

**TENDER FOR PROPOSED CIVIL,
PAINTING & OTHER RELATED WORKS
IN GUEST HOUSE AT IMM BUILDING,
2ND FLOOR, COLABA , MUMBAI.
FOR THE ORIENTAL INSURANCE CO.LTD.MRO1**

**: PART - II :
: FINANCIAL BID :
Envelope No. II : FINANCIAL BID**

Date of Pre Bid Meeting : 26 / 02 / 2024 at 2.30 p.m.

Date of Tender Submission : 07 / 03 / 2024 before 3.00 p.m.

ARCHITECT : **RASHMIN BHANDARE**
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Total No. of pages : Include Technical Specifications ,BOQ :Total 24 No pages

: 1:

Seal & Signature of the contractor

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: IMPORTANT :

The Contractor should satisfy himself that no paper or document from this Sealed Document is missing while submitting this tender consisting of 1 to 24 pages

Tender issued to

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Issued by :

The Dy. General Manager,
The Oriental Insurance Co.Ltd.
MumbaiRegional office No.1
Estate & Estb. Dept.
7,J.Tata Road,Churchgate,
Mumbai 400 023.

:2:

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: RECOMMENDED BRANDS :

NOTE :

The Contractor shall quote for the best of the materials as specified below with ISI mark wherever applicable. The Contractor shall obtain prior approval from the Employer / Consultant before placing order from the Specific materials agencies. In case of non-availability of any of the approved / specified materials / agency during / the execution of works. The owner / consultant may approve suitable equivalent brand / agency and his decision shall be final and binding on the contractor and the price variation if any shall be adjusted accordingly.

1.	Cement (43 Grade)	:ACC, L & T, Narmada / Roffe/ Ambuja
2.	Sand	: River sand
3.	Epoxy resin + hardner	:Hindustan ciba geigy / Dr Beck
4.	Integral Waterproofing Compound	:Impermo, Roffee, Pidiproff
5.	Super Plasticiser	:Supercon 100 / Conplast 211
6.	P.V.C. Pipes & Fittings	:Supreme, Prince
7.	C.I. Pipe & Fittings	:Neco
8.	G.I. Pipes	:Tata / Zenith
9.	G.I. Fittings	:Kirti Brand / Unik
10.	Taps & Valves Chromium plated fittings & Fixtures	: ISI Jaguar
11.	Polysulphide sealant	:Choksi Chemicals
12.	Wall tiles	:Kajaria / Johnson / Bell / Varmora
13.	White Cement	:J.K. / Birla
14.	Non slippery Vitrified Floor tiles	: Asian / Nitco / Johnson
15.	Toilets Fittings	: Nycer / Paryware / Hindware
16.	Exterior Emulsion Paint	: Asian / Nerolac / 9-Flex

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17.	Synthetic Enamel Plastic emulsion/ Oil Bond distemper	:	Nerolac, Berger, Asian, ICI
18.	Exterior Paint	:	Excel / Apex / 9 Flex
19.	Waterproof Coating	:	POLYALK WP of Sunanda Chemicals.
20.	Cables ISI	:	Polycab / Asian / CCI
21.	MCB & DB	:	M.D.S. / HAGER / Seimens
22.	PVC insulated wires ISI	:	V Plast / Sundeeep / Polycab / Pyroflex / Vinay
23.	Wooden Screws	:	Nettlefolds
24.	S.F.U.S. with fuses (H.R.C.)	:	Crompton / L & T
25.	E.L.M.C.B. (RCCB)	:	M.D.S. / HAGER / Seimens
26.	Telephone wiring	:	Delton / Finolex / Vinay
27.	Conduits	:	Precision (ISI) / Circle arks
28.	Cable Luggs	:	Dowells
29.	Cable gland	:	Braco / Comet / H.M.I.
30.	Spot light	:	Geminy Global / Liberty
31.	Fan Regulator	:	Anchor
32.	Switch board	:	Sunwood
33.	Switch & Sockets	:	Anchor/ Vinay (Corum)
34.	Casing capping	:	Precision
35.	Ind. Switch socket	:	MDS / Crompton
36.	Fixtures, Fittings etc.	:	Philips / Crompton / Wipro

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SR. NO.	MATERIAL	APPROVED MANUFACTURERS / SUPPLIERS
01.	Glass	Modi guard float glass
02.	Aluminium false-ceiling	Supersil
03.	Glass wool	Fiber glass pilkington
04.	Fire Retardant Paint	Fire Tard
05.	Wood Preservative	Bison by British Paints, Termiseal by PCI
06.	Locks	Godrej, Vision, Laxmi, Vijayan.
07.	Door closer / Floor springs	Garnish, Everite, Harden.
08.	Chairs	Godrej Make ONLY
09.	Paint	ICI (Dulex – duco), Asian Paints, Goodless Nerolac.
10.	Adhesive	Fevicol SH for Woodwork ,Plywood & Laminate
11.	Hardware	Shalimar, CIEF, Vision
12.	Screws	G.K.W., Nettle fold
13.	Soft Board	Jolly Board
14.	Laminate	Signature / Sunmica (1mm thick)
15.	Gypsum Board (false-ceiling)	India Gypsum Limited .
16.	Teak wood based particle board	Nova Teak Super by Indian plywood Mfg Co
17.	Commercial Plywood / block board	Century , Samrat ,Anchor
18.	Teak Veneer	Century, Samrat , Anchor
19.	Marine plywood BWR GRADE IS 303	Century / Samrat
20	Aluminum framework	Jindal

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: TECHNICAL SPECIFICATIONS FOR ELECTRICAL WORK :

