

Roads & Building Department
Government of Gujarat

Division _____

**TENDER
FOR
ELECTRICAL WORK**

Name of work _____

Estimated Cost Rs. _____

Date of Issue of Tender _____

Last Date of Receiving Tender _____

Name of Work _____

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Last Date of Receipt of Tenders by R.P.A.D. Dt. ____/____/____

OR

* Downloading of tender documents From date ____/____/____
Start & End Date upto date ____/____/____ Till ____; ____ hrs.

Issued to M/s. _____

Divisional Accountant / D.A.O.
Executive Engineer..

* (Only in case of Tender above Ten lakhs)

MEMORANDUM

1. Name of Work Rs.
2. Estimated Cost Rs.
3. Earnest Money 1% Rs.
4. Validity period of tender offered (90/120*) days from the stipulated date of receiving tender if tenders are invited off line and no modification shall be allowed after handing over the tender to postal authorities. In case of on line tenders, the validity period shall be counted from the date of opening on line tenders, in case of single cover system tenders and from the date of opening technical bid in case of two cover system tenders
5. Security Deposit -
 - (i) In the form of small Savings or Narmada Bonds or FDR of schedule bank (of minimum one year time limit) ... 2.5% Rs.
 - (ii) To be deducted from bills (Security Deposit)... 2.5% Rs.
 - (iii) Performance bond of schedule Bank ... 5% Rs.
(In case of tender estimating Rs. 30 lacs or more)
- Total ... 10% Rs.
- (6) Time limit Months

*** Strike out which ever is not applicable**

*Vide R & GD G.R. No. TNC-1088-1B/1 (13)/C dated 4/5/1993 & revised vide G.R. No. TNC-1088/1B/18/(13)-C, dated 31/8/94 & TNC-10-2013-3 (Part 1)-C dated 19-11-13 & TNC-10-2013-3 (Part 2)-C dated 20-11-13

Deposit furnished in the form of interest bearing document as per Item .4 (i) can further be extended for renewal if so desired and communicated by the Contractor in writing before one month from the date expiry date. Similarly Security Deposit deducted as the Item No.4(ii) can also be converted into interest bearing fixed term securities of schedule and Nationalised Banks, if so desired and communicated by the contractor in writing. The security Deposit will be released against Bank Guarantee as provided in Clause 3.8 of General Conditions of Contract..

Should this tender be accepted, I/We hereby agree to abide by and fulfill all the terms and provisions of the conditions of the contract annexed here to so far as applicable and in default thereof to forfeit and pay to Government in Office the sums of money mentioned in the said conditions.

(Receipt No. dated from the Government Treasury or Sub-Treasury at in respect of sum Rs. is forwarded herewith representing the earnest money + (a) the full of value of which is to be absolutely forfeited to Government should I/We not deposit the full amount of security Deposit specified in the above memorandum in accordance with Clause I of the said conditions, otherwise the said sum of above Rs. shall be refunded).

Date :

Place :

*Digital signature of the contractor

** Signature of the contractor

(Witness)*** (At the time of execution of contract document)

Name and Address (Occupation)

* Digital signature of contractor before submission of tender.

** Signature of the contractor at the time of execution of contract document.

*** Signature of witness to Contractor's signature at the time of execution of Contract document

The Above tender is hereby accepted by me on behalf of the Government of Gujarat

dated the day of 201

Signature of The Executive Engineer,
Division

Note : The normal rate of Security Deposit is 5 percent for works upto Rs. 30 lacs and further 5% as performance bond for works above Rs. 30 lacs. Out of 5% of Security Deposit 50% is payable at the time of acceptance of tender and the balance by deduction from progress bills.

1

Instructions to Tenderers

1. Tenders, sealed and marked on the outside for
"will be received by undersigned
Upto the _____ day of 200
in the form of "Tender for Electrical Works" hereto annexed
2. The tenderers shall state precisely in his tender the type and description of the materials, plant and stores he proposes to use for the work. If he proposes to use materials, plant or stores of other than Indian manufacture he must clearly state this in his tender, together with the name, manufacturer and of the country of origin of the same.
3. The officer with whom cash deposits are to be made, or to whom securities are to be endorsed in accordance with clause 3 of General Conditions of Contract for Electrical Works, is the Ex. Engr. _____
4. The work must be carried out in accordance with the General Conditions of Contract for Electrical Works, and the general specification for electrical works in Government building.
5. Plans may be seen, in the office of the Ex. Engr. _____
Division, _____
Department _____
6. The Governor of Gujarat does not undertake to accept the lowest or any tender.

Date: - 200

Executive Engineer

Original

Form of Tender for Electrical Works

Department

1. I/We do hereby tender to execute the whole of the work

Described in the accompanying tender for the several sums, and in the case of measured works, at the several rates, set forth in the tender hereto attached and signed by me/us and should this tender be accepted, I/We further undertake to complete the work within the time stated below reckoned for the date of acceptance of tender, namely,

2. I/We do agree and bind myself/ourselves to abide by and fulfil the general conditions of contract and the Special Conditions of Contract annexed to the Specification or in default thereof to pay to the purchaser, as reasonable compensation for such breach of such conditions, the sums of money mentioned in the said condition.

3. I/We further agree to make good at my/our own expense all defect in the installation which appear within twelve months from the date bringing the installation into beneficial use when such defects are due to defective workmanship or material executed or supplied by me/us.

4. I/We hereby declare that my/our near relative are not working in this Division or in its sub-division as an Ex-Engineer, Deputy Executive Engineer, Assistant Engineer, Additional Assistant Engineer, Overseer, Divisional Accountant, Store Keeper, Manager of Atithi/Vishram Gruha and in the circle as Superintending Engineer in addition for Panchayat Works not working nor having posting as Chairman of P.W. Committee or as incumbant in Jilla Panchayat at today.

Signature(s)

Dated at

The

Date of

200

The above tender is hereby accepted by me for and on behalf of the Governor of Gujarat.

Dated at

The

day of

200

Executive Engineer.

Form of Tender for Electrical Works

Department

1. I/We do hereby tender to execute the whole of the work.

Described in the accompanying tender for the several sums, and in the case of measured works, at the several rates, set forth in the tender hereto attached and signed by me/us and should this tender be accepted, I/We further undertake to complete the work within the time stated below reckoned for the date of acceptance of tender, namely,

2. I/We do agree and bind myself/ourselves to abide by and fulfil the general conditions of contract and the Special Conditions of Contract annexed to the Specification or in default thereof to pay to the purchaser, as reasonable compensation for such breach of such conditions, the sums of money mentioned in the said condition.

