall be used for wiring.
37. The size of cables shall be selected based on current carrying capacity, voltage drop, fault current level and the provision for future demand. The selection shall also consider installation conditions and conform to the requirements prescribed in BTS: 272:2019 and the amendment part thereof.
38. The cables running through inaccessible areas such as walls, floors, and ceilings shall be installed in conduit or trunking to be withdrawable in the future. In such a case, suitable inspection plates and pulling-out points shall be provided.

Distribution and Switch Board

39. All distribution boards must be factory assembled, type-tested, and as prescribed in the BTS: 272:2019 and the amendment part thereof.
40. All distribution and switch boards shall be of robust construction and capable of withstanding expected electrical, thermal, and environmental stresses during normal operation and faults.
41. All distribution and switch boards shall be installed in locations easily accessible for inspection, operation, and maintenance. Such locations shall be secured from unauthorized interference, particularly from children.
42. The switchboard shall be placed in dry and ventilated rooms. It shall not be placed in the vicinity of storage batteries, or gas and exposed to chemical fumes. If the switchboard is expected to

harsh or humid weather conditions, the outer casing shall be weatherproof with cable glands and bushing for incoming and outgoing cable.

43. All main switches, sub-main switches and distribution main switches shall be provided with appropriate enclosures having proper insulation.

Plugs, Sockets, and Switches

44. All plugs, switches and socket outlets accessible for normal use may be positioned at a height as prescribed in the BTS: 272:2019 and the amendment part thereof.
45. All plugs and socket outlets in the kitchen, toilet, or other areas where water is used shall be positioned as prescribed in the BTS:272:2019 and the amendment part thereof.
46. All switches provided for local isolation of appliances and equipment shall conform to BTS: 272:2019 and the amendment part thereof.

Conduits, Trunking, and Cable Trays

47. If the materials are of galvanized iron (GI) or steel, the outer surface of the conduit including all bends, unions, tees, and junction boxes forming part of the conduit system, shall be adequately protected against rust when such system is exposed to weather as prescribed in the BTS:272:2019 and the amendment part thereof.
48. The earthing of conduits shall be carried out in accordance with the requirements prescribed the BTS: 272:2019.
49. A separate conduit shall be provided for different network installations.
50. The conduits, trunking, and cable trays must be installed to provide ease of access to cable circuits throughout the route. Sufficient inspection plates and pulling points must be provided to enable inspection, repair, and drawing out of cables throughout the life of the electrical installations.

Busbar

51. All busbars and switches must conform to standards prescribed in the BTS: 272:2019 and the amendment part thereof.

CHAPTER 6

REQUIREMENT FOR SAFETY

52. The cautionary signs shall be placed on the main distribution box and wherever necessary.
53. All parts of an electrical installation shall be designed and installed to ensure the safety of the general public and prevent property damage.
54. All parts of an electrical installation shall be sufficiently sized and rated to safely carry out the function for which they are required.
55. All parts of an electrical installation shall be insulated appropriately according to the function they serve and in consideration of the expected operating environment, to prevent danger.
56. All parts of an electrical installation must be suitably located to provide safe access for operation, maintenance, and repair and must be protected against accidental or deliberate interference or damage.
57. All exposed-conductive parts of an electrical installation and appliances must be connected to earth via appropriate earth conductors, to protect against electric shock.
58. All electrical installations must be protected against damage caused by excess current due to a fault or overload by suitable protective devices.
59. All electrical installations must be provided with a means of isolating the electricity supply at suitable sections, subsections, and circuits, and at points where appliances are used.
60. The wiring shall be done in the looping system only if the total connected load does not exceed the current-carrying capacity of the looped cable. In cases where the load exceeds the permissible limit, looping shall not be considered. All looping arrangements shall strictly conform to the provisions prescribed in the BTS: 272:2019 and the amendments thereof.

CHAPTER 7
PROTECTION

61. All electrical installations shall be designed and installed to ensure protection against overload, short circuits, and other associated electrical hazards.

Protection against overcurrent and short circuit

62. All electrical installations shall be provided with devices that protect against overload and short circuits, located at suitable sections and circuits to give effective isolation of such conditions.
63. The main circuit breaker shall include a Miniature Circuit Breaker (MCB) for the protection of the circuits, and a Moulded Case Circuit Breaker (MCCB) shall be used for the protection of the sub-main and main cables.
64. Miniature Circuit Breaker and Moulded Case Circuit Breaker shall be enclosed in an enclosure or mounted on such material that is heat-resistant and free from ignition.

Protection against overvoltage and earth faults

65. The electrical installation shall withstand the overvoltage as and when it occurs.
66. All exposed metallic parts of an electrical installation shall be earthed via appropriate earth conductors.
67. All electrical installations shall be fitted with an earth leakage circuit breaker, residual current device, or similar protective device at appropriate points.
68. All electrical installations shall be provided with a means of isolating the electricity supply at suitable sections, subsections, and circuits, and at points where Appliances are used.

