



Chapter 3

GENERAL PROVISIONS



INTRODUCTION

PURPOSE:

- **Practical Safeguarding** of persons and property from hazards arising from the use of electricity.
- **Adequacy** - Contains provisions that are considered minimum requirements necessary for safety.



FPN No. 1: Hazards often occur because of overloading of wiring systems by methods or usage not in conformity with this code.

FPN No. 2: It is highly recommended that a licensed electrical practitioner be consulted for any electrical requirements, including changes.

FPN No.3: Fire Hazard, electrocution, serious injury or even death may also occur with lack or improper maintenance of wiring system.



- **Intended** as a design specification or an instruction manual to qualified persons.
- **Relation to Other International Standards.** The requirements in this code address the fundamental principles of protection for safety contained in Section 131 of IEC 60364-1, Electrical Installation of Buildings.



- **FPN. IEC 60634-1, Section 131.** Encompasses protection against thermal effects, protection against overcurrent, protection against fault currents, and protection against overvoltage.

SCOPE

- This code **covers** the installation of electrical conductors, equipment and raceways; signaling and communications conductors.
- Does **not cover** the (1) installations in railway rolling stock, aircraft or automotive vehicles. (2) installations of railways for generation, transformation, transmission or distribution of power used.



A photograph of a cleanroom environment. Several workers wearing white protective suits and masks are visible. They are standing on a white floor, and there are pieces of equipment on wheels. The background shows a dark, perforated wall. The image is partially obscured by a large yellow diagonal shape on the right side of the slide.

AUTHORITY

- This code has been approved and adopted by the Board of Electrical Engineering and PRC.
- By virtue of authority vested in the Board under RA 7920, it hereby direct strict adherence to the provisions of this code.



ENFORCEMENT

- This code intended for mandatory application by the office of the Building Official/EE over electrical installations.
- The Office of the Building Official/EE shall have the responsibility of implementing the provisions of this code.
- This code may require new products, constructions, or materials that may not yet be available at the time this code is adopted.



MANDATORY RULES, PERMISSIVE RULES, EXPLANATORY MATERIAL AND APPENDICES

- **Mandatory rules-** are those that identify actions that are specifically required or prohibited and are characterized by the use of terms shall or shall not.
- **Permissive rules-** identify actions that are allowed but not required, are normally used to describe options or alternative methods.



MANDATORY RULES, PERMISSIVE RULES, EXPLANATORY MATERIAL AND APPENDICES

- **Explanatory material**- references to other standards, references to related sections of this code
 - Information related to a code rule in the form of fine print notes (FPN).
- **Appendices** – are not part of the enforceable requirements of the PECL, but are included for information purposes only.

WIRING PLANNING

- Future expansion and convenience.
 - Plans and specifications that provide ample space in raceways, spare raceways and additional spaces allow for future increases in electric power and communication circuits.
- Number of circuits in enclosures.
 - Number of wires and circuits confined in a single enclosure be varyingly restricted.





DEFINITIONS

Attachment Plug (Plug Cap) (Plug) – a device that by insertion in a receptacle, establishes a connection between the conductors of the attached flexible cord and the conductors connected permanently to the receptacle

Authority Having Jurisdiction (AHJ) – Organization, Office or individual responsible for approving equipment, materials and installation, or a procedure.

Bonding Conductor – A reliable conductor to ensure the required electrical conductivity between metal parts required to be electrically connected.



Branch Circuit – the circuit conductors between the final overcurrent device protecting the circuit and the outlet.

Circuit Breaker – a device designed to open and close a circuit by non-automatic means and to open a circuit automatically on a predetermined overcurrent without damage to itself when properly applied within its rating.

Conduit Body – A separate portion of a conduit or tubing system that provides access through a removable cover to the interior of the system at a junction of two or more sections of the system or at terminal point of the system.



Cutout Box - an enclosure designed for surface mounting that has swinging doors or covers secured directly to and telescoping with the walls of the box proper

Dead Front - without live parts exposed to a person on the operating side of the equipment.

