

Electrical Specification

CONSTRUCTION OF NEW BUILDINGS FOR IIT MADRAS RESEARCH PARK PHASE – 2-FOOD COURT WORKS ELECTRICAL WORKS SPECIFICATION

LABELS AND DIAGRAM PLATE

Every incoming or outgoing switch mounted on the Panel / DB shall be provided with individual label identifying its designation and feeder number. Also all the Panels / DBs shall be provided with a non-rusting label on the front, engraved with its designation as per the Electrical Schematic Diagram. Inside the Panel / DB a circuit diagram shall be pasted on the back of the door for quick reference.

LT BOARD

- The boards shall be made with pressed CRCA Sheet steel of 1.6mm. thickness and should be of free standing design.
- Degree of protection shall conform to IP 50 of IS 2147.
- The minimum and maximum heights shall be 450 mm. and 1950 mm. respectively from floor level.
- All fuse switches shall be of double break design and utilisation category shall be AC 23 duty except for Lighting Boards (AC 22).
- HRC Fuse links of 80 KA minimum rupturing capacity shall be used.
- Proper door interlocks shall be provided such that unless the Fuse Switch/ Isolator is in OFF Position, the door cannot be opened and vice versa.
- The Busbar compartment shall be separate and shall be accessible from the front.
- The maximum current density of Aluminum busbars shall be 0.8 A per Sq.mm.
- They shall be liberally sized for the specified current ratings (both short circuit and continuous currents) maximum temperature of the bus and bar connection shall be limited to 80° C.
- The metering equipments shall not be mounted on the busbar compartment cover.
- All bus works shall be braced to withstand stresses due to short circuit current and without damage.
- Appropriate colour code shall be used to identify the various phases busbars and the neutral as per relevant Indian Standard using heat shrinkable sleeves.
- The boards shall be easily extendable on both sides.
- The design shall be compartmentalised.
- All cables shall be entering the boards only from the top or bottom.

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- All Aluminum bus bars should confirm to E 91 E grade as per IS 5082.

PAINTING

- All metal surfaces shall be thoroughly cleaned and degreased to remove all mill scale, rust, greased and dirt. Fabricated structures shall be pickled and then rinsed to remove any trace of acid. The under surface shall be prepared by applying two coats of red oxide. The under surface shall be made free from all imperfections before undertaking the finishing coat.
- After preparation of the under surface, the switchboard shall be of powder coated spray painted with two coats of final paint. Colour shade of final paint shall be as per SHADE RAL 7032 (SIEMENS GREY COLOR) .
- All unpainted steel parts shall be cadmium painted or suitably treated to prevent rust formation. If these parts are moving elements, then they shall be greased.

SWITCHES

- All switches shall be load break heavy duty air break type provided with quick make/ break manual operating mechanism. The operating handle shall be mounted in the door of the compartment having the switch.
- Switches shall be designed to carry the rated current continuously without overheating.
- Barriers shall be provided to prevent inter phase arcing and live terminals shall be shrouded to avoid accidental contact.

FUSES

- Fuses shall be non deteriorating HRC Cartridge link type, Diazed Fuses are not acceptable.
- The fuses shall be pressure fitted type and shall preferably have ribs on the contact blades to ensure good line contact.
- It shall be possible to handle fuses during off load conditions with full voltage available on the terminals. Wherever required fuse pullers shall be provided. The fuse bases shall be so located in the modules to permit insertion of fuse pullers and removal of fuse links without any problems.

MCCB

- MCCBs should comply with IEC 947 Part 2.
- The MCCB shall be suitable for universal mounting (i.e) the Load / Line must be interchangeable.
- The MCCB shall be suitable for operating Voltage of 415 V minimum and an Insulation Voltage of 600 V.

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PROTECTION

- The Thermal setting shall be continuously adjustable from 63% to 100% of its normal current.
- The magnet setting shall be continuously adjustable from 500% to 1000% of its normal current.
- Trip reset should be available Manual / Automatic.

02. MCB/MCB DB's

All the MCB Distribution Boards shall be fabricated out of 16 G thick sheet steel and shall be of the totally enclosed dust proof type suitable for wall mounting.

The DB shall have welded back and sides and gasketed fully hinged front door. Detachable gland plates shall be provided at the top and bottom with suitable gaskets for cable entry.

The enclosure shall undergo suitable pretreatment followed powder coated of RAL 6032 (SIEMENS GREY COLOR).