1.0 DISTRIBUTION BOARDS :

- 1.1 SCOPE : This specification covers design, manufacture, testing and commissioning of the Dist. boards.
- 1.2 STANDARDS : The design, manufacture and testing of the distribution board shall comply with the latest issue of the following standards :
- a) IS : 2675 : Specification for enclosed distribution fuse boards and cut-out for voltages not exceeding 1000 volts.
 - b) IS : 4237 : General requirements for switch-gear and control gear for voltages not exceeding 7000 Volts.
 - c) IS : 4047 : Specification for heavy duty air break switches and composite units of air break switches.
 - d) IS : 2208 : Specification for HRC fuse links upto 650 Volts.
 - e) IS : 375 : Specification for marking and general arrangement for switch-gear, busbar, main connection and auxiliary wiring
 - f) IS : 1897 : Specification for copper bus bars.
 - g) IS : 2147 : Degree of protection provided by enclosure for low voltage switch-gear

1.3 CONSTRUCTION :

- a) Distribution boards shall be metal cubicle type wall / floor mounting type. It shall be totally enclosed, completely dust-proof and vermin-proof.
- b) Sheet steel work shall be of high quality and shall be free from burrs.
- c) The sheet steel used for the body and doors shall be at least 1.6mm thick.
- d) The design shall be based on modular construction. Barriers shall be provided between the modules as well as between vertical and horizontal busbars and the modules.
- e) Distribution board shall be extensible on both the sides and shall be uniform in height.
- f) The distribution board shall have a covering at the bottom and top so that entry of dust and vermin is prevented.
- g) Each module shall have an independent hinged door with concealed type hinges. Each door shall be provided with gasket to make the equipment dust tight. Each door shall be provided with insulated quick turn.
- h) Adequate space shall be provided in each module for termination of cables.
- i) The design shall be dead front type. No live components shall be mounted on the door. All the components such as switches, fuses etc. shall be mounted on the rear plate of the module, or with suitable mounting brackets as required.
- j) Door interlock shall be provided with every door so that it shall not be possible to open the door with the switch in closed position.

1.4 BUSBARS :

- a) Three phase and neutral copper busbars of hard drawn high conductivity tinned copper shall be provided. The current density in the busbars shall not be more than 160A/Cm². Neutral busbars rating shall not be less than 50% of the phase busbar.
- b) The busbar chamber shall have screwed on sheet steel removable covers with gaskets.
- c) Copper earth bus, to suit the system fault level shall be provided for entire length of distribution board.
- d) The copper busbars shall be run, one set for each panel.
- e) The busbars supports shall be non-hygroscopic ant tracking material. Busbar supports shall be provided at every 300mm. apart on as directed by Engineer in charge.
- f) Bolted joints shall be provided with couch screws, spring washers, lock nuts etc. for ant vibration. The bolts shall either be of Brass or cadmium plated type.

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1.5 WIRING AND TERMINALS :

- a) Flexible copper wires of suitable current rating and of 1100/600 V. grade shall be used for internal wiring. Lugs shall be used for terminating these wires. The lugs shall be fitted by crimping method only.
- b) Elmex type terminals blocks shall be provided where upto 35 mm 2 cables are to be terminated.
- c) For termination of cables of sizes higher than 35 mm 2 terminals in the form of copper busbar pieces shall be provided.

1.6 WIRE-WAYS :

- a) Vertical wire-ways of adequate capacity shall be provided for clamping and accommodating all outgoing cables including provision for future requirements.
- b) The wire-ways shall have hinged door with concealed type hinges and non-aging material gasket. The door shall have insulated quick term screws.
- c) Clumping facility shall be provided in the wire-ways for clamping outgoing cables.
- d) Adequate shrouds shall be provided to prevent accidental contact with outgoing terminals.

1.7 CABLE ENTRY :

- a) Cable entry for all the feeders shall be from top / bottom. Cables and base of adequate size to be provided wherever required.
- b) Removable sheet steel gland plates shall be provided. Holes for appropriate sizes of cables glands shall be made at site.
- c) Compression type brass plated cable glands shall be provided.

1.8 SWITCHES :

- a) The switches shall be heavy duty type and shall be suitable for heavy duty / motor duty.
- b) The switches shall be 3 pole and neutral units / triple pole as required.
- c) Shrouds shall be provided for the incoming live terminals.
- d) The terminals shall have spring washers.
- e) ON - OFF mechanical indicators / switch position marking shall be provided.
- f) Locking facility shall be provided.
- g) The switches shall be operable from front.

1.9 FUSES :

- a) The fuse links shall be per relevant ISI standards.
- b) Two nos. fuse pullers shall be supplied at each panel location and suitably mounted on wall.

1.10 INSPECTION AND TESTING :

a) Inspection :

The inspection shall consist of following, but shall not be limited to the same :

- i) Appearance and construction
- ii) Dimensions mounting details etc.
- iii) Feeder arrangement and feeder details
- iv) Door alignment, gaskets etc.
- v) Alignment of switch drive and handle.

b) Tests :

The following tests shall be carried out :

- i) Insulation resistance.

The insulation resistance shall be measured between phases, between phases & neutral and between phases and earth.

The insulation resistance shall be measured with 10000 Volts megger., both before and after the high voltage power frequency test. The insulation resistance shall not be less than (three) megaohm in any case.

- ii) High Voltage Power frequency test :

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This test shall be carried out by applying a Voltage of 2.5 K V for one minute.

- a) between all the three phases and earth.
- b) Between the phases.
- c) between phases and neutral

iii) If the results of inspection and tests are not satisfactory, the defects shall be rectified and tests shall be repeated to entire satisfaction of Engineer-In-charge without, any extra charge to Engineer-in-charge / owner. The inspection and test results shall be submitted, in quadruplicate for Engineer-in-charge approval.

1.11 DRAWINGS & GUARANTEED TECHNICAL PARTICULARS

The following shall be submitted, in quadruplicate for Architects approval, before taking up the fabrication.

a) Guaranteed technical particulars for :

- i) Switches
- ii) HRC fuses & fuse bases
- iii) All insulations such as busbar supports.
- b) Drawings :
 - i) Assembly drawing - This should incorporate dimensions, weight and feeder arrangement.
 - ii) Foundation Drawing.
 - iii) Insulation instructions
 - iv) Maintenance instructions, spare parts catalogues for components.