3. I/We further agree to make good at my/our own expense all defect in the installation which appear within twelve months from the date bringing the installation into beneficial use when such defects are due to defective workmanship or material executed or supplied by me/us.

4. I/We hereby declare that my/our near relative are not working in this Division or in its sub-division as an Ex. Engineer, Deputy Executive Engineer, Assistant Engineer, Additional Assistant Engineer, Overseer, Divisional Accountant, Store Keeper, Manager of Atithi/Vishram Gruha and in the circle as Superintending Engineer in addition for Panchayat Works not working nor having posting as Chairman of P.W. Committee or as incumbent in Jilla Panchayat at today.

Signature(s)

Dated at

The _____ Date of _____ 200

The above tender is hereby accepted by me for and on behalf of the Governor of Gujarat.

Dated at

The _____ day of _____ 2000

Executive Engineer.

GENERAL CONDITIONS

1. The work of the Electrical Installation shall be carried out as per I.S. Specifications I.S. 732-Code Part I, II & III – 1982-82 of practice of Electrical wiring and fitting in building.
 For Hospital I.S. 7732 of 1985
 For Educational Installation I.S. 108941 – 1984
 For Aluminium Conductor I.S. 398 – 1984 Part III
2. The fitting should be fixed with mild steel hooks to be supplied and erected and duly grouted in the cement concrete by the contractor wherever possible the decision of the Ex. Engr. in respect of the feasibility of providing such hooks in the cement concrete, shall be final and binding on the contractors.
3. The work shall have to be completed within the prescribed time limit unless the extension in the time limit at the instance and the request of the contractor is granted by the authorities in which case, the application for the extension in time limit have to be made by the contractors by registered post before the date of expiry of the schedule time limit under the agreement.
4. The amount of Rs. 1-00 for each empty wooden box of ceiling fan and 0-50 paise for each empty wooden box of Table fan issued to the contractors for the work as per Schedule B of the work shall be recovered from the Contractors.
5. Materials required for the work shall be supplied to the contractor as per rates mentioned in the Schedule 'A' attached herewith and the cost of materials will be recovered from their bills.
6. The tender documents required shall have to be filled in either in ink or by ballpen.
 (G.R.B. & C. Dept. No.TNC-1175-1113-853/198 V, Dtd. 8-6-79).
7. In addition to the above the tender will also be liable to be rejected outright if -
 - (i) Any of the pages of the tender is/are removed or replaced.
 - (ii) In the case of "Item rate" tender, the rates not entered in ink, in figures and words and the total of each item and grand total are not struck by the tenderer or in ink in the last column of schedule 'B' under his signature.
 - (iii) All Corrections additions or pasted slips are not initialled by the tenderer.
 - (iv) Any erasure is made by him in the tender AND
 - (v) The tenderer in the case of a firm, each partner or the person holding the power of attorney thereof does not sign or the signature is/are not attested by witness on page 8 of the tender in the space provided for purpose.
8. A certificate of registration as approved contractor should be attached with the tender.
9. In respect of tenders from the Co-operative society a solvency certificate of an amount equal to 20% of the amount of the work put to tender plus costs of work in hand will have to be produced along with the tender or a certificate, regarding the borrowing capacity of the society issued by the legal Assistant, Directorate of Cottage Industries will have to be produced along with the tender.
10. The several documents forming the contract are the essential parts of the contract and requirement occurring in one is as binding as though occurring in all, they are intended to be mutually explanatory and complementary and to describe and provide for a complete work.
11. In the event of any discrepancy the several documents forming the contract or in any one document the following order of precedence should apply
 - (a) Dimension and quantities :
 - (i) Drawing
 - (ii) Schedule 'B' of the tender form
 - (iii) Specification
 On drawing figures, dimensions unless obvious in contract will be followed in preference to scaled dimension.
 - (b) Description :
 - (i) Schedule 'B' of the tender form
 - (ii) Drawings
 - (iii) Specifications
 In case of defective description or an ambiguity, the Ex. Engineer in charge should issue further instructions directing in what manner the work is to be carried out is being understood that the last modern practice is to be followed. The contractor should forthwith comply with such instruction.
12. The contractor should take no advantage of any apparent error, omission in drawings or a specifications and the Ex Engineer in charge should be permitted to make fulfil the intent of the plans and specifications.
13. Controlled materials (Essentially certificate)
 - (i) As regards "Controlled materials, the R. & B. Dept. will help to arrange for the permits as far as possible and hold the contractor in securing the same. All incidental charges in procuring these materials shall be borne by the permit as far as possible by the contractor himself. Though the R. & B. Dept. will help to arrange for the permit as far as possible and help the contractor in obtaining the materials, it shall not accept any responsibility for any delay or loss on account of delay caused to the contractor while obtaining the same.

- (ii) The contractor shall submit the monthly returns in the prescribed forms as to the receipts and actual use of the controlled materials during the month to the Ex. Engr. of Every calendar month.
- (iii) The contractor shall submit the Ex. Engineer or his representatives to inspect the stock of the controlled materials by him at any time whenever the Ex. Engineer or his representatives so desire.
14. The tender shall remain open for 90/120* days. The validity period shall be counted from the stipulated date of receiving tenders if tenders are invited off-line.
In case of online tenders the validity period shall be counted from the stipulated date of opening online tenders in case of single cover system tenders and from date of opening technical bid in case of two cover system tenders. (R & B.D. G.R. No. TNC-10-2013(2)-C dated 10-5-2013)
If any tenderer withdraws or makes any modifications or additions in the terms and conditions of his tender not acceptable to the Government (Public Works Department) as above then the Government shall without prejudice to any right remedy, be at liberty to forfeit in full the said earnest money absolutely.
15. The contractor shall employ only such labourers who shall produce a valid certificate of having been vaccinated against small pox within a period of last three years.
16. The contractor shall provide drinking water facilities to the workers, labourers to comply with the provisions, the engineer in charge shall give notice for such facility to the workers, Labourers within a period of ten days from the date of the notice in writing the Engineer in charge shall there upon make the arrangement for the drinking water at the cost of the contractor.
17. The contractor shall provide the amenity of shade and shelter to the workers, labourers and their children on Govt. work as soon as the work starts. If the contractor fails to provide shade and shelter than the Govt. Shall provide the same at the cost of the contractor.
Govt Resolution PWD No. TNC-2172 (i) 76-C Dt. 4-7-1973.
18. Challan for earnest money @ 1% of the estimated cost must accompany the tender. Tenderer may pay earnest money upto Rs. 50,000 in cash or in the form of Crossed Demand Draft or in case of tenderer is member of only IEEMA DEPOSIT AT CALL receipts of Nationalised or scheduled Bank drawn in favour of Executive Engineer, Divisional Officer concerned. However in respect of the works estimated to cost above Rs. 50 lacs, the amount of earnest money in excess of Rs. 50,000 can be offered by the contractor, at his choice, in the form of Bank Guarantee of the Scheduled Bank only. The Bank Guarantee in such cases will be furnished in the following form. In such cases also, the amount of first Rs. 50,000 will be paid only in the form of cash or crossed demand drafts or fixed deposit receipts or deposit at call receipts worth the validity period of not less than 6 months of the nationalised or Scheduled Banks. The Contractors who have secured exemption certificate for payment of earnest money by depositing Lump Sum earnest money Deposit need not pay earnest money, but produce the certified copy of the exemption certificate alongwith the tender.