The MCB Distribution Boards shall have the following:

Incoming MCB required rating in an independent compartment. The incoming terminals shall be fully shrouded.

Three phase compartments, each housing MCB's connected to one phase of the power supply system. Each of the sections shall have a 4P MCB on the incoming and SP MCB's for Lighting/ Power.

In each section a separate neutral bus and independent earth bus shall be provided.

The MCB's shall be of current limiting type and shall comply to IS 8829 – 1996 / IEC 898-1995. The power loss per pole shall be in accordance with IS 8828 – 1996 and shall be furnished by the Manufacturers.

All cable entries shall be from the bottom or top.

The busbars shall be of Tinned Copper having continuous current ratings equal to that of the incoming switch. The busbars shall be designed to withstand a fault level of not less than 31 MVA for one second.

The MCB's shall have a lockable switching lever.

The minimum electrical endurance shall be 20,000 operations-.

The housing of the MCB shall be mounted self-extinguishing thermoset plastic material.

The short circuit current shall be brought to zero within 4 to 5 milli seconds from the time they are established.

All MCBs shall have a minimum short circuit capacity of 10 KA Rms.
Undrilled gland plates shall be provided both at the top and bottom.
The degree of protection shall conform to IP 50.
Phase separation barriers shall be provided

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03. LT CABLES

LAYING OF CABLES

METHOD OF LAYING CABLES

In the Plant Buildings, Switch/Control rooms etc., power and control cables shall generally be taken exposed on brackets, cable racks/trays/hooks unless otherwise specified laid in concrete trenches or along building and technological structures.

Power and control cables installed along buildings and technological structures, ceiling, walls etc. which are required to be protected against mechanical damage.

Extra length of cables shall be provided wherever possible for any future contingency to the extent of 10% of the length of any section.

The cables laid fully buried in ground or partly in trench and partly in ground shall be armoured type. Cables are laid fully in rack/tray/hook or laid in G.I. pipes, shall be also armoured type.

The installation work shall be carried out in a neat workman like manner by skilled, experienced and competent workmen particularly with experience in jointing termination of aluminium / copper conductor cables.

Cables runs shall be uniformly spaced properly supported and protected in an approved manner. All bends in runs shall be well defined and made with due consideration to avoid sharp bending and linking of the cable. The minimum bending radius of cables shall not be less than twelve times the overall diameter.

Cable installation shall be property co-ordinated at site with the routing of other services, utilities and the cable routings with a view to avoid interference with any part of the building, structure, equipment, utilities and services.

Entry of cables directly buried in ground or from underground trenches, to the buildings shall be through GI pipe sleeves. Necessary precautions shall be taken to make entry point fully watertight by properly sealing the pipe sleeves with epoxy resin (rubberised compound).

All cables shall be provided with identification tags indicating the cable numbers in accordance with the cable/circuit schedule. Tags shall be fixed at both the ends of cable at joints and at 20 m. Spacing for straight runs. When a cable passes through a wall tags shall be of durable fibre of aluminum sheet with the numbers punched on them, and securely attached to the cables with non-corrosive wire. For single core cables wire shall be non-ferrous material.

All cables shall be tested for proper insulation prior to laying. The cable drums shall be transported on wheels to the place of work. The cables shall be laid out in proper direction as indicated on the drum using cable drunk stands. In case of higher size cables, the laid out cables shall run over rollers placed at close intervals and finally transferred carefully on to the trenches and racks. Care shall be taken so that links and twists or any mechanical damage does not occur in cables. Only approved cable pulling grips or other devices shall be used.

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Adequate length of cables shall be pulled inside the switchboards, control panels, terminal boxes etc. so as to permit neat termination of each core/conduct. Control cables cores entering switchboard or control panels shall be neatly bunched and strapped with PVC perforated tapes and suitable supported to keep it in position at the terminal block. All spare cores shall be neatly dressed and suitably taped at both ends.

Power cable terminations shall be carried out in such a manner to avoid strain on the terminals by providing suitable clamp near the terminals.

All power cable terminations shall be by means of crimping type cable lugs. Control cables shall be terminated by crimping or directly clamped in the terminal blocks by screws.

No jointing shall normally be made at any intermediate point in through runs of cables unless the length of the run is more than the length of the standard drum supplied by cable manufacturers. In such cases when jointing is unavoidable, the same shall be made by means of standard cable jointing boxes/kits.

All cables entry openings in the equipment shall be sealed and made proof against entry of creeping reptiles.