Demand Factor - the ratio of the maximum demand of a system or part of the system to the total connected load of a system or part of the system under consideration.

Electric Sign - a fixed or portable self-contained, electrically illuminated utilization equipment with words or symbols designed to convey information or attract attention.



Electrical Practitioner, Licensed – who has undergone training in electrical engineering and has complied with the requirements of RA 7920.

Electrical Practitioner, Non-Licensed – who has not complied with the requirements of RA 7920 or a qualified person with relevant education and experience to enable him/ her to perceive risks and to avoid hazards.

Ground - a conducting connection, whether intentional or accidental, between an electrical circuit or equipment and to earth or to some conducting body that serves in place of the earth



Hoist way – any shaft way, hatch way, well hole or other vertical opening or space in which an elevator or dumbwaiter is designed to operate.

Interrupting Rating – the highest current at rated voltage that a device is intended to interrupt under standard test conditions.

Overcurrent – any current in excess of the rated current of equipment or the ampacity of the conductor. It may result from overload, short circuit, or ground fault.



Raceway – an enclosed channel of metal or nonmetallic materials designed expressly for holding wires, cables or bus bars with additional functions as permitted in this code.

Receptacle – is a contact device installed at the outlet for the connection of an attachment plug.

Service Drop – the overhead service conductors from the last pole or other aerial support to and including the splices, if any connecting to the service entrance conductors at the building or other structure.

Service Point – the point of connection between the facilities of the serving utility and the premises wiring.

PERMITS AND INSPECTION CERTIFICATES

Electrical Permit Needed Before Work is Started

- Contractors shall obtain Electrical permit for buildings or other premises from the office of the Local Building Official, and for watercrafts from the Maritime Industry Authority (Marina).

Requirement for Electrical Permit

- Signatures and Submittals
- Applicant
- PEE who signed and sealed electrical plans & specifications
- Licensed Electrical Practitioner who is in- charge of electrical works
- Building owner
- Lot owner
- Building official
- Five sets of complete electrical plans signed & sealed by PEE.



ELECTRICAL INSPECTION

- An **application for inspection** shall be filed with the Office of the Building Official (OBO) before a preliminary and/or final inspection is done.
- **Certificate of Inspection.** No electrical installation, alteration, and/or addition shall be connected or reconnected to any power supply or any other source of electrical energy without a Certificate of Final Electrical Inspection or Completion.



DRAWING SHEET SIZES

Electrical plans and drawings:

760 mm x 1000 mm

600 mm x 900 mm

500 mm x 760 mm

GRAPHIC SCALE

Since the size of the drawing sheet can be changed photographically, graphic scale shall be shown on each drawing sheet.





PLANS AND SPECIFICATIONS

Location and Site Plans:

- Location of service drop, service equipment and nearest pole of the utility company furnishing electrical energy.
- Location of the meter as well as sizes of service entrance wires, conduits and equipment.
- Clearance of the path or run of service drops and entrance wires to adjacent existing and/or proposed structures.



PLANS AND SPECIFICATIONS

Electrical Layout – floor plan showing location of equipment and devices and their interconnection wiring.

- Plan for Power
- Plan for Lighting and Receptacle Outlets
- Plan for Fire Alarm Circuits



PLANS AND SPECIFICATIONS

Design Analysis – shall be included on the drawings or shall be submitted on separate sheets of standard size and shall show;

- (1) Branch Circuits, Sub feeders, Feeders, Bus ways, and Service Entrance.
- (2) Types, ratings, and trip settings of overload protective devices.
- (3) Calculation of short circuit current
- (4) Calculation of voltage drops
- (5) Protection coordination of overcurrent protective devices
- (6) Arc-Flash Hazard Analysis



SUBSTATION PLANS AND SPECIFICATIONS

Indoor Substation Plans:

- (1) Locations and Dimensions
- (2) Substation Structural Requirements
- (3) Substation Electrical Requirements
- (4) Cross sectional views
- (5) Miscellaneous



SUBSTATION PLANS AND SPECIFICATIONS

Outdoor Substation

- Shall show same items as indoor substation except that in lieu of walls and roof, details and fence and supporting steel structure shall be shown in accordance with the latest edition of the PEC, Part 2.

REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

- This covers general requirements for examination and approval, installation and use, access to and spaces about electrical conductors and equipment.
- This shall only be acceptable if approved.



EXAMINATION, IDENTIFICATION, INSTALLATION, USE, AND LISTING OF EQUIPMENT

- **APPROVAL**

The conductors and equipment required or permitted by this Code shall be acceptable only if approved.

FPN: See 1.0.1.7, Examination of Equipment for Safety, and 1.10.1.3, Examination, Identification, Installation, and Use of Equipment. See definitions of Approved, Identified, Labeled, and Listed.



EXAMINATION

In judging equipment, considerations such as the following shall be evaluated:

- (1) Suitability for installation and use in conformity with the provisions of this Code

FPN: Suitability of equipment use may be identified by a description marked on or provided with a product to identify the suitability of the product for a specific purpose, environment, or application. Suitability of equipment may be evidenced by listing or labeling.



EXAMINATION

- (2) Mechanical strength and durability, including, for parts designed to enclose and protect other equipment, the adequacy of the protection thus provided
- (3) Wire-bending and connection space
- (4) Electrical insulation
- (5) Heating effects under normal conditions of use and also under abnormal conditions likely to arise in service



EXAMINATION

- (6) Arcing effects
- (7) Classification by type, size, voltage, current capacity, and specific use
- (8) Other factors that contribute to the practical safeguarding of persons using or likely to come in contact with the equipment



INSTALLATION AND USE

Listed or labeled equipment shall be installed and used in accordance with any instructions included in the listing and labeling.



The image shows a person in a white lab coat working inside an anechoic chamber. The chamber's walls are covered in dark, textured electromagnetic interference (EMI) absorbers. The person is standing on a white floor, and there are various pieces of equipment and cables visible. The scene is brightly lit, and the overall atmosphere is technical and professional.

LISTING

- > Product testing
- > Evaluation
- > Listing (product certification)

[Shall be performed only by recognized qualified electrical testing laboratories]

AREAS



VOLTAGE

- At which the circuit operates.
- Voltage rating shall not be less than the nominal voltage

CONDUCTOR

- Normally used is copper or aluminum.
- If not specified, sizes will apply to copper conductors.

CONDUCTOR SIZES

- The sizes are expressed in metric system (SI)

AREAS



WIRING INTEGRITY

Completed wiring shall be free from short-circuit and grounds or otherwise stated.

WIRING METHODS

- Only methods recognized as suitable are included.
- The recognized methods shall be permitted to be installed.

INTERRUPTING RATING

Shall have a rating sufficient for the nominal circuit voltage at least equal to the line current at terminals.

AREAS

LISTED AND LABELED WHEN NOT REQUIRED

- Listing/labelling of products shall not be required if local or international standards do not require.

MECHANICAL EXECUTION OF WORK

- Electrical equipment shall be installed in a neat and workmanlike manner.
- Unused opening shall be closed to afford protection
- Integrity of internal parts shall not be damaged or contaminated by foreign materials