BANK GUARANTEE

Whereas M/s. _____ (hereinafter called the Tenderer) is desirous and preferred to tender for works in accordance with the terms and conditions of tender for the work of _____ and where as We, Bank, agree to give the tenderer a guarantee for the Earnest Money.

1. Therefore, we hereby affirm that we are guarantors on behalf of the Tenderer upto total rupees _____ in words) Rs. _____ (in figures) and we undertake to pay to Executive Engineer _____ Division _____ Department of Government of Gujarat the _____ (name of Govt. previous notice of judicial or to be specified), upto his first written demand, without demur, without delay and without the necessity of a previous notice of judicial or administrative procedures and without the necessity to prove to the Bank the defects or shortcomings or debts of the contractor any sum within the limit of Rs. _____

2. We further agree that the Guarantee herein contained, shall remain in full force and effect during the period that would be taken for the acceptance of tender.

However, unless a demand of claim under this guarantee is made on us in writing on or before the _____ (Date to be specified - will not be less than 180 days from the date of opening the tender) we shall be discharged from all liabilities under the guarantee thereafter.

3. We undertake not to revoke the guarantee during its currency except with the previous consent of the Executive Engineer _____ Division _____ in writing.

4. We lastly undertake not to revoke the guarantee for any charge in constitution of the Tenderer or of the Bank.
Date _____ Signature & Seal of Guarantor _____

* Strike out whichever is not applicable.

19. Wires of I.S.I. mark will be allowed to be used on the work.
20. The rates should be written both in words and figures inclusive of all taxes and duties.
21. The percentage additions in total amount tendered of any items is not allowed however if over all reduction in percentage is offered the same should be stated in the prescribed clause added at the end of schedule 'B' in words and figures. If no reduction is to be made the gap should be filled in by the word 'NIL'.

Note : As per Govt. Resol. No. CDN/1269/PAC/51-C. dt. 15/4/1978

22. Safeguards:

- (a) That the percentages and the tender amount by each contractor shall actually be shown to the other contractors who may be present at the time of opening the tenders.
 - (b) That a tender with any erasures and/or over writing in percentage (both in word and in figures) shall be rejected outright.
 - (c) That insertions and or correction in the percentage quoted (both in words and in figures) resulting into increase in the value of the work shall be liable to be rejected outright unless it is authenticated by the officer opening the tender at the time of opening tender as well as the contractors they may be present at the time of opening tender and
 - (d) That any other correction or insertions shall be authenticated by the officer opening the tender and the intending bidders who may be present.
23. Any error in quantity or amount in Schedule 'B' showing items of works to be carried out shall be adjusted in accordance with the following rules :
- (a) In the event of a discrepancy between description in words and figures quoted by a tenderer in the rates column, the description in words shall prevail.
 - (b) In the event of an error occurring in the amount column of the Schedule 'B' showing item of works, as a result of wrong multiplication of the unit rate and quantity the unit rate shall be regarded as firm and multiplication shall be amended on the basis of the rate.
 - (c) All errors in totalling in the amount column, and in carrying forward totals shall be corrected.
 - (d) Any rounding off of amounts against items of in totals shall be ignored. The tendered sum so altered shall for the purpose of tender be substituted for the sum original tendered and considered for acceptance.
24. Battens shall be teakwood for acceptable quality and shall be varnished before fixing in position.
25. Wooden-cup board should be polished on both the sides.
26. Whenever Government materials are issued, the contractor shall be responsible for the safe custody and proper use of the materials.
27. Loose electric fitting connections should be done at the time of handing over possession of building to the concerned civil or administrative department and accordingly after taking over possession of these connection concerned Civil/ Administrative department is responsible for fittings.
28. (i) Late tenders (i.e. tender received after the specified time of opening) Delayed tender (i.e. tenders received before the time of opening but after the due date & time of receipt of tenders) and post tender offers shall not be opened and considered at all.
29. (ii) The tenders received (by registered post after the time of date specified in the tender notice) shall not be received by the concerned office from the postman, for which date and time may be recorded on the cover of the tender as to when tender was refused by the Divisional Accountant or the Divisional Head or any other person in charge.
30. GST where recoverable shall be deducted from bills for payment according to rules Prevailing at the time of payment.

Signature of contractor/s

Executive Engineer,
Division

Pages 7 & 8 are for E-tendering of Electrical Tender Form only

DATA SHEET For Electrical E-Tendering

(A) Details of Tender Item :

Sr. No.	Name of Work	Estimated Tender Value (Rs. In _____)	EMD (Rs. In _____)	Tender fee In Rs.	Total Security Deposit	Period for Completion of Work
1	2	3	4	5	6	7

(B) Eligibility : Registered in _____ Class or above / Pre-qualification

(C) Schedule for e-tendering is fixed as under :

(i) Site Visit (If any) On date ____/____/____; ____:____ hrs.
Venue :

(ii) Downloading of tender documents From date ____/____/____
Start & End Date upto date ____/____/____ Till ____:____ hrs.

(iii) Online submission of bid Upto date ____/____/____ Till ____:____ hrs.

(iv) Submission of EMD and Tender fee Submission in electronic format only through online by scanning and then the same should be sent in original to Superintending Engineer _____ Circle _____ at the time of tender opening, or send the same through R.P.A.D. So as to reach Executive Engineer _____ Division _____ within 7 days from the last date of opening

(v) Online opening of Bid On date ____/____/____ & ____:____ hrs.
Venue

(vi) Bid Validity Period 90 / 120 days from the end date of downloading Bids

- Bidders can download the tender documents free of cost from the website, www.rnb.nprocure.com
- Bidders have to submit bid in Electronic format only on above mentioned website till the Date & time shown above.
- Offers in physical form will not be accepted in any case.