LAYING OF CABLES ON RACKS/TRAYS/BRACKERS/HOOKS

All power cables in trenches and on structures shall be laid on racks and shall be clamped by means of single or multiple galvanised MS saddles. The saddles shall be placed at an interval of 1000 mm. in both horizontal and vertical straight runs, at each bend and turnings from horizontal to vertical direction and vice versa.

Multi-core control cables shall be laid touching each other on trays and wherever required may be taken in two layers.

Ladder type cable racks shall be selected from three sizes viz. 300 mm., 450mm. and 600 mm. Ladder. type trays shall be painted after fabrication.

Vertical spacing between cable racks/trays shall be 250 mm.

Power cables of different voltage grades shall be laid in separate racks / brackets / hooks. Control cables as well as signal and communication cables shall be laid in a separate trays. However, in cases where smaller size power cables (below 16 sq.mm) of fewer numbers cables provided suitable vertical barriers are installed between them.

Order of laying of various cables in racks/trays brackets/hooks shall be such that control cables are located at the bottom-most tier and 1100 V grade cables at top tier. In case of duplicate feeders of same consumer, these shall be laid in two separate racks/brackets.

Where there is possibility of mechanical damage cable rack / trays shall be adequate protected by sheet steel covers.

For future installation of cables, provision shall be made to keep 20% space as spare on each tray/rack/bracket.

LAYING OF CABLES BURIED UNDERGROUND

Power and control cables laid directly buried in ground shall be laid generally conforming to the requirements of code of practice IS : 1255 in so far as it is applicable. Generally cables shall be taken at a depth of 750 mm. from finished ground level and shall be provided atleast 150 mm. sand cushioning both at top and bottom and precast reinforced concrete protective covers or

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bricks.

For laying 1100V grade power cables in horizontal axial spacing shall be 75 mm. Control cables shall be laid touching each other without any horizontal spacing. However, the distance of the control cable from the nearest power cables shall be 150 mm. Power and control cables may be laid in a common trench, but power cables for each voltage grade cables may be laid in a common trench, but power cables for each voltage grade and the control cables shall be separately in groups. Generally, cables shall be laid in one layer. In general, communication shall not be taken in a common trench. In case the same is required to be taken along with power cables, the minimum axial spacing between two cables shall be 350 mm where a brick separator shall be provided between the two cables and without brick separation the spacing shall be 500 mm.

Precast concrete protective cover shall be placed centrally along the cables. The concrete slab shall be of RCC type as per appendix C of IS : 1225 of length having suitable provision for dove tailing with the adjacent slab. The length of the slab shall be 750 mm the width however shall vary depending on the number of cables in the trench as well as axial spacing. The minimum width of slab shall not be less than 200 mm.

After laying of cables the trench shall be back filled with good excavated soil and well rammed in successive layers not less than 300 mm. depth. The excavation of trenches shall be kept as straight as possible. The width of trench shall be in accordance with the number of cables to be laid out in no case shall be less than 400 mm. The minimum clearance between trench edge and cable shall not be less than 100 mm.

Where cables required to cross roads, railway tracks and surface drains they shall be taken through reinforced concrete spun pipes at a minimum depth for 1000mm.

For crossing water, oil, gas or sewage pipes etc. cables shall be taken above the pipes where minimum 500 mm. clearance is available from top of pipes. Where 500 mm. clearance is not available the cables shall cross pipes through RC pipes at a minimum depth of 750 mm. from finished ground level keeping the distance between the utility pipes and pipe carrying cables 250 mm. minimum.

In each cable run some extra length shall be kept at a suitable point to enable one or two straight through joints to be made in case the cable develops fault at a later date. Also when group of cables are laid together the cable length shall be adjusted to stagger the straight through joints.

Direct burial underground cable shall be generally laid in the utility alley along the roads and cable routing shall follow the road layout. However, in special cases to keep the cable lengths minimum the cables may be laid by the shortest route and the same shall be taken through RC pipe.

While laying cables parallel to buildings, utility pipelines, drainage, sewerage etc., the minimum clearance shall not be less than 1000 mm.

CABLE TERMINATION AND JOINTING

Termination and jointing of aluminium conductor power cables shall be by means of compression method using compression type of aluminium lugs. Copper conductor control cables shall be terminated directly into screwed type terminals provided in the equipment. Wherever control cables are to be terminated by means of terminal lugs, the same shall be tinned copper compression type.

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04. WIRING

All Light, Fan, Sockets, fittings must be earthed.

Point wiring rate should include circuit mains wiring cost also.