1.12 PAINTING :

All steel work shall undergo a process of degreasing pickling in acid bath, phosphatising. This shall be followed by two coats of primer and two coats of final finish paint, both applied with spray. The colour shade shall be got approved before painting.

1.13 LABELS :

Engraved PVC / Black Anodised labels shall be provided on all the incoming and outgoing feeders.

2.0 FUSE, DISTRIBUTION BOARDS & ISOLATORS.

2.1 SCOPE :

The scope of work shall cover the supply, installation, testing and commissioning of fuse, distribution boards and isolators. Associate minor civil work required for the erection of the DB's and isolators are included in the scope of this contract.

2.2 STANDARDS :

The following standards and rules shall be applicable -

- IS - 2675 : Enclosed distribution fuse boards and cutouts for voltages not exceeding 1000 V.
 - IS - 2607 : Air-break isolators for voltages not exceeding 1000 V.
 - IS - 375 : Marking and arrangements of switch-gear, busbars, main connections and auxiliary wiring.
- Indian Electricity Act 1910 and rules issued there under.

2.3 CONSTRUCTION :

- a) Fuse distribution Board along with the controlling switch fuse unit or isolator shall be fixed in an M.S. box with hinged lockable door suitable for wall mounting. Distribution boards shall be made of 16 SWG sheet steel. Three phase boards shall be made of 16 SWG sheet steel... Three phase boards shall have phase barriers and a wire channel on three sides. Conduits knockouts shall be rendered dust and vermin proof with necessary sealing gaskets.
- b) Fuses shall be HRC link type only with necessary fuse carriers and with a minimum short circuit rating at 25 KVA.
- c) Isolators shall be fixed on self-supported angle iron frame or mounted inside a recessed mounted sheet steel enclosing with hinged front cover as required, and as directed by Engineer-in-charge.
- d) Painting, earthing and labels shall be provided as indicated for power panels as shown on drawings.

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2.4 INSTALLATION & TESTING :

- a) All distribution Boards and Isolators shall be mounted on necessary angle iron frame work. All mounting frames shall be prime coated with two finish coats after the completion of work. All distribution boards shall be touched up for damaged printing.
- b) All boards shall meggered phase to phase and to neutral and phase to earth using a 1000 V. megger with all switch-gear in closed position. The megger values should not be less than 25 megohms between phases and 15 megohms between phase and neutral, and between phases and earth.
- c) Fabrication drawings of all the boards shall be approved by the Engineer-in-charge before the fabrication.

2.5 MODE OF MEASUREMENT :

- a) The distribution board / isolator complete with the various components specified including supporting frame, erection etc. will be treated as one unit for purpose of measurement and payment.
- b) Earthing of the boards from the equipment earthing system will not be a part of the unit for purpose of measurement.

3.0 LIGHTING DISTRIBUTION BOARD :

3.1 SCOPE :

The specification covers design, manufacture, testing and commissioning of lighting distribution boards.

3.2 STANDARDS :

- IS - 2675 : Specification for enclosed distribution fuse boards and cut-outs for voltage not exceeding 1000 V.
- IS - 4237 : General requirements for switch-gear and control gear for voltages not exceeding 1000 V.
- IS - 375 : Specification for marking and general arrangement for switch-gear busbars, main connection and auxiliary wiring.
- IS - 2147 : Degree of protection provided by enclosure for low voltage switch-gear.
- IS - 4064 : Heavy duty fuse switch units
- IS - 8828 : Miniature Circuit Breakers
- IS - 9224 : High Rupturing Capacity fuse links.
- (BS - 3871 - pl) : Specification for Miniature Circuit Breakers

3.3 CONSTRUCTION :

- a) Lighting distribution board shall be cubical type suitable for wall mounting or recessed mounting. It shall be totally enclosed, completely dust-proof and vermin proof.
- b) Sheet steel work shall be of high quality and shall be free from burrs.
- c) Sheet steel used for the body and door shall be at least 2 mm. thick, while the base angle / sheet shall be at least 3mm. thick.
- d) Lighting distribution board shall have one hinged door which will cover the entire front portion. The door shall be provided with gasket, to make the equipment dust, tight and also with insulated quick turn screws.
- e) Design shall be dead front type. No live components shall be mounted on the door.
- f) Adequate space shall be provided for termination of aluminium / copper cables and wires.

3.4 BUSBARS :

- a) Phase and neutral copper busbars shall be provided at the top, for the entire length of the lighting distribution board.

3.5 WIRING & TERMINAL :

- a) The Lighting distribution board shall be factory wired.
- b) Flexible copper wires shall be used for internal wiring.
- c) El mex type terminal blocks shall be provided for all the outgoing phase wires.
- d) For neutral terminals brass neutral terminal block shall be provided. It should have spare capacity of at least 10%

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3.6 CABLE ENTRY

- a) Cable entry for in-comer shall be from bottom / top but entry for outgoing circuits shall be from top.
- b) Removable sheet steel plated shall be provided for conduit entry / cable entry.
- c) Compression type plated brass cable gland shall be provided for the incoming / outgoing cables.

3.7 MINIATURE CIRCUIT BREAKERS :

- a) Bakelite shrouds shall be provided for all the live terminals and only dollies shall project outside for operation.
- b) The dollies shall be made of phenolic material. The dollies made of nylon material shall not be accepted.
- c) The MCB housing shall be made of melamine powder.

3.8 EARTHING :

Two non earthing terminals shall be provided, on either side of the lighting distribution board.

3.9 INSPECTION AND TESTING

a) Inspection :

The Inspection shall consist of following, but not limited to the same :

- i) Appearance and construction
- ii) Dimension, mounting details etc.
- iii) In-comer and outgoing circuits details
- iv) Door alignment, gasket etc.

b) Testing :

The following test shall be carried out

i) Insulation resistance :

The Insulation resistance shall be measured between phases, between phases and neutral and between phases and earth.

The insulation resistance shall be measured with 1000 Volt meggar, both before and after the high voltage power frequency test. The Insulation resistance shall not be than two megachms in any case.

ii) High voltage power frequency test :

This test shall be carried out by applying a voltage of 2.5 KV for a minute.