Bidders who wish to participate in online tenders will have to procure / should have legally valid Digital Certificate (Class-III) as per Information Technology Act-2000 using which they can sign their electronic bids. Bidders can procure the same from any of the license certifying Authority of India or can contract (n) code solution-a division of GNFC Ltd., who are licensed Certifying Authority by Govt. of India.

(D) (i) Bid inviting authority Executive Engineer _____ Division

(ii) Bid Opening Authority

(E) Mode of Quoting Rates Percentage premium or rebate in words and figures at the end of Schedule B

The list of certifying agencies are as mentioned under :

<u>Sr. No.</u>	<u>Name of Certifying Agency</u>	<u>Website Address</u>
1.	(n) Code solution (G.N.F.C.)	www.gnvfc.com.
2.	Safecrypt	www.safecrypt.com.
3.	TCS	www.tcs.-ca.tcs.co.in
4.	MTNL	www.mtnitrustline.com

As a result of E-tendering the information / Instructions on Pages 4 to 6 following may be read as modified below :-

General Conditions from Page 4 to 6 are substituted for E-tendering as below :

6. Deleted

7. In addition to the above the bid will also be liable to be rejected if :-

- (i) The bidder proposes any alteration in the work specified or in the time allowed for carrying out the work or any condition in the covering letter.
- (ii) The bidder or the person authorised to sign on behalf of the bidder does not digitally sign the bid offer.

8. A Certificate of registration as approved contractor should be incorporated in electronically transmitted bid.

14. The tender for the work shall remain open for a period of 90 / 120 days counted from the last date of on line submission of bid.

20. The rates should be expressed both in words and figures inclusive of all taxes and duties.

22. The bid will also be liable

- (i) The bidder proposes any alteration in the work specified or in the time allowed for carrying out the work or any condition or correction made in any code or mode of Schedule-B or Specifications
- (ii) The bidder or the person authorised to sign on behalf of the bidder does not digitally sign the bid offer.

31. (i) The Bids shall be offered in Electronic format only on online website [www.rnb.procure.com /](http://www.rnb.procure.com/) www._____ till the date and time shown on Page 2 supra.

31. (ii) **Payment of Tender Fee and Earnest Money Deposit :** "Demand Draft for E.M.D. & Tender fee shall be submitted in electronic format only through online (by scanning) while uploading the bid. This submission shall mean that E.M.D. & tender fee are received for purpose of opening the bid. Accordingly offer of those shall be opened whose E.M.D. & tender Fee is received electronically. However for the purpose of realization of D.D. bidder shall send the D.D. in original to Superintending Engineer _____ Circle _____ at the time of tender opening or send the same through R.P.A.D. So as to reach Executive Engineer _____ Division _____ within 7 days from the last date of opening. Penaltative action for not submitting D.D. in original to E.E. by bidder shall be initiated. D.D. for Exemption Certificate is not necessary. However Exemption Certificate shall have to be submitted electronically through online. If the contractor does not remit the tender fee & the earnest money within the specified time his registration will be held in abeyance for one year & his tendering code will be cancelled for one year.

Any documents in supporting of tender bid shall be submitted in electronic format only through online (by scanning etc.) & hard copy will not be accepted separately." (R.&B Circular No. 424-102008 & R.&B.D.G.R. No. Parach-102008-5-C (Partfile) dated 27-11-08)

GENERAL CONDITION OF CONTRACT FOR ELECTRICAL WORKS IN THE BUILDING AND COMMUNICATION DEPARTMENT

GENERAL CONDITIONS OF CONTRACT

1. Definition of terms :

In construing these general conditions and the annexed specification the following words shall have the meaning here assigned to them unless there is something in the subject or context inconsistent with such constructions :

The "GOVERNOR OF GUJARAT" shall include his successors and assigns.

The "Engineer" shall mean the Ex. Engineer, Electrical Division, for the time being attached to the Public Works Department of the Gujarat State or such other officer as may be appointed by the Ex. Engineer, Electrical Division to supervise the work on behalf of the Governor of Gujarat.

The "CONTRACTOR" shall mean the Tenderer whose tender, shall be accepted by the Governor of Gujarat, and shall include the tenderer's legal personal representatives or successors and assigns.

"PLANT" shall mean and include any machine, fixed or movable, used for the generation or transmission of power or actuated by power.

"WORK" or "WORKS" shall mean the whole of the plant and material to be provided and work to be done, executed or carried out by the contractor under the contract.

The "CONTRACT" shall mean all the documents by which the agreement by the contractor to be provided to execute or carry out the plant work or works shall be constituted or in or by which the terms of such agreement or any of them are contained or set forth specially as per these General conditions, any special conditions attached to or issued, with these conditions, the specification, the Drawings, the invitation for Tenders (if any) or any other letter, notice or document upon or with reference to which the Tender is made and the schedule of prices (if any) furnished by the contractor with his Tender.

The "SPECIFICATION" shall mean the specification annexed to these General conditions and the Schedule thereto (if any).

The "SITE" shall mean the whole of the premises, buildings and grounds in or upon which the Plant work or works is or are to be provided, executed, erected, done or carried out.

The "DRAWINGS" shall mean the drawings issued with the specification which will ordinarily be identified by being signed by the Engineer and any further drawings submitted by the contractor with his tender and duly signed by him and accepted or approved by the Engineer and all other drawings supplied or furnished by the contractor or by the Engineer in accordance with these General conditions.

The "SPECIAL CONDITIONS" shall mean the special conditions of contractor (if any) attached to general condition.

The "SCHEDULE" shall mean the schedule or schedules attached to the specification.

2. Contractor to inform himself fully :

The contractor shall be deemed to have carefully examined the invitation for Tender (if any) the general and any special conditions, the specification and Drawings and the Schedule of price (if any). In case of discordance or want of agreement between or amongst the several things herein described as the grounds or data of the contract, then these conditions shall have precedence of and be held to be more correct and binding and in like manner detailed drawings shall be held to be more correct, and binding than general drawings and in like manner drawing made to a large scale, or for special instruction, shall be held to be more correct and binding than drawing made to a smaller scale, or for general instruction and figured dimensions shall be held to be more correct than dimensions by scale but subject nevertheless in case of doubt or dispute as to any of the matters aforesaid to the determination and decision of Engineer as hereafter is more particularly mentioned and provided always that nothing herein contained shall limit the powers of the Engineer hereinafter mentioned.

3. Security Deposit :

3.1 Security Deposit is required to be furnished by the contractor as guarantee money for performance of the contract and observance of Contract Conditions.