AREAS

MOUNTING AND COOLING OF EQUIPMENT

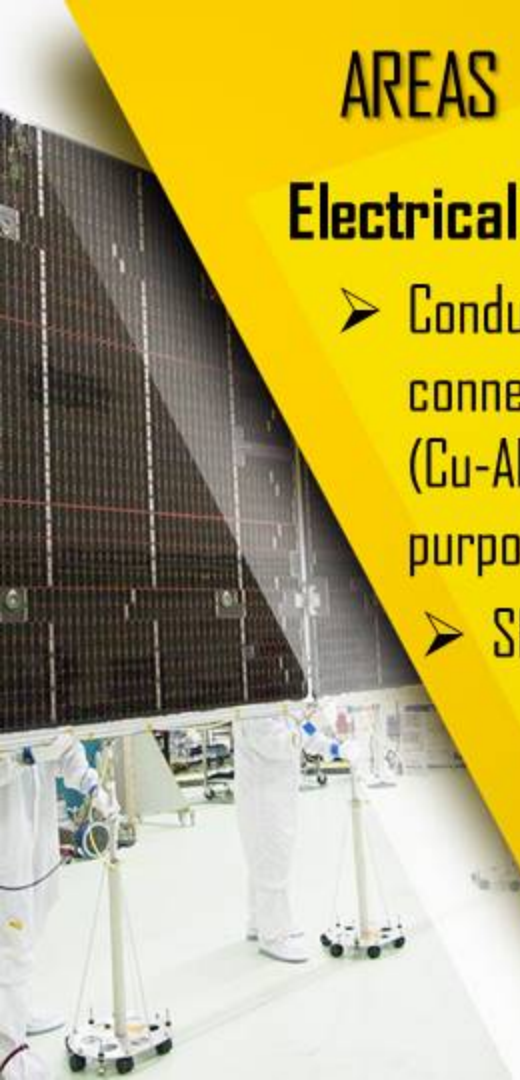
- Equipment shall be firmly secured to the surface. Wooden plugs driven into holes in masonry, concrete, plaster, or similar materials shall not be used.
- Equipment of natural circulation of air and convection principles for cooling shall not be prevented by walls or adjacent equipment.



AREAS

Electrical Connections

- Conductors of dissimilar metals shall not be intermixed in a splicing connector where physical contact occurs between dissimilar conductors (Cu-Al, Cu and Cu-clad Al, or Al and Cu-clad Al), unless determined for a purpose and conditions of use.
- Shall be more stranded than Class B & C.
 - Installation where a tightening torque is indicated as numeric value on equipment or in installation instructions provided by manufacturer by use of calibrated torque value.



AREAS

High-Leg Marking

- ❑ Only the conductor with higher phase voltage to ground shall be marked with orange color.
- ❑ Identification be at the connection.

Arc-Flash Hazard Warning

- General Electrical equipment, to require examination, adjustment, servicing, or maintenance while energized
- Service Equipment.
 - Other than at (A) permanent label shall be field or factory applied to service equipment rated 1200amps or more.



AREAS

Identification of Disconnecting Wires

- General - each disconnecting means be legibly marked indicating its purpose.
- Engineered Series Combination Systems
- Enclosures for circuit breakers in compliance with series combination ratings shall be legibly marked.



AREAS

Current Transformers

- ❑ Unused current transformers associated with potentially energized circuits shall be short-circuited.

Available Fault Currents

❑ Field Marking

- Maximum field current
- Markings shall include the date the fault-current calculation was performed

❑ Modifications

- If modifications was made, the maximum available fault current shall be verified and recalculated as necessary



EQUIPMENT PROVISIONS

❑ Termination provisions rated 100A or less, or marked for 2.0mm² (1.6 mm dia.) through 38mm² conductors, shall be used only for one of the following:

1. Conductors rated 60°C

2. Conductors with higher temperature ratings based on 60°C ampacity

3. Conductors with higher temperature ratings if listed for use with such

4. For motors with design letters B, C, or D, with insulation of 75°C or higher shall be permitted if ampacity does not exceed 75°C.

EQUIPMENT PROVISIONS

- ❑ Termination provisions rated 100A or less, or marked for conductors larger than 38mm^2 , shall be used only for one of the following:
 1. Conductors rated 75°C
 2. Conductors with higher temperature does not exceed the 75°C ampacity or up to ampacity listed and identified for use with such conductors



SEPARATE CONNECTOR PROVISIONS

- Separately installed pressure connectors shall be used with conductors at the ampacities not exceeding the ampacity at the listed and identified temperature rating of the connector.