- a) between all three phases and earth
- b) between phases
- c) between phases and neutral

3.10 DRAWINGS & GUARANTEED TECHNICAL PARTICULARS :

The followings shall be submitted for consultants approval

- a) Guaranteed technical particulars for Miniature Circuit Breakers.
- b) Assembly drawing - This should incorporate dimensions weight and MCB arrangement.
- c) Mounting details

3.11 PAINTING :

All steel work shall undergo a process of degreasing, picking in acid bath, phosphatising. This shall be followed by a coat of primer and two coats of final finish paint, both applied with spray.

3.12 LABELS :

Engraved PVC/Black Anodised labels shall be provided on all the incomer and outgoing circuits.

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4.0 CABLING :

4.1 SCOPE :

This specification covers supply, testing, erection and commissioning of cables as detailed under Bill of Materials.

4.2 CABLING :

a) Power Cables :

The L. T. Power Cables shall conform to I.S. 1554. The conductor shall be of copper / aluminum PVC insulated , PVC sheathed steel armoured. The cables shall be suitable for grounded neutral system and shall be of 1100 volts grade. The conductor size and no. of cores shall be as specified.

b) Control Cables :

The control Cables shall conform to I.S. 1554. The conductor shall be of copper, PVC insulated, PVC sheathed 1100 volts grade, the conductor size shall not be less than 2.5 sq mm. unless otherwise specified. The number of cores shall be as specified.

4.3 CABLE ACCESSORIES :

a) The cable glands shall be compression type plated brass. They shall be complete with neoprene rubber rings, two nos. galvanised M.S. washers, lock nuts etc.

b) Cable Terminator :

Cable lugs shall be used for stranded conductors, cable lugs shall be fitted by Crimping method only. The oxide inhibiting compound shall be used for removal of oxide film on the conductor. Tinned copper lugs shall be used for cables upto 35 mm² and aluminium lugs shall be used for higher sizes.

c) 25mm x 3 mm G.I. / Aluminium strips, galvanised nuts, bolts and flat washers shall be used for cable clamping.

d) G.I. / Aluminium cable tag markers shall be used for identification of the cables. The cable nos. shall be punched on the tag markers. 16 SWG G.I. wires shall be used for fixing the cables tag markers.

4.4 ERECTION

a) Before cable erection, phase to phase. phase to neutral and phase to earth insulation and continuity of the conductor shall be ascertained.

b) Sharp bends shall be avoided. The bending radius shall not be less than 12 X diameter of the cables for L.T. cables.

c) The cables shall be clamped at every 600mm.

d) The cable tag markers shall be fixed at every 10m. and at strategic locations, as directed by the Engineer in charge.

e) Holes of appropriate sizes shall be drilled on cable glands plates of the D.B. for cable / conduct entry and exit. The paint around the holes shall be scraped before fixing the cable glands. The amounring strands shall be cut, bent and clamped between G.I. washers, after glanding the cable shall not slip.

f) Solid conductor shall be tinned before terminations.

g) The workmanship in end termination and glanding shall be excellent.

h) Cables shall be laid in the routes marked in the drawings. Where the route is not marked, the contractor shall mark it out on the drawings and also on the site and obtain the approval of the Architect / Consultants before laying the cable.

Procurement of cables shall be on the basis of actual site measurements.

4.5 UNDERGROUND CABLES :

Cables shall so laid that they will not interfere with other underground structure / services. L.T. cables shall be laid after excavating a trench of uniform depth of 750mm. and wide enough for laying the number of cables. A layer of bricks shall be laid on the sides of the cables and then the trench shall be refilled with sand and earth 1/2" thick cast iron galvanised a RCC pipe of 150mm. dia. shall be provided. The pipe shall be laid to a depth of 1 Mt. below the surface of the road. The pipe shall be laid to prevent choking.

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4.6 SITE TESTS :

The following tests shall be carried out :-

a) Continuity Test :

The continuity shall be established with multimeter.

b) Insulation Resistance Test :-

The insulation resistance shall be measured between phases, phase to neutral and phase to earth before and after high voltage power frequency test.

c) High voltage power Frequency Test :-

This test shall be carried out for providing phase to phase insulation, phase to neutral and phase to earth insulation. The cables should withstand the appropriate voltage for one minute.

5.0 EARTHING :

5.1 SCOPE : The scope of work under this section covers the earthing of various panels. DB's and utilisation equipments.

5.2 STANDARDS :

The following standards and rules shall be applicable :-

- a) IS - 3043 / 1966 Code of Practice for earthing.
- b) Indian Electricity Act. 1910 and rules issued there under.

5.3 PLATE ELECTRODES :

Plate type earth electrodes shall be provided at the location shown on drawing. The plate size shall be 600 x 600 x 3mm. tinned copper plate. The minimum depth, type of electrodes, soil treatment shall be in accordance with I.S. Code 304 / 1966 complete with masonry watering pipe, G.I. cover etc. The number of earthing stations shall be as shown on the drawings, and as directed Engineer-in-charge.

5.4 EQUIPMENT EARTHING :

- a) 3 phase motors and other 3 phase apparatus shall have two distinct earth connections of size equal to 50% of the connecting cables.
- b) For 1hp. motors and 1hp. apparatus, the single earth connections shall be provided. For all light fittings and fans a single earth connection with 1.5 mm² copper shall be provided.

5.5 EARTH CONTINUITY CONDUCTORS :

- a) Metallic conduit shall not be accented as an earth continuity conductor. A separate copper earth continuity conductor of size of 50% of phase conductor or 16 SWG copper wire whichever is more shall be provided.
- b) The earth continuity conductor shall be clamped to the conduit at one meter intervals using approved copper earth clamps. Binding wire is not accepted as a sub.....for earth clamps.