3.2 The person/persons whose tender is accepted (hereinafter called the "Contractor" which expression shall, unless excluded by, or repugnant to the context include his Legal heirs, executors, administrators and assigns shall pay the total amount of Security Deposit :

(a) In respect of the tender upto Rs. Thirty lacs, equal to 5(Five) percent of the estimated cost of the work put to tender.

(b) In respect of the work above thirty lacs, equal to 10 (Ten) percent of the estimated cost of the work put to tender.

3.3 In respect of the tenders upto Rs. 30 lacs the contractor shall pay Five percent of security deposit in two parts as tender : Part - I :- 2.5 percent in the form of Narmada Bond of Sardar Sarovar Narmada Nigam Ltd. or in any form of National Small saving (N.S.S.) Schemes or F.D.R. of any Schedule Bank to be paid within 10 days from the date of receipt of Acceptance letter of his offer.

Part - II :- 2.5 percent in the form of cash / Security Deposit to be deducted from Running Bills that become payable to the contractor from time to time.

3.4 In respect of the tenders above Rs. thirty lacs the contractor shall pay first five percent of Security Deposit as specified in part 3.3 above and for the remaining five percent, the contractor shall have to give Performance Bond to be produced within 10 days from the date of receipt of acceptance letter of his offer.

3.5 The work-order to commence the work shall be issued only after the security deposit as per Para 3.3 and 3.4 is paid / furnished by the tenderer. If the tenderer fail to produce the security deposit as above the earnest money paid by him shall be forfeited and his registration shall be held in abeyance for three years from the date of such default.

3.6 All compensation, Liquidated damages or other sums or money payable by the contractor to Government under the terms of this contract shall be deducted from or recouped by the realisation of a sufficient part of his security deposit, or from the interest arising therefrom or performance bond or from any sums which may due or may become due by Government to the Contractor on any account whatsoever and whether in respect of this contract, any other contract, or otherwise. In the event of his security deposit being reduced by reason of any such deduction or recoupment as aforesaid, the contractor shall within ten days thereafter, make good in cash or in Government securities transferred as aforesaid any sum or sums required to make good the shortfall in the amount of the security deposit.

3.7 The portion of security deposit deducted at 2.5 percent from Running Bills as Security Deposit can be converted into interest bearing securities or F.D.R. of Schedule Bank in the Name of Executive Engineer provided that the recovery of full amount of 2.5% is made and that the contractor has expressly desired this in writing.

3.8 The full amount of Security Deposit deducted in cash from running bills will be released proportionally as indicated in table below on production of Bank Guarantee of schedule Bank provided the contractor produces Bank Guarantee for the period of six months beyond the stipulated period of completion of work. Further if the time limit of contract is extended the period of Bank Guarantee shall have to be extended for six months beyond the proposed extension of time limit and the contractor shall have to furnish the undertaking for this alongwith the application for extension in time limit.

Table of proportionate release of Security Deposit :

Sr.	Monetary Progress	Portion of Security Deposit to be released	Against production of Bank guarantee of
1.	25% of Tender cost	Equal to the amount retained from Running Bills or 0.625% of the estimated cost of work, whichever is less.	Equal to the amount to be released
2.	50% of Tender cost	Equal to the amount retained from Running Bills or 1.25% of the estimated cost of work, whichever is less.	Equal to the amount to be released
3.	75% of Tender cost	Equal to the amount retained from Running Bills or 1.88% of the estimated cost of work, whichever is less.	Equal to the amount to be released

3.9 It will have to be ensured that Ten percent amount of security deposit in any form as permissible above is kept available with the employer till the actual date of completion of work.

3.10 Fifty percentage of the Security Deposit alongwith performance bond shall become refundable within fifteen days after the final completion certificate is issued as per Clause-25. All dues under this contract or other contract, or otherwise, shall be recovered from the aforesaid amount of fifty percentage of the said security deposit and the balance shall be refunded within fifteen days after the final certificate is issued as per clause-25. The remaining fifty percentage of the security deposit shall be refunded after the expiry of the Defect Liability period as per clause-33 after deducting therefrom the amount of expenses, if any, due to Government under this contract. (See Performance bond below) (Modified as per R & B Circular No. TNC-10-2013-3-(Part 1)-C dated 19-11-2013 and GR. No. TNC-10-2013-3-(Part-2)-C dated 20-11-2013)

Annexure

PERFORMANCE BOND

(The date of this bond must not be prior to the date of the instrument in connection with which it is given).

Principal (Contractor)

Surety (Bank)

Sum of bond (express in words and figures)

Contract No. and date of contract

KNOW ALL MEN BY THESE PRESENTS, THAT WE, THE PRINCIPALS AND SURETY above named are held and firmly bound unto the hereinafter called the Employer in the amount stated for payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors jointly and severally, firmly by these presents subject to the provisions of which the aforesaid Contractor on demand and without demand on a claim being made by the Employer. **THE CONDITION OF THIS OBLIGATION IS SUCH,** that whereas the principals have entered in to a contract with the Employer numbered and dated as shown above and hereto attached for the execution of work

NOW THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said contract during the original terms of the said Contract and any extensions thereof that may be granted by the Employer with or without notice to the surety and during the life or any guarantee required under the contract and shall also well and truly perform and fulfill all the Undertakings, covenants, terms, conditions and agreements of any all duty and unduly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the surety being hereby waived or shall pay over, make good and reimburse to the Employer all loss and damages which the employer may sustain by reason of failure or default on the part of said Principal so to do.

We further agree that the guarantee herein Contained shall remain in full force and effect during the period that would be taken for the validity of the said Contract, and that it shall continue to be enforceable till all the dues of the employer under or by virtue of the Contract have been fully paid and its claims satisfied or discharged or till the Employer certifies that the terms and conditions of the Contract have been fully and properly carried out by the said Contractor and accordingly discharges the guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the we shall be discharged from all liability under this guarantee thereafter.

IN WITNESS WHERE OF, the above bounded parties have executed this instrument under their several seals on the date indicated above the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representatives, pursuant to authority of its governing body.

In the presence of witness

individual

Principal

1. as to (seal)
2. as to (seal)
3. as to (seal)
4. as to (seal)

by affix Corporate Seal

Attested

Corporate surety

Business address

Affix by corporate Seal

Title

For and on behalf of the Employer

4. Mistake in contractor's Drawings :

The contractor shall submit such drawings as may be required and shall be responsible for any discrepancies, errors or omissions in any drawings or other particulars supplied by him notwithstanding that such drawings or particulars may have been approved by Engineer.