Earthing

69. The neutral and metal parts of all the mains, sub-mains, distribution mains, and trunk or conduit lining, including the socket outlets, shall be effectively connected to earth electrodes with suitable size wire as prescribed in the BTS:272:2019 and the amendment part thereof.
70. The earth electrode resistance shall be reduced through suitable design measures, such as increasing the electrode length, number, or configuration. Where these methods are insufficient, appropriate treatment of the soil may be applied, subject to environmental considerations and compliance with standards prescribed in the BTS:272:2019 and the amendment part thereof.

71. Proper care shall be taken while choosing the location of the earth electrode so that excavations for the earth electrode may not affect the foundation of the building. Entrances, pavements, and roadways shall be avoided for locating the earth electrode.
72. Separate earthing systems shall be provided for power and communication systems, where required, to minimize electrical interference and ensure the functional safety of sensitive electronic equipment.

Lightning Protection

73. Lightning protection systems shall be designed and installed as prescribed in the BTS: 272:2019 and the amendment part thereof.
74. Lightning protection systems and associated earth electrodes shall be kept separate from the main earthing system.

CHAPTER 8
MISCELLANEOUS

Non-Compliance

75. Failure to comply with these rules and regulations, or any part thereof, shall result in action in line with the Penalty Rules and Regulations 2024.

Amendment

76. The Authority may amend these rules and regulations as and when required.

Definitions

77. Unless the context otherwise requires, the following words and expressions shall have the meaning ascribed to them:

(1) "Alteration" means any proposed increase in demand load that requires a change in the wiring capacity, service connection or metering arrangement;

(2) "Appliance" means an item of current using equipment;

(3) "Authority" means the Electricity Regulatory Authority established under Part 2 of the Electricity Act of Bhutan 2001;

(4) "BTS: 272:2019" means the Internal House Wiring Standard 2019 developed by the Bhutan Standard Bureau;

(5) "Cables" means one or more insulated conductors, which are laid and surrounded by armor or protective cover;

(6) "Certified Electrician" means a person who is authorized to carry out electrical wiring, testing, inspection and maintenance of the electrical installations of the premises in the country and is certified by the Bhutan Qualifications and Professionals Certification Authority;

(7) "Circuit breaker" means a mechanical switching device capable of breaking or closing the flow of currents under normal circuit conditions;

(8) "Earthing or Earthed" means a general term used to describe the connection of metallic parts of an electrical installation or an appliance to earth;

(9) "Earth Conductor" means the protective conductors used to connect the exposed metallic parts of an electrical installation and associated appliances to earth, via a main earth terminal to local earth electrodes;

(10) "Earth Electrode" means a conductor or group of conductors in intimate contact with earth, providing an electrical connection to earth, and normally having a known and measurable value of earth resistance;

(11) "Earth Leakage Circuit Breaker (ELCB)" means a circuit breaker which is designed to open the phase and neutral conductors of a circuit upon detection of a leakage of current (above a specified value) through the earth conductor or through extraneous metallic parts of an installation;

(12) "Earth Resistance" means the resistance (in Ohms) of any point on an installation to earth, being measured using an approved testing device and approved procedure;

(13) "Electrical Firm" means a firm approved by the Authority for carrying out electrical wiring, testing, inspection and maintenance of the electrical installations of the premises in the country;

(14) "Electricity Supplier" means the holder of the license for the distribution of electricity issued by the Authority under the Electricity Act of Bhutan 2001;

(15) "Electrical installation" means an installation that generally comprises any fixed or temporary cable, switchgear, transformer, or other electrical equipment or apparatus within a Premises or other place where there is an electricity supply;

(16) "Exposed Metallic Part" means a metallic part of an installation or appliance which can be touched by a person and which is not normally live but may become live due to a fault condition;

(17) "Extraneous Metallic Part" means a metallic part, structure, or any metalwork within Premises which is not part of the electrical installation and which is not designed to carry current, but which may become live due to a fault condition. Extraneous metallic parts are required to be connected to earth using equipotential bonding conductors where there is a significant risk that they may become live due to a fault condition;

(18) "Low Voltage" means voltage not exceeding 400 volts between phase to phase for a three-phase supply or 230 volts between phase to neutral in the case of a single-phase supply;

(19) "Network Installations" means installations including the telephone network, television network, LAN, security system, etc.;

(20) "Owner" means the legal owner of the premises in which an electrical installation is installed and connected to a supply of electricity; and

(21) "Premises" means any occupied building, enclosure, or other place. Such locations include, but are not limited to, dzongs, monasteries, temples, residential areas, offices, hotels, malls, warehouses, cinema halls, glamping tents, stores, schools, hospitals, parks, swimming pools, construction sites, and labor camps.

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