5.6 SIZE OF COPPER STRIPS / WIRES FOR EARTHING :

Earthing of cable boxes shall be carries out as under :

S.No.	Size of Cable	Size of copper strip / wire
1.	a) 10 Sq. mm/4 core b) 16 Sq. mm/4 core c) 25 Sq. mm/3 core d) 35 Sq. mm/3 core	2 Nos. of 8 SWG copper
2.	a) 50 Sq. mm/3 core b) 70 Sq. mm/3 core c) 95 Sq. mm/3 core	2 Nos. of 4 SWG copper
3.	a) 100 Sq. mm/3 core b) 150 Sq. mm/3 core c) 185 Sq. mm/3 core	2 Nos. of 25 x 3 mm copper

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4. a) 225 Sq. mm/ 3core
b) 300 Sq. mm/3 core
c) 400 Sq. mm/3 core
d) 500 Sq. mm/3 core

2 Nos. of 25 x 6 mm copper
or as directed by Architects.

Earthing of following equipments shall be done with two number copper strips of size specified in schedule from Ring Main earthing tapped at different places.
HT Switch-gears, LT Switch-gears & Panels and Transformers.

Ground equipments :

Ground wire / strip shall either terminate on ground lugs provided on the equipments or shall be fastened to the foundation bold and the frame of equipment.

All conduits shall be grounded with approved proper size certain flexibility in its connection to the equipment.

Suitable size of sleeves required in the wall column etc. taking earth strips across them shall be provided by the electrical contractor during the civil construction. After laying the earth strip, the sleeve shall be properly sealed.

5.7 ERECTION :

a) Joints : The joints of earthing conductors shall be brazed, bolted or welded. Welded surface shall be painted with red oxide and then aluminium painted.

b) Termination : Where the diameter of the bold, at the joints, exceeds one quarter of the width of the earth continuity, the connection shall be made with a wider piece sandwiched between the two conductors.

c) Cable / Earthing conductors supports :

i) Cables / earthing conductors shall be fixed on walls / cable racks.

ii) Cable racks shall be fabricated from folded section (40 x 40 x 5 angles and 25 x 3 flats) and they shall rest and be supported on steel supports, located approx. at 3 M. apart and at salient points. The cable racks shall be painted with two coats of red oxide primer and two coats of paint of deep battleship gray colour.

iii) If the cables / earthing conductors are run along the wall, M.S. galvanised or Aluminium of suitable size spacer (25mm x 30 mm thick) shall be provided at every 600mm. The spacer shall be fixed with good quality rawl plugs and G.I. screws.

5.8 SITE TEST :

The following earth resistance values shall be measured with an approved earth meggar and recorded : -

1. Each earthing station.
2. Earthing system as a whole.
3. Earth continuity conductors.

5.9 MODE OF MEASUREMENT :

a) Providing an earthing station, complete with excavation electrode watering pipe, soil treatment, chamber etc. shall be treated as one until of measurement.

b) The following item of work shall be measured and paid at unit rates covering the cost of the earth wires / strips clamps, labour etc. :-

i) Main equipment earthing grid and connections to earthing stations.

ii) Connection to the power panels, distribution boards etc.

c) The cost of earthing the following items shall become part of the cost of the item itself and no separate payment for earthing shall be made.

i) Motors - earthing forming part of the cabling / wiring for the motors.

ii) Isolating switches and starters - should form part of mounting frame, switch starter etc.

iii) Light Fittings - form part of installation of light fittings.

iv) Conduit wiring and cabling - should form part of the wiring of cabling.

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6.0 **LIGHTING INSTALLATION :**

6.1 **SCOPE :** The specification covers supply, erection, testing and commissioning of lighting fixture plug point etc. as detailed under bill of materials.

6.2 **STANDARDS & CODES :**

The design, manufacture, erection, testing and commissioning shall comply with, but not limited to the latest issue of the following :

- IS - 1937 (Part - III) : Specification for rigid PVC conduit for Electrical wiring.
- IS - 694 (Part - I) : PVC insulated cables with copper conductors for voltages upto 1100 V.
- IS - 732 : Code of Practice for wiring installation (voltage not exceeding 650V
- IS - 1646 : General code of practice for fire safety of building - electrical installation

- IS - 3043 : Code of Practice for Earthing, Indian Electricity rules and Fire Insurance Regulations.

6.3 **CONDUIT WIRING :-**

- a) All conduits and wiring shall be completely open. Outlet junction boxes, inspection boxes shall be provided on the surface.
- b) All conduits wiring shall conform to IS - 9537 (Part III) and shall be rigid PVC conduit accessories shall be PVC grip type. No. PVC conduit less than 20mm dia shall be used.
- c) Conduit pipe shall be jointed by means of couplers and accessories only. In long distance straight runs of conduit, inspection boxes at reasonable intervals shall be provided.
- d) The outer surface of the conduit pipes including all bends, unions, tees, junction boxes etc. forming part of the conduit system, shall be adequately supported.
- e) All necessary bend in the system shall be done by bending pipes or by using standards bends, for diversion purpose pipes shall be bent.
- f) At least 18 SWG G.I. wire shall be laid through the conduit to enable to pull the wires through the conduit.
- g) The conduits for concealed wiring in slab or in R.C.C. wall shall be tied to the reinforcement bars by M.S. Galvanised wires at suitable places to give the conduits rigidity. Before installing conduits junction boxes and inspection boxes in the brick-wall, a chase shall be made. This work is done before plastering of the walls is done and shall be co-ordinating with the other agency. After installing the conduits the chase shall be closed and shall be finished flush with the wall.
- h) The junction boxes and inspection boxes and switch boxes shall be temporarily blocked by jute, before the concreting is done and shall be co-ordinating with Architects. After concreting is over, all the boxes shall be cleaned if they are choked up by concrete.
- i) Separate earth wire of 14 SWG copper shall run along with each conduit for earthing externally. Conduit shall not be used as a earth medium.
- j) The conduit of each circuit or section be completed before conductors are drawn in. The entire system of conduit after erection shall be tested for mechanical and electrical continuity throughout and permanently connected to earth.