5. Patent Rights etc.

The contractor shall fully indemnify the Governor of Gujarat against all actions suits claims demands, costs, charges and expenses arising from or incurred by reason of any infringement or alleged infringement, of any, letters patent, design, trademark or name copyright or other protected rights in respect of any machine, plant, work materials thing or system or method of using, fixing, working or arrangement used or fixed or supplied by the contractor but this indemnity shall not extend or apply to any action, suit, claim, demand, cost charges or expenses arising from or incurred by reason of the use of the work or any part thereof otherwise than in the manner of for a purpose contemplated by the contract. All royalties and other similar payments which may have to be paid for the use of any machine, plant, work, material, thing, system or method as aforesaid (whether payable in one sum or by instalments or otherwise) shall be covered by the contract price and payable by the contractor.

In the event of any claim or demand being made or action or suit brought against the Governor of Gujarat in respect of any such matter or matters as all negotiations for the settlement of such claim or demand and such action aforesaid the contractor shall be duly notified, thereof, and he shall conduct or suit also be conducted by him subject if and so far as the Governor of Gujarat shall think proper under the Supervision & Control of Governor of Gujarat through the officer duly authorised on his behalf.

6. Excess over Tender quantities, Extra items & Variations in Specifications, Drawings etc. :

6.1 The Engineer-in-charge shall have power to make any alterations additions in or to the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work and the contractor shall be bound to carry out the work in accordance with any instructions in this connection which may be given to him in writing signed by the Engineer-in-charge and such alternation shall not invalidate the contract and additional work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the contractor on the manner above specified as part of the work shall be carried out by the contractor in the same conditions in all respects on which he agreed to do the work and at the same rate as are specified in the tender for the main work.

6.2 Except that when the quantity of any item exceeds the quantity as in the tender by more than 10%, the contractor will be paid for the quantity in excess of 10% at the rate entered in the S. O. R. of the year during which the excess in quantity is first executed or tender rate whichever is less.

6.3 If the additional or altered work includes any class of work for which no rate is specified in this contract, then such class of work shall be carried out.

(i) At the rate derived from the item within the contract which is comparable to the one involving additional or altered class of work; where there are more than one comparable items, the item of the contract which is nearest in comparison with regard to class or classes of the work involved shall be selected and the decision of the Superintending Engineer as to the nearest comparable item shall be final and binding on the contractor.

(ii) If the rate cannot be derived in accordance with (i) above, such class of works shall be carried out at the rate entered in the Schedule of Rates of the Division for the year in which, the tender was received, increased or decreased by the percentage by which the tender received, increased or decreased by the percentage by which the tender amount is more or less as compared or decreased by the percentage by which the tender amount is more or less as compared to the amount arrived at the rates in the "Schedule of Rates" of the Division in the year in which the tender was received. If the Schedule of rates calculated considering such items which were included in the "Schedule of Rates" of the Division for the year and for materials consumed on such item the rate to be charged would be the basic rate taken into account for fixing the rate in S.O.R. referred to above, instead of the rate.

(iii) If it is not possible to arrive at the rate from (i) and (ii) above, such class of work shall be carried out at the rate decided by the competent authorities on the basis of detailed rate analysis after hearing the contractor before a committee of two superintending Engineers stationed at the same place or the nearest place.

6.4 If the additional or altered work, for which no rate is entered in the "Schedule of Rates" of the Division is ordered to be carried out before the rate is agreed upon, then the contractor shall within seven days of the date of receipt by him of the order to carry out the work, inform the Engineer-in-charge of the rate, which it is his intention to charge for such class of work and if the Engineer-in-charge does not agree to this rates, he shall by notice in writing be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner as he may consider it advisable, provided always that if the contractor shall commence work or incur any expenditure in regard thereof before the rates shall have been determined as lastly herein before mentioned, then in such cases he shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of the determination of the rate as aforesaid according to such rate or rates as shall be fixed by the Engineer-in-charge. In the event of the dispute, the decision of the Superintending Engineer of the Circle shall be final.

Where, however, the work is to be executed according to the designs, drawings and specifications recommended by the contractor and accepted by the competent authority, the alteration above referred to shall be within the scope of such designs, drawings and specifications appended to the tenders.

The time limit for the completion of the work shall be extended in the proportion that the increase in the cost occasioned by alternations bears to the cost of the original contract work and the certificate of the Engineer-in-charge as to such proportion shall final and conclusive.

7. Workmanship and Materials :

The work shall be carried out in all respects with workmanship and materials of the best and most substantial and approved qualities to the entire satisfaction of the Engineer who may reject any plant, apparatus of material or workmanship which shall in his opinion be of defective quality any such rejection to be final and conclusive. The contractor shall at his own expenses provide all material labour, haulage, power, tools, tackles and apparatus necessary to execute and complete the works and plant in the manner aforesaid.

8. Use of work pending completion :

The Governor of Gujarat shall be at liberty at any time to put into beneficial use the whole or any part of the work he may desire to use pending the formal completion and taking over of the same.

9. Subletting of contract :

The contractor shall not without the consent in writing of the Governor of Gujarat under the hand of the Engineer assign or sublet the contract nor make any sub contract with any person or persons for the execution of any portion of the work other than for raw materials, or for any part of the work of which the manufacturers are named on his contract.

10. Protection and liability for accidents, Theft and Damage :

The Contractor shall at all times until the commencement of the period maintenance as provided in clause 16 property and sufficiently cover up and protect all materials delivered on site from damage or injury by exposure to the weather and shall take every proper precaution against accident, damage or injury on the same from any cause. The contractor shall be and remain answerable and liable for all accident and damage thereto which until the commencement of the period of maintenance as provided for under clause 16 may arise or be occasioned by the acts or omissions of the contractor or his workmen, agents, servants or sub-contractors and all losses and damages arising from such accidents, damage or injuries as aforesaid shall be made good in the most complete and substantial manner by and at sole cost of the contractor and to the satisfaction of the Engineer.

Provided that should the Engineer certify, that the work has been completed but that owing to circumstances

over which the contractor has no control the work cannot be taken over the contractor shall not be held liable for any loss of or damage to the work occasioned by such delay in taking over and occurring more than one month after date of completion of the work as certified by the Engineer.

Until the work shall be or deemed to be taken over as hereafter provided the Contractor shall also indemnify to Governor of Gujarat from and against all claims and demands, suits, proceedings, cost and expenses in respect in respect of or in connection with any injury to person or damage to property by whomsoever sustained or by defective design work or materials made, done, furnished or supplied by the contractor. The Contractor shall also be responsible for thefts of any property of the Governor of Gujarat or of others committed by any employees of his own or his subcontractors and shall be liable for the costs of replacing any property stolen.

11. Insurance :

Subject as hereinafter provided the contractor shall at his own expense insure and at all times prior to the commencement of the period of maintenance keep insured against destruction or damage by fire or earthquake storm and tempest such plant and materials ordered for the work as may for the time being be upon the site for the full value of such plant and materials.

12. Materials brought on the site :

All materials, tools and tackle brought to and delivered upon the site for the purpose of the work shall from the time of their being so brought vest in and be the property of the Governor of Gujarat but may be used for the purpose of the work but for that purpose only and not on any account be removed or taken away by the contractor or any other person without the express permission in writing of the Engineer, but the Contractor shall nevertheless (Subject as hereinafter provided) be solely liable and responsible for any loss or destruction thereof or damage unless resulting from causes beyond the Contractor's control not being causes insurance against destruction or damage from which is provided for in clause 11. The Governor of Gujarat shall have a lien on such materials, tools and tackle for any sum which may to any time prior to the completion of the works be due or owing to him by the Contractor under in respect of or by reason of the Contract and shall be at liberty to sell and dispose of any of such materials, tools and tackle remaining after the completion of the works in such manner as he shall think fit, and to apply the proceeds in or towards the satisfaction of such sum or sums so due or owing as aforesaid but subject to such lien and power of sale and disposal such surplus materials, tools and tackle shall being to the contractor and may be removed and disposed of by him as he shall think fit after the lien is withdrawn by the Engineer in charge.

13. Default :

If the Contractor shall at any time fail in the opinion of the Engineer to proceed with the work with due diligence and expedition, or shall refuse, neglect or omit to comply with any orders given to him in writing by the Engineer in accordance with the provisions of these conditions or shall commit any other breach of the provision of the contract, the Engineer shall be at liberty to give notice in writing to the Contractor to make good the failure neglect, omission or breach complained of and should the Contractor shall fail to comply with any such notice within such period as may be prescribed in such period as may be prescribed in such notice then and in such case the Governor of Gujarat shall be at liberty to employ workmen other than those of the contractor to perform and execute the work in respect of which the failure neglect or omission referred to in such notice shall have been committed or occurred. If the Governor of Gujarat shall think fit, it shall be lawful for him to enter into a new contract with any other persons, or person, for the execution of such part of the work as may not have been executed and in that event the Governor of Gujarat shall without incurring any liability to the Contractor be entitled to use all or any of the materials, tools, tackle or other things which may then be on site for the purpose of completing the work or any part thereof and to provide any additional materials, tools, or tackle required for the purpose and the cost of executing any such work and providing any such materials shall be paid by the contractor to the Governor of Gujarat on demand.

Subject to and after satisfaction of the lien of the Governor of Gujarat for any sum due to him by the Contractor for any expenses, cost or charges incurred in the completion of the work, all materials, tools, tackle or other thing remaining on the site and unsold after such completion shall forthwith hereafter be removed by the contractor.

14. Replacement of Defective work or material :

If during the progress of the work the Engineer shall notify in writing to the contractor that in his opinion the Contractor has executed any unsound or imperfect work, or has supplied any materials inferior in quality to those stipulated for by the Contractor, the contractor shall at his own expense, within ten days of his receiving the notice, proceed with due expedition to remove or alter and reconstruct or replace the work, or as the case may be supplied fresh materials up to the standard of the specification. In place of the work or materials complained of by the notice (as the case may be) and in case the contractor shall fail to do so the Governor of Gujarat may after expiration of ten days from giving of such notice give a further notice in writing stating that the Governor of Gujarat intention so to do forthwith at the cost of the Contractor remove the work or materials complained of and perform all such work or (as the case may be) supply all such materials in place of those complained of as may be necessary or proper in order to comply with the Contractor and the cost as certified by the Engineer of any such removed and performance of work or

supply of materials shall be paid by the contractor to the Governor of Gujarat on demand, provided always that nothing in this clause shall be deemed to deprive the Governor of Gujarat or effect any other rights or remedies under the Contract or otherwise which he may have in respect of such defects or deficiencies. No payment which have been made on account of materials delivered or work executed shall be looked on as acceptance of such or any work or materials.

15. Cutting away & making good :

The tender is to include all necessary cutting and making good for the purpose of the contract of the wood work, walls, floors etc. of the site. The contractor will be held responsible for, and will have to make good at his own expense, to the satisfaction of the Engineer, any damages to or disfigurement of the site which may have been caused by the acts or omissions of himself or his servants or agents in connection with the carrying out of the contract.

16. Maintenance :

The Contractor shall make good at his own expense all defects due to faulty design material, or workmanship on the part of the contractor which may during a period of 6 calendar months from the date on which the work is certified by the Engineer to have been brought into beneficial use or if no such certificate is given from the date of the final payment for the work under clause 20 (which period is hereinafter called the "the period of maintenance") develop under proper use in the work or any part thereof by replacing plant materials or work or otherwise as may be necessary. Any such making good by the contractor shall in no case relieve him from his liability to make good any further defect in the work made good or replace which may develop during the remainder of such period of twelve months. If any such defects are clearly caused by the fault of the Contractor and are liable to recurrence the contractor shall make such alterations as are required to prevent any recurrence of such defects. If any defects or alterations which Contractor shall become liable to make good or make under this clause be not made good or made (as the case may be) within such time as the Engineer may prescribe for the purpose, the Engineer may proceed to make good or make the same (as the case may be) at the risk and expense of the Contractor, but without prejudice to any other right or remedies which the Governor of Gujarat may have against the Contractor in respect of his default in making good or making the same as aforesaid and the cost of any such making good or making shall be paid by the Contractor to the Government of Gujarat on demand.

17. Contractor's Representative & workmen :

The contractor Shall employ at least one competent representative, whose name or names shall have previously been communicated in writing to the Engineer by the Contractor to Superintend the carrying out the works. The said representative, if more than one shall be employed then, one of such representative, shall always be present on the site during working hours and any written orders or instruction which the Engineer or his duly authorized representative, whose name shall have been previously communicated in writing to the contractor, may give to the said representative of contractor, shall be deemed to have been given to the contractor.

The Engineer shall be at liberty to object to any representative or person employed by the Contractor in the execution of or otherwise about the work who in the Engineers opinion shall misconduct himself or be incompetent or negligent and the contractor shall remove every person so objected to forthwith upon receipt from the Engineer of notice in writing requiring him to do so.

17.A Minimum age of persons employed and employment of donkeys or other animals :

- (i) The Contractor shall not employ any person who is under the age 15 years.
- (ii) The contractor shall not employ donkeys or other animals with breaching of string or thin rope. The breaching must be at least three inches side and should be tape (Nawar).
- (iii) No animal suffering from sores, lameness or emaciation or which is immature shall be employed on the work.
- (iv) If contractor does not accept the proceeding conditions No. (i), (ii), & (iii) his tender shall not be accepted and his name shall be removed from the list of contractors.
- (v) The Engineer shall remove from the work any person or animal found working which does not satisfy these conditions and to responsibility shall be accepted by the Governor of Gujarat for any delay caused in the completion of the work by such removal.

17.B One percent of work done and payable in bills be recovered as contribution towards building and other construction workers welfare cess the certificate of deduction of welfare cess shall be issued to the contractor (R.&B.D. G.R. No. 5.S.R. -10-2004-IB-41(24)-C dated 2-12-2006).

18. Submission of Samples :

The contractor shall not without written sanction of the Engineer use for the execution of the work any materials plant or stores of any type of description other than those specified in his tender. He shall, if required to do so, or at his options, deposit samples, at the office of the Engineer for approval and the Engineer shall within 14 days of the receipt of the samples, express in writing to the contractor his approval or otherwise of the samples deposited, and all materials, plant and stores used in the execution of the works must be in every way equal to the deposited samples.

All the deposited samples will be returned to the contractor within one month of the work being taken over :

19. Deduction from contract Price :

The amount or all costs of works, expenses or other sums which under the contract shall be payable by the contractor to the Governor of Gujarat from any moneys due or becoming due by him to the Contractor under contract, without prejudice to the Governor of Gujarat, right to recover the same by the ordinary process of law.

20. Terms of Payment :

Subject to any deduction which the Governor of Gujarat may be authorised to make under the contract, the Contractor shall be entitled upon the certificate of the Engineer to the effect hereinafter stated **payments of R.A. Bills shall be made to the contractor as per items, in measurable units executed according to the specifications.**

If at any time the contractor shall be prevented for any period of not less than 30 days from causes within the control of the Governor of Gujarat either first, from delivering on the site any plant or material ready in India for delivery or secondly from proceeding with the erection at any plant or materials which he had already delivered on the site, the Governor of Gujarat shall bear the cost of storage and protection, including insurance in accordance with clause II, of the plant and material during such period in the first of such of contractor shall be entitled to payment of 80% percent of the value certified as aforesaid of the plant or materials delivery of which shall have been so prevented within one month from the date on which as certified by the Engineer such plant or material are so ready as aforesaid provided that all portions thereof have been suitably and sufficiently marked as being property of the Governor of Gujarat and are delivered into the custody of some person approved by the Engineer who has granted a receipt thereof.

Installments shall be due and payable by the Governor of Gujarat within one month from the date of each certificate of the Engineer.

21. Certificates of Engineer :

Every applications to the Engineer for a certificate must be accompanied by a detailed claim in duplicate) setting forth (in the order of the Schedule for price if any) particulars of the Plant or materials delivered and work executed to the date of the claim, and the certificate as to such of the plant and work mentioned in the claim as is in the opinion the Engineer in accordance with the contract shall be issued within 14 days of the application. No application for a certificate shall be made within 14 days previous applications.

22. Certificate not to affect rights of the Governor of Gujarat of contractor :

The Engineer may be any certificate make any correction or modification in any certificate previously issued, by him, any payment shall be regulated and adjusted accordingly. No certificate of the Engineer shall nor shall any payments on account by the Governor of Gujarat to the Contractor, nor extension of time for the execution of the works by the contractor which may be granted by or behalf of the Governor of Gujarat affect or prejudice any of the rights of the Governor of Gujarat against the contractor under or relieve him any of his obligations for or in respect of the due performance of the contract, or be interpreted as approval of work done or of material supplied.

23. Suspension of Work :

The Governor of Gujarat shall any to the contractor all proper expenses arising from suspensions of the works by order in writing of the Engineer or any other officer on behalf of the Governor of Gujarat unless such suspension is due of some default on the part of the Contractor or any sub-contractor under him.

24. Damages for delay in completion :

(i) If the Contractor fails to complete the work under contract by the stipulated date, he shall pay liquidated damages of Rs. 0.1 percentage of the contract value per day from the date of delaying the said work upto the date of completion and handing over to the Government.

(ii) However also if the contractor fails to complete any part of the work Proportionate to by the time in relation to the value of such part, he shall pay Liquidated damages per day from the date of delaying the said part of the work up to the date of completion of the said designated part at the rates shown in the said schedule of the contract Value of such part for such failure till the said designated part is completed.

(iii) The aggregate maximum of liquidated damages payable under this clause shall not exceed Rs. 0.1 percentage of contract value per day and shall be subject to the maximum amount of ten percent of the estimated amount put to tender.

(iv) Delays requiring payment of ten percent liquidated damages of the amount put to tender for performance shall be sufficient cause for termination of contract and for forfeiture of security deposit. (including amount of performance bond in respect of works estimated to cost more than Rs. 15 lacs, for performance) and registration of the contractor shall also be kept in abeyance for three years from the date as fixed in all such cases.

24-A If the Contractor shall desire an extension of the time for completion of work on the ground of his having been unavoidably hindered in its execution or on any other ground he shall apply in writing to the Ex. Engr. before the expiration of the period stipulated in the tender or before expiration of 30 days from the date on which he was hindered as aforesaid on with the cause for making for extension occurred whichever, is earlier and the Ex. Engr. may if in his

opinion. There are reasonable and bonafide grounds for granting, and extension grant such extension as he thinks necessary or proper. The decision of the Ex. Engr. in this matter shall be final.

No applications for extension of time for completion of work shall be considered unless it is received by registered post in the office of the Executive Engr. or left at his office and obtained receipt there of duly signed by the Ex. Engr. or his nominee authorised in this respect.

The date of receipt of application by the Ex. Engr. shall be considered as the date of application for the purpose of counting the period as mentioned above.

24-B. "If the contractor or his workmen, or servants shall break, deface, injure or destroy any part of the building, or the work in question in or which they may be working or any building, road fence, enclosure or glass-land or cultivated ground contiguous to the premises on which the work or any part thereof is being executed or if any damage shall be done to the work from any cause whatever before completion of the work or before the completion of the maintenance period whichever is later or any damages occurred/caused due to normal flood or rain or if any imperfection become apparent in it within three-months from the grant of a certificate of completion, final or otherwise by the Engineer-in-charge, the contractor shall make good the same at his own expenses or in default, the Engineer-in-charge may cause