SECTION- B 2.21

IDENTIFICATION FOR ELECTRICAL SYSTEM

2.21.1 PREAMBLE

This section of specification defines the requirements for Identification requirement for electrical system, warning sign, instruction labels etc. as specified in accordance with the requirements.

2.21.2 SUMMARY

Code for Identification for Electrical System

IS 732 / IS 12307 / IS 12349 / NBC

IS 5578	Guide for marking of insulated conductors.
IEC 60068-2-52	Environmental testing - Part 2: Tests - Test Kb: Salt mist, cyclic (sodium, chloride solution)
IEC 61851-1	Electric vehicle conductive charging system - Part 1: General requirements
IEC 61851-21	Electric vehicle conductive charging system - Part 21: Electric vehicle requirements for conductive connection to an a.c./d.c. supply
IEC 61851-22	Electric vehicle conductive charging system - Part 22: AC electric vehicle charging station
IEC 62196-1	Plugs, socket-outlets, vehicle couplers and vehicle inlets - Conductive charging of electric vehicles - Part 1: Charging of electric vehicles up to 250 A a.c. and 400 A d.c.
IEC 62196-2	Part 2: Dimensional compatibility and interchange ability requirements for a.c. pin and contact-tube accessories
ISO/IEC 14443	Identification cards - Contactless integrated circuit cards - Proximity cards specifications (Parts 1-4)
ISO/IEC 15693	Identification cards — Contactless integrated circuit(s) cards — Vicinity cards (Parts 1-4)

2.21.3 SUBMITTAL

A. Samples of each labels, signs and, if requested by the Engineer, other accessories.

B. Drawings: Submit Drawings for approval including, but not limited to, the following:
- Exact size & characters of the labels in A4 sheet .
- Schedule of equipments where identification labels to be fixed.

2.21.4 REQUIREMENT

2.21.4.1 CONDUCTOR IDENTIFICATION MATERIAL

a) Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 4 mils thick by 25 to 50mm wide.

b) Self-Adhesive Vinyl Labels: Pre-printed, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

c) Snap-Around Labels: Slit, pre tensioned, flexible, pre-printed, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

d) Snap-Around, Color-Coding Bands: Slit, pre tensioned, flexible, solid-colored acrylic sleeve, 50mm long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

e) Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

f) Write-On Tags: Polyester tag, 0.25mm thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.

i. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

ii. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.21.4.2 WARNING LABELS AND SIGNS

a) Comply with IS 732 and NBC

b) Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

2.21.4.3 INSTRUCTION SIGNS

a) Engraved, laminated acrylic or melamine plastic, minimum 1.5mm thick.

i. Engraved legend with black letters on white face.

ii. Punched or drilled for mechanical fasteners.

iii. Framed with mitered acrylic moulding and arranged for attachment at applicable equipment.

b) Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 10mm.

c) Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 10mm. Overlay shall provide a weatherproof and UV-resistant seal for label.

2.21.4.4 EQUIPMENT IDENTIFICATION LABELS

a) Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 10mm.

b) Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 10mm. Overlay shall provide a weatherproof and UV-resistant seal for label.

c) Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 10mm.

d) Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 10mm.

e) Stencilled Legend: In non fading, waterproof, black ink or paint. Minimum letter height shall be 25mm.

f) Enclosed Switches and Circuit Breakers shall also be identified by labels. Label designation shall be in accordance with the BOQ & Drawings. All removable components shall have a circuit label.

Description	**Requirement**
Material	Anodised Aluminium / Trafolite
Engraving	Black engraving on white background
Size of the Label	To suit application / importance
Fixing	With self-tapping screws
Use	Main Panel, feeders and individual devices

a) Labels shall have black characters on a white background and be made of a non-corrodible material. Danger/warning labels shall be engraved with black letters on a yellow background, in English, Marathi languages.

b) Labels shall not be affixed by adhesive.

c) Labels shall be printed in English.

2.21.4.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

a) Paint: Select paint system applicable for surface material and location (exterior or interior). Provide data sheets to Lodha for approval before use!

b) Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

2.21.5 EXECUTION

2.21.5.1 INSTALLATION

a) Verify identity of each item before installing identification products.

b) Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

c) Apply identification devices to surfaces that require finish after completing finish work.

d) Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

e) Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

f) System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 20 maximum intervals in straight runs, and at 10m maximum intervals in congested areas.

g) Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

h) Cable Ties: For attaching tags. Use general-purpose type, except as listed below:

   i. Outdoors: UV-stabilized nylon.

   ii. In Spaces Handling Environmental Air: Plenum rated.

2.21.5.2 IDENTIFICATION SCHEDULE

a) Concealed Raceways, Duct Banks, More Than 600 V, within Buildings: Provide safety labelling

b) Accessible Raceways, Armoured and Metal-Clad Cables, More Than 600 V: Self-adhesive vinyl labels. Install labels at 10m maximum intervals.

c) Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 230 V to ground: Identify with self-adhesive vinyl label. Install labels at 10m maximum intervals.

d) Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:

   i. Emergency Power.

   ii. Power.

   iii. UPS.

e) Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

   i. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.

      1. Color shall be factory applied.
      2. Colors for 415V / 240-V Circuits:
      3. To IS code
      4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for minimum distance of 150mm from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

f) Power-Circuit Conductor Identification, More than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use write-on tags.

g) Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

h) Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.

i) Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

   i. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

   ii. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

   iii. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the

   iv. Operation and Maintenance Manual.

j) Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.

   i. Limit use of underground-line warning tape to direct-buried cables.

   ii. Install underground-line warning tape for both direct-buried cables and cables in raceway.

k) Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Do not install at flush-mounted panel boards and similar equipment in finished spaces.

l) Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self adhesive warning labels.

   i. Comply with NBC/ NEC 2011 / respective codes for signage requirements

   ii. Identify system voltage with black letters on an orange background.

   iii. Apply to exterior of door, cover, or other access.

   iv. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:

      1. Power transfer switches.
      2. Controls with external control power connections.
      3. Insert items.

m) Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

n) Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 10mm - high letters for emergency instructions at equipment used for power transfer and generation.

o) Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

i. Labelling Instructions:

1. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 12mm - high letters on 40mm - high label; where two lines of text are required, use labels 50mm high.
2. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
3. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
4. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

ii. Equipment to Be Labelled:

1. Panel boards: Typewritten directory of circuits in the location provided by panel board manufacturer. Panel board identification shall be engraved, laminated acrylic or melamine label.
2. Enclosures and electrical cabinets.
3. Access doors and panels for concealed electrical items.
4. Switchgear.
5. Switchboards.

   Emergency system boxes and enclosures.
6. Motor-control centers.
7. Enclosed switches.
8. Enclosed circuit breakers.
9. Enclosed controllers.
10. Variable-speed controllers.
11. Push-button stations.
12. Power transfer equipment.
13. Contactors.
14. Remote-controlled switches, dimmer modules, and control devices.
15. Battery-inverter units.
16. Monitoring and control equipment.
17. UPS equipment.

END OF SECTION- B2.21