Separate neutral must be taken for each circuit.

The physical and electrical continuity shall be maintained throughout the conduit systems.

Only 14 SWG thick PVC conduits shall be used as required in Bill of Quantities or Schedule of works.

Only concealed type of fan hooks shall be used on all possible locations.

Wires of any two branch circuits connected to different phases must be drawn in separate conduits.

Receptacles, control switches, fan regulators, MCB DBs, junction boxes for concealed wiring system shall be flush mounted in wall / ceiling / partitions as required.

50 mm. dia and height MS inspection boxes of 14 SWG Thick having smooth external finish shall be provided to facilitate removal and replacement of wires wherever required.

Strands of wires shall not be cut for connecting terminals. The terminals shall have sufficient cross sectional area to take all strands. At all bolted terminals, flat washers of large area and approved steel shall be used.

ALL STRAIGHT JOINTS THROUGH INSULATED TUBE LUGS –CRIMPED

Only certified wiremen and cable jointers shall be employed to do jointing work. All wires and cables shall bear the manufacturer's label and shall be brought to site in original packing. For all internal wiring, PVC Insulated wires of 650 V grade shall be carried out in loop system and no joints shall be allowed in the length of the conductors. If the use of joints/connections are unavoidable due to any reason prior permission, in writing shall be obtained from the Consultants / Clients. No wire shall be drawn into any conduit, until all work of any nature, that may cause injury to wire is completed. Care shall be taken in pulling the wires into the conduits. The conduits shall be thoroughly cleaned of moisture, dust, dirt or any obstruction by forcing compressed air through the conduits. The minimum size of PVC Insulated copper conductor wires for all sub-circuit wiring for light points shall be 1.5 Sq.mm.

LOAD BALANCING

Balancing of circuits in three phases installation shall be planned before the commencement of wiring and shall be adhered to.

CIRCUIT WIRING

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Lights, 5A sockets, Ceiling fans and Ex-haust fans may be wired on a common circuit. Such circuit shall have 10 points of light, ceiling and ex-haust fan and socket outlets or a load of 800 watts, whichever is less. A switch board might have more than two circuits but should be of same phases.

The following shall be deemed to be included in the point wiring: -

- a) Switches and Manufacturing mounting box.
- b) Ceiling rose or terminal connector as required
- c) Bushed conduit, G.I.Sleeves where cables or pipes passes through wall etc.
- d) Earth wire from three pin socket outlet point/fan regulator to common earth including earth drolley except the earth wire from the first tapping point of live wire to the final distribution board.
- e) All fixing accessories such as clips, rails screws, rawl plugs, wooden plugs etc. as required.
- f) Connections to ceiling rose, connector socket outlet, lamp holder, switch and fan regulator etc.
- g) Looping the same switch board interconnections between points on the same circuit.
- h) Providing fish wire in conduits while recessed circuiting work undertaken.

The Chases in the wall shall be neatly made and in ample dimensions to permit the conduit to be fixed in the manner desired. In case of buildings under construction, conduits shall be burried in the wall before plastering. These shall be grouted and covered with cement and mortar, neatly finished at the plane of the unplastered brick work and stratched for providing key to the plaster and cured. Under no cificumstances, finished plastered surfaces shall be allowed to be chased for the conduit work. Before taking up chasing of the wall, the routes shall be marked and got approved by Consulants. In case of exposed brick / rubble masonry work, special care shall be taken to fix the conduit and accessories in position along with the building work.

COLOUR CODING OF WIRES

Colour coding of wire shall be carried out as detailed below:

PHASES	RED
	YELLOW
	BLUE
NEUTRAL	BLACK (OR) GREY
EARTH	GREEN

The minimum diameter of the conduits shall be 25 mm. only.

The following sizes of PVC insulated multi stran8ded copper conductor wires shall general be followed throughout:

- a. From the final switch to

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	individual outlets (Phase, Neutral and Earth)	1.5 sq.mm
b.	From Distribution Boards to First Switch Board and subsequent switchboards	1.5 sq.mm
c.	All 15A socket (Only Phase & Neutral)	4.0 Sq.mm.
d.	Earth wire throughout for Lighting.	1.5 Sq.mm.

Conduits for power and lighting shall be separate and shall not be mixed. All Control switches (5 AMPS & 15 AMPS Capacity) used in point wiring, whether surface mounted or concealed type shall conform to IS 3854 and carry ISI Mark distinctly. All switches and socket outlets shall be mounted in a suitable sized MS Box with ample space for connection and disconnection of wires. All socket outlets shall invariably have their third earth pin connected to main grounding /earthing grid.