WORKING SPACES

Nominal Voltage to Ground	Condition 1 (mm)	Condition 2 (mm)	Condition 3 (mm)
0-150	900	900	900
151-600	900	1000	1200
601-1000	900	1200	1500



CONDITIONS



- ❖ Condition 1: Exposed live parts on one side and no live or grounded parts on the other side or exposed live parts on both sides are guarded by insulating materials
- ❖ Condition 2: Exposed live parts on one side and no live or grounded parts on the other side. Concrete, brick, or tile wall shall be considered as grounded.
- ❖ Condition 3: Exposed live parts on both sides

ENCLOSED EQUIPMENT ACCESSIBLE TO UNQUALIFIED PERSONS

- Openings shall be designed to deflect foreign objects inserted.
- Nuts and bolts exposed are not readily removed, permitting access to live parts.



LOCKED ROOM ENCLOSURES

- @ over 1000V, shall be kept locked unless under observation of a licensed electrical practitioner or qualified person under the supervision of a licensed electrical practitioner.
- If @1000V or higher, permanent and conspicuous warning signs shall be provided, reading as follows:

DANGER—HIGH VOLTAGE—KEEP OUT



ILLUMINATION

- Control by automatic means shall only be permitted.
- Lighting outlets shall be arranged so the person changing lamps or repairing are not endangered by live parts or other equipment.



ELEVATION OF UNGUARDED LIVE PARTS

Nominal Voltage to Ground	Condition 1 (mm)	Condition 2 (mm)	Condition 3 (mm)
1001-2500V	900	1200	1500
2501-9000V	1200	1500	1800
9001-25000V	1500	1800	2800
25001-75kV	1800	2500	3000
Above 75kV	2500	3000	3700



CONDITIONS



- ❖ Condition 1: Exposed live parts on one side and no live or grounded parts on the other side or exposed live parts on both sides are guarded by insulating materials
- ❖ Condition 2: Exposed live parts on one side and no live or grounded parts on the other side. Concrete, brick, or tile wall shall be considered as grounded.
- ❖ Condition 3: Exposed live parts on both sides

PROTECTION OF SERVICE EQUIPMENT, SWITCHGEAR, AND INDUSTRIAL CONTROL ASSEMBLIES

- ❑ Pipes or ducts foreign to the electrical installation whose malfunction would endanger the operation of electrical system shall not be located in the vicinity of service equipment.
- ❑ Piping and other facilities are not considered foreign if provided for fire protection of the electrical installation.



CIRCUIT CONDUCTORS

- ❑ Are permitted to be installed in raceways, cable trays as metal-clad cable, bare wire, cable, and bus bars but shall conform to standards.
- ❑ Insulators used in mounting and such must withstand the maximum magnetic forces of a circuit subjected to short-circuit current.
- ❑ Support for lead-covered cables shall be designed to prevent electrolysis of the sheath.



INSPECTIONS AND TESTS



A. Pre-energization and Operating Tests

The complete electrical system design shall be prepared in advance and made available on request of OBO/EE.

- 1001 - 7500V, elevation is 2.05m
- 7501 - 35kV, 4.57m
- Over 35kV
- Add 9.5mm per kV above 35kV

B. Test Report

Shall be available at OBO/EE prior to energization and made available to those authorized to install, operate, test, and maintain the system

TUNNEL INSTALLATION

- ❑ This shall apply to installation and use of HVPD and utilization equipment that is portable, mobile or both.
- ❑ Conductors and cables in tunnels shall be located above the tunnel floor.



MANHOLES INTENDED FOR PERSONNEL ENTRY

- ❑ Enclosure intended for personal entry shall be of sufficient size to provide safe work and shall be designed to withstand all loads likely to be imposed on the structures, with a work space of not less than 900 mm wide if cables are on both side or 750 mm if only on one side, not less than 1800 mm high unless opening is within 300 mm.
- ❑ Openings shall not less than 650 mm x 550 mm. Round access not less than 650mm in diameter.
- ❑ Covers shall be over 45kg, labeled.



Thank You!