6.4 **WIRE AND FLEXIBLE :**

- a) Single core PVC insulated 630 volts grade copper wire shall be used for wiring. The size of the conductor shall be as specified in the drawings but in no case it shall be less than 15 mm² for lighting circuit and 2.5mm² for power circuit. Three core PVC insulated and PVC sheathed flexible shall be used from junction box to lighting fittings / fan. The minimum size of flexible wire shall be 16/0.20mm. copper conductor. Black color insulated wire shall be used for neutral conductors. Coloured insulated wires of respective colours shall be used for phase conductor.
- b) The wiring shall be done in looping system. The phase conductor shall be looped at the switch-box for sub-circuit. The neutral conductor for sub-circuit can be looped either from switch box or from the light / fan / socket point. Twisted joints for looping are not acceptable.
- c) Straight through joints shall not be permitted on single core wires and flexible.
- d) Colored insulated wires of respective color shall be used for phase conductors and black colours insulated wires shall be used for neutral conductors.

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6.5 FITTINGS & ACCESSORIES :

a) Lighting Fixture - The lighting fixtures shall be as per the specifications enclosed. The lighting fixtures shall be of the type specified in the drawing. The mounting height and location shall be as specified in the drawing. The mounting height and location shall be as specified in the drawing. Unless otherwise specified, the mounting height shall not be less than 2.5m. The lighting fixtures shall be either supported vertically of mounted on bracket or suspended by a hook, as required.

b) Plug Points - (10 amp/20 amp metal clad type) only three pin socket outlets as per the specification enclosed shall be used. Every socket shall be controlled by a switch which shall be located adjacent to it at operable height and wiring for socket outlet on switch box shall also be included. The switch controlling the socket outlet shall be on the live side. The mounting and location shall be as specified in the drawing. Unless and otherwise specified, the mounting height shall not be more than 1.5 m. above floor level.

c) Switches - The switches shall be 5 amps. rating for lighting sub-circuit. The switches shall be single pole, plate type.

d) Switch Boxes - The switch boxes shall be totally enclosed made of sheet steel concealed type.

e) Attachment of fitting and Accessories - All the necessary materials for the mounting and operation of lighting fixtures, sockets, outlets etc. such as M.S. painted down rods brackets, ball and socket of approved make, M.S. painted down rods brackets ball and socket of approved make, M.S. painted junction boxes, terminals strips etc. shall be used.

6.6 INTER CHANGEABILITY :

Similar part of all the switches, pendants, brackets, conduits and accessories etc. of the same type shall be inter changeable.

6.7 EARTHING :

The earth shall conform to IS 3043 - 14 SWG copper wire shall be used for earthing and the conduit. The earthing wire shall be run continuously along the conduit. All the earthing wires shall be connected to the earth bus provided near the distribution board.

6.8 TESTING OF INSTALLATION :

Before the installation is put into service, the following tests shall be completed with :-

a) Insulation Resistance - The insulation resistance shall be measured by applying between earth and whole system of conductors or any section thereof. 500 volt D.C. for single phase system by means of a megger. The insulation resistance shall not be less than one megaohm.

b) Testing Earth Continuity Path - The earthing conductors shall be tested for electrical continuity. The electrical resistance of the same along with earthing lead from the connection with the earth electrode to any point, in any point in the earth continuity conductor in the complete installation shall be less than one ohm.

c) Testing of Polarity of single pole Switch - The test shall be made to verify that all single pole switches have been fitted between the phase conductors and light / fan / socket outlet.

6.9 MODE OF MEASUREMENTS :

a) Mains / Sub. Main Wires - Conduit wiring from lighting D.B. upto switch board and looping the phase conductor from one switchboard together as mentioned in the single line diagram shall be treated as main / sub-mains wiring respectively. This shall be run in a conduit separate from that of point wiring. The estimated length of the conduits for the circuits wiring has given in the schedule of quantities. This includes the length of conduits with different no. of wire viz. 2,4,6,8 etc.

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b) Point Wiring -

i) Point wiring shall include all work necessary to complete wiring of any length from the tapping point of distribution circuit to the following via. switch bell push :-

- * Junction box / ceiling rose for light / fan points.
- * Plug points
- * Lumi-sound indicator bell / bujjer.

ii) The following shall be deemed to be include in the point wiring :-

- * Switch / bell push and switch box (for switch fan regulator, bell push etc.).
- * Conduit and accessories such as bends, inspection bends, tees, junction boxes etc.
- * All fixing accessories for conduits and conduit accessories such as clamps, spacers, rawl plug, G.I. screw etc.
- * Wiring between switch / bell push and junction box / ceiling rose / plug point / lumisound indicator and wiring necessary between switch boards other than mains wiring shown in the drawing.
- * 14 SWG copper earth wire all along the conduit including clamps for the same.

c) Primary & Secondary Points - Where the lighting fixture are controlled from LDB directly, the entire wiring from LDB to the first fixture shall be treated as a primary point and with continuation of circuit from one point to another shall be treated as secondary point.

6.10 NOS. OF WIRES IN A CONDUIT :-

The maximum number of wires that may be laid in any conduit for circuit wiring or point wiring is given below :-

<u>Size of Wires</u>	<u>Size of conduits mm.</u>		
1.5sq. mm.	19	25.4	31.8
2.5sq. mm.	6	8	12
	4	6	10

6.11 MAKE OF ITEM :-

All the materials used in electrical works covered in this contract shall be as per the list of preferred makes. The contractor shall submit the list of items and their manufacture for Architect approval.

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: TECHNICAL SPECIFICATIONS:

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Note :

- a) Rate is inclusive of Scaffolding & carting away the debris from the site totally. Also all relevant permissions from Mumbai Municipal Corporation , Chief Fire Officer (CFO) , BEST for higher capacity meter or any other statutory bodies.
- b) Contractor to refer Technical Specifications thoroughly & visit the site before quoting all the following tender items in Bill of quantities. Contractor is requested to take photographs of existing premises before demolition & after completion of the work
- c) Only official Receipts payments will be made by the OICL .Any loss or damage to the Company's property during the progress of work shall be borne by the Contractor.
- d) guest house & Toilets are in working condition shall be used. Beside existing electrical / telephone & computer / Lan cabling ,water connection shall not be disconnected till the handing over the site without any extra charges.this please be noted
- e) Rate to include Removal of Existing loose ,existing electrical fittings & fixtures ,shifting of existing furniture, steel cabinets, cupboards or any other loose furniture which are required to be shifted on temporary basis on the same floor till the completion of the work and handing over the complete furnish premises to OICL

4) Polymer plaster to structural members :

- a) Chipping off loose cover of the concrete in damaged areas or honeycombed areas and exposing the reinforcement
- b) Applying two coats of Alkaline rust converting primer, Fevert on the reinforcement bars, including cleaning the reinforcement ,wire brushing to remove loose rust spalls with time intervals of one hour between the coat.
- c) Providing additional steel in distress areas including drilling & fixing it in desire position.
- d) Applying IPNET-RB to the Reinforcement in two coats with time interval of minimum 4 hours between each coat . 1st coat to be applied after 10 minutes of application of dry quartz sand over second coat of IPNET-RB when freshly applied.
- f) Applying epoxy latex based bonding agent EL Monobond on concrete as well as reinforcement before application of mortar.
- g) Applying polymer modified mortar in CM (1:3) With river sand with addition of 15% Monobond by weight of cement per bag. In layers not more than 15mm in one application of mortar including curing etc.complete.
- g) Applying polymer modified plaster with addition of 10% polymer in creating smooth surfaces.
- h) Erecting scaffolding / Props to carry out the above Polymer Plaster work

6) Injection Grouting in structural members:

- a) Drilling the holes in the RCC members where loose concrete is found upto 2" inside the concrete .
- b) Providing & fixing PVC nozzles inside the holes.
- c) External periphery of the hoies to be sealed by Polymer modified mortar
- d) Inject the cement slurry with waterproofing /polymer compound inside of RCC members
- e) After next day the nozzles upto the slab level to be cut gently.

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A) False Ceiling & Painting work

Repairs to existing Gypsum Board False Ceiling : Repairs to false ceiling with step down Gyp board false ceiling replacing Gypsum India Ltd. frame work if necessary which include g.i. perimeter / intermediate channel ,suspender ,g.i. cleats steel expansion fastener fixed to RCC ceiling, portion in grid pattern as per manufacturer's instructions. 12.5 mm thick Gypsum board sheets are fitted to the g.i. frame work with 4" x4" cove type step down false ceiling all around Rate to include 2 coats of plastic emulsion paint over a coat of primer with necessary surface preparation .Entire work to be carried out as per manufacturer's instructions.

2) Wall Paneling with paint finish :-

Providing & fixing paneling over the wall out of 18 Gauge Alum .framework of size 2"x1" @ 18" c/c both ways **OR** 2" x 1.5" @ 18" c/c both ways Frame work to be covered with 6mm thick Bisen Board as per the manufacturer's instructions and finish with side t.w.moulding of 3" x1" t.w. around and 2 coats of plastic emulsion paint of Asian / Nerolac make to walls over a coat primer with necessary surface preparation with pop,putty etc. complete in workmanship like manner. Paint to be applied as per the manufacturer's instructions.

3) POP Punning : Providing & applying 12mm thick POP leveling in line & level on the wall & ceiling surface in workmanship like manner Etc. complete.

4) Plastic Emulsion Paint: Applying 2 coats of plastic emulsion paint of Asian / Nerolac make to walls & ceiling over a coat of primer with necessary surface preparation with pop / Birla ,putty etc. complete in workmanship like manner.

4) Synthetic Enamel painting: Providing & applying 2 coats of enamel paint over a coat of red oxide/ anti rust primer to steel cabinets , steel cupboards Slotted angle racks & wooden surfaces etc. .with necessary surface preparation scrapping etc. .

8) Texture paint : Applying 2 coats Texture paint of Asian / Nerolac make to walls over a coat primer with necessary surface preparation with pop

B) ELECTRICAL WORK

2) Primary light point wiring

Supplying ,installation ,testing & commissioning of Light Point wiring using 2 Nos of 2.5 sqmm & 1no1.5 sqmm circuit wire through of 25/20mm PVC conduit with necessary accessories. All wires below the false ceiling must be concealed. Rate quoted must include the cost of switches ,concealed m.s outlet box, face plate and required accessories etc.
(Make MK/ ANCHOR ROMA /NORTH WEST)i)

3) Secondary Light point wiring

...do .. as item no.2 above but secondary light points are looped from single primary point i.e.on single point maximum 3 light will be looped together.

6) 15A Power point wiring :

P & F 15 A power point wiring using 2 x 4 sqmm in 1no1.5 sqmm circuit wire through of 25/20mm PVC conduit from power D.B. including earthing & circuit.

7) 6 A Plug point wiring :

Providing wiring for 5 pin 6 A switch socket outlet from Main DB to the primary point using 3 x 2.5sq. mm. Copper conductor wires in underfloor conduit upto 6 A socket outlet mounted on concealed m.s.outlets complete with 6 A single pole switch of approved make on partitions of cubicles / cabin / wall, above table top areas per the approval of the Architect. Max. 6 points to be looped in one circuit 25mm dia. rigid medium gauge PVC conduits to be used for wiring from floor junction box to power points on partitions.

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8) 5/15 plug pont wiring

Providing wiring for 5/15 A switch socket outlet from Main DB using 3 x 2.5sq. mm. PVC insulated copper wires upto 5/15 A socket outlet in underfloor trunking / rigid PVC conduit of 25mm dia. medium gauge ISI concealed in wall or & through partition of cubicles with 5/15 single pole switch & socket mounted on concealed m.s.outlets complete

Light Fittings & Fixture :

Supply, installation ,testing &commissioning of light fixture of their standard accessories and complete with connections '

1) 2 x36 w LED 2' x2' LED Light Fixtures consists of Electronic Ballast Crescent Recess mounted Mirror optic fitting with paralite louvers of Wipro / Crompton make with 4nos LED 36w lamps suspended from ceiling on m.s. rod with ball & socket arrangement.

2) 2 x 18 W Recess mounted down lighter fittings 8"x8" Low depth square down lighter with satin finsh reflector and ribbed diffuser with 2 nos 18w LED lamps and required accessories.

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: BILL OF QUANTITIES :

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Rashmin Bhandare Architect					
TENDER FOR CIVIL , PAINTING & THER RELATED WORKS IN GUEST HOUSE,AT IMM BUILDING,2ND FLOOR, COLABA, MUMBAI.					
FOR THE ORIENTAL INSURANCE CO.LTD. MRO 1					
Page 1/3					
Item	Description	Quantity	Unit	Rate (Rs.)	Rate (Rs.)
	SECTION A (Waterproofing to internal dampness,Bisen Board Panelling ,Polymer treatment And painting work) ENTIRE WATERPROOFING WORK to be carried out as per manufacturer's instructions only.				
1	Waterproofing to internal dampness of wall & ceiling :- (Rate to include carting away the debries away from the site)				
a	Removing existing paint on damage surfaces on walls & ceiling with wire brush.	3830	SFT		
b	Removing the existing putty till the existing plaster on walls /ceiling is visible	3830	SFT		
c	Applying watermix carefully with base coat & hardner (Dr.Fixit make)	3830	SFT		
d	Apply 2 coats of Dr.Fixit Damp Guard Damproof coating Classic after interval of 8 hours	3830	SFT		
	Total of waterproofing to internal dampness of wall & ceiling (Rs.)				
2	Bisen board panelling on wall abutting the external side of Entire Flat				
a	Providing & Fixing Alum. frame work 2"x1" @ 2'c/c	4388	SFT		
b	Providing & Fixing 6mm thick bisen board over the frame work finish with plastic paint	4388	SFT		
	Total of Bisen board panelling on wall abutting the external side(Rs.)				
3	Polymer treatment to structural members of Entire Flat				
a	Removing existing loose plaster on structural members	383	SFT		
b	Apply rustiside liquid on reinforcement	383	SFT		
c	Polymer treatment to existing structural members including waterproof plaster	383	SFT		
d	Removing extg. on damage loose plaster on brick wall & carry out cement plaster 1:4	248	SFT		
e	Applying Birla putty surface preparation on walls & structural members	248	SFT		
	Total of Polymer Treatment to Structural members (Rs.)				
4	Painting work of Entire Flat				
a	Plastic emulsion paint to walls & ceiling in all rooms include passage ,kit,& caretaker room	15080	SFT		
b	Enamel paint to grills, doors and wooden surfaces of all rooms include passage and kitchen and Caretaker room.	2471	SFT		
	Total of Painting work (Rs.)				
	SUMMARY OF WORK OF SECTION A OF ENTIRE FLAT			AMOUNT (RS.)	
1	Waterproofing to internal dampness of wall & ceiling of Entire Flat				
2	Bisen board panelling on wall abutting the external side of Entire Flat				
3	Polymer treatment to structural members of Entire Flat				
4	Painting work of Entire Flat				
	Total Amount (Rs.) (Rupees GST will be Extra				

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TENDER FOR CIVIL , PAINTING & THER RELATED WORKS IN GUEST HOUSE,AT IMM BUILDING,2ND FLOOR, COLABA, MUMBAI.FOR THE ORIENTAL INSURANCE CO.LTD.MRO1					
Page 2/3					
Item	Description	Quantity	Unit	Rate (Rs.)	Rate (Rs.)
	SECTION B (Repairs & & other related works)				
1	Living Room				
a	Repairs to existing Gypsum board false Ceiling for cut outs for light fittings	392	SFT		
b	Cove type Step down gypsum board false ceiling all around	122	RFT		
c	Making cut outs for light fittings in the False ceiling	10	Nos		
d	Light point wiring	23	NOS		
e	5Amps switch socket point	5	NOS		
f	Installation of down lights	5	NOS		
g	Bracket Lights	4	NOS		
h	Picture lights	5	NOS		
i	Ceiling Lights	14	NOS		
j	Hanging Decorative Chandelier	1	NOS		
k	Zero watts continuous strip lighting in cove type ceiling.	122	RFT		
l	Applying Birla putty to damage walls to have smooth surface to receive the paint.	1094	SFT		
m	Applying 2 coats of french polishing to doors , windows and wall unit.	464	SFT		
	Total of Electrical & other related works in Living Room (Rs.)				
2	Single Bed Room				
a	Repairs to existing Gypsum board false Ceiling for cut outs for light fittings	428	SFT		
b	Step down gypsum board false ceiling with moulding all around	122	RFT		
c	Making cut outs for light fittings in the False ceiling	10	Nos		
d	Light point wiring	18	NOS		
e	5Amps switch socket point	5	NOS		
f	Installation of down lights	5	NOS		
g	Bracket Lights	4	NOS		
h	Picture lights	4	NOS		
i	Ceiling Lights	10	NOS		
j	Applying Birla putty to damage walls to have smooth surface to receive the paint.	833	SFT		
k	Applying 2 coats of french polishing to doors , windows and wardrobe	284	SFT		
l	Servicing of all windows	JOB			
	Total of Electrical & other related works in Single Bed Room (Rs.)				
	SUMMARY OF WORK OF SECTION B		AMOUNT (RS.)		
1	Living Room				
2	Single Bed Room (Rs. x 3 NO BED ROOMS)				
	Total Amount of Section B include Living Room & 3 Nos Bed Rooms (Rs.) (Rupees GST will be extra				

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: Rashmin Bhandare Architect TENDER FOR CIVIL , PAINTING & THER RELATED WORKS IN GUEST HOUSE,AT IMM BUILDING,2ND FLOOR, COLABA, MUMBAI.FOR THE ORIENTAL INSURANCE CO.LTD.MRO1		
		Page 3/3
	GRAND SUMMARY OF SECTION A & B	AMOUNT (RS.)
1	TOTAL OF SECTION A	
2	TOTAL OF SECTION B	
	GRAND TOTAL AMOUNT OF SECTION A & SECTION B (Rupees GST will be Extra	

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