SWITCHES AND ACCESSORIES

All switches shall be placed in the live conductor of the circuit and no single pole of fuse shall be inserted in the earthed neutral conductor of the circuit.

Single pole switches (other than for multiple control) carrying not more than 15Amps may be of the piano key type/moulded plat type and the switch shall be 'ON' when the knob is down.

The switch box shall be placed in the live conductor of the circuit and no single pole of fuse shall be inserted in the earthed neutral conductor of the circuit.

Single pole switches (other than for multiple control) carrying not more than 15 Amps may be of the piano key type/moulded plat type and the switch shall be 'ON' when the knob is down.

The switch box shall be made of metal on all sides, except on the front. In the cases of cast iron boxes wall thickness shall be atleast 3mm. and in case of welded mild steel sheet boxes the wall thickness shall not less than 18 guage for boxes upto a size 20 cms x 30 cm. above this size 16 guage MS boxes shall be used. Except where otherwise stated 3mm. thick phenolic laminated sheets shall be fixed on the front with aluminium alloy/ brass/cadmium plated iron screws as approved by Site Engineer.

To facilitate drawing of wires in the conduit, GI Fish wire of 16 SWG shall be provided while laying recessed conduit.

Point wiring shall include all works necessary to complete wiring of a switch circuit of any length from the tapping point on the distribution circuit to the following (via the switch).

- a) Ceiling rose or contractor (in the case of ceiling / exhaust fan points)
- b) Back plate (in case of flourescent fitting with down rods etc).
- c) Socket outlet (in the case of socket outlet points)
- d) Lamp holder (in case of wall brackets, bulk head and similar fittings).
- e) All civil works like chippiding, making good the damages, drilling holes in walls etc., are to be done by the contractor only.

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The following shall be deemed to be included in the point wiring: -

- a) Switch
- b) Ceiling rose or connector as required
- c) Any special or suitable round block for neatly housing the connector and covering the fan hook in case of fan point.
- d) Bushed conduit, MS.Sleeves where cables or pipes passes through wall etc.
- e) Earth wire from three pin socket outlet point/fan regulator to common earth including earth dolley.
- f) All wood or metal blocks, boards and boxes sunk of surface type, including those required for mounting fan regulator but excluding those under the main distribution switchgear.
- g) All fixing accessories such as clips, rails screws, rawl plugs, wooden plugs etc. as required.
- h) Connections to ceiling rose, connector socket outlet, lamp holder, switch and fan regulator etc.
- i) Looping the same switch board interconnections between points on the same circuit.
- j) Providing fish wire in conduits while recessed circuiting work is undertaken.

LENGTH PER POINT

The term "Length per point" in point wiring in the case of the fan and light points shall mean the distance between the switch and ceiling rose, connector or back plate, lamp holder depending upon the fitting, measured along the run of wiring irrespective of the number of wires in the run.

In the case of socket outlet points, the length shall mean the distance between the socket outlet and the tapping point of live wire on the nearest switch board.

MEASUREMENT OF POINT WIRING

Points on the basis of length per point inclusive of circuit mains shall be classified as under:

- a) Average point : Length per point not exceeding 10 M.
- b) Special point for Light, Fan and 5A socket outlet points : Length per point exceeding 10 M

The rate for average point shall be on a per point basis.

For special points, the extra length of wiring over and above the length of Meters specified shall be measured and paid for.

In case of points with more than one light point controlled by the same switch, they shall be measured on a set basis (i.e.) Two lights controlled by one switch shall be considered a set and so on. The distance between the first point and subsequent point shall not be more than 5 mts. In case of more than two lights controlled by one switch only the average distance between light points shall be considered.

ADDITIONAL CONSIDERATION FOR INTERNAL WIRING

The minimum size of pipe shall be 25mm. dia only. The wall thickness shall 2mm. only. The chases in the wall shall be neatly made and in ample dimensions to permit the conduit to be fixed in the manner desired. In case of buildings under construction,

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conduits shall be burried in the wall before plastering. These shall be grouted and covered with cement and mortar, neatly finished at the plane of the unplastered brick work and scratched for providing key to the plaster and cured. Under no circumstances finished plastered surfaces shall be allowed to be chased for the conduit work. Before taking up chasing of the wall the routes shall be marked and got approved by Engineer. In case of exposed brick/rubble masonry work, special care shall be taken to fix the conduit and accessories in position along with the building work.

05. EARTHING

The method adopted for system as well as equipment earthing shall be in accordance with the code of practice for earthing IS:3043-1966 and shall also comply with the relevant clauses of Indian Electricity Rules.

All non-current carrying metallic parts of various electrical equipment as well as cable armouring metallic conduit/GI pipe system, cable racks/ trays brackets, supporting structures etc. shall be effectively earthed. Earthing of medium and high voltage equipment shall be done by means of twoP separate earth conductors connected either directly to earth electrodes or to an earthing ring irrespective of use of armoured cable or metallic conduit/GI pipe.

The total earth resistance at any point of the earthing system for sub-station and main building shall not be more than 1 Mega ohms. However, for other areas, shall not exceed 5 Mega ohms.

Interconnections with electrodes shall be done with 16 mm.² PVC Insulated armoured copper cable with crimped sockets at a depth of 600mm. and shall be provided.

06. CLEARANCE AND SAFETY

For all switch boards, control panels, power control centres, a clear front space of not less than 1000 mm. shall be provided in front of the equipment. In case, where the equipment is provided with drawout unit, a minimum clearance of 2,000 mm shall be provided.

For all electrical equipment a minimum clearance headroom of 500mm shall be provided.

All motors located away from the feeding and control panels and for which control desk of posts are not within visible location, shall be provided with readily accessible and easily operated, locally mounted lockable type `stop' pushbuttons in the control circuits.

All electrical equipment operating on 415 V or higher voltage shall be provided with caution notice boards of approved type and shall be affixed permanently in a conspicuous position. Where a group of equipment is located within a switch / control room or within a fenced area, the notice board shall be fixed at the entrance.

Where a group of equipment is located within a switch / control room or within a fenced area, the notice boards of approved type and shall be fixed at the entrance.

All moving parts of the equipment which are exposed and liable to cause hazard to the operating and maintenance personnel shall be suitably protected by metallic guards.

In front of all the switch boards rubber mats shall be provided for personnel safety.

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Open type control panel or open type busbars shall not be installed inside the plant/ building.

07. TESTING AND COMMISSIONING

The inspection and testing shall be carried out in accordance with Indian Electricity Rules 1956 and IS 732 (PART – 3) Inspection and Testing of Installation by the Contractor in the presence of Architect / Engineer incharge's representative. In the event of defects being found , these shall be rectified as soon as practicable and the installation re-tested free of cost.

Some of the Test and Inspections to be carried out are: -

- a) General inspection of complete installation with respect to conformity with Indian Standards and Indian Electricity Rules.
- b) General workmanship (Earthing, cables, bolt, connections etc).
- c) Testing of Insulation Resistance of all cables and wires.
- d) Testing of Earth continuity path
- e) Testing of Polarity of Single Pole switches.
- f) Lighting circuits to be tested for resistance to earth in the following ' manner: -
 - i) All switches 'ON' with consuming devices in circuit
 - ii) All switches 'ON' with consuming devices removed the IR values between poles and E
 - iii) All switches 'ON' with consuming devices in position the IR between poles and E
- g) Testing the earth resistance of earth pits and full earthing grid as a whole.
- h) Test specified by manufacturer's for particular equipment.
- i) Check for 'DANGER BOARD' sign wherever required and shall be supplied and erected at free of cost.

All Panels and DBs shall be subjected to High Voltage Test (2500 Volts for one minute) and Megger Test and Test Report shall be submitted by the Contractor before despatch of the panel.

SAFETY CODE

The Contractor shall maintain in a readily accessible place first aid appliances including adequate supply of sterilised dressings and cotton wool.

An injured person shall be taken to a public hospital without loss of time, in cases where the injury necessitates hospitalisation.

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No portable single ladder shall be over 8 metres in length. The width between the side rails shall not be less than 30 cm. Clear and the distance between two adjacent rungs shall not be more than 30 cm. When a ladder is used an extra mazdoor shall be engaged for holding the ladder.

Every opening in the floor of a building or in a working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable encing or railing whose minimum height shall be one metre.

Workers employed on mixing and handling material such as asphalt, cement, mortar shall be provided with protective footwear and rubber handgloves.

Hoisting machine and tackle used in the works, including their attachments, anchorage and supports shall be in perfect condition.

The Consultants / Employer reserves the right to instruct the Contractors to take additional safety precautions if found necessary.

All workers shall be provided with helmet, Safety Shoes and Safety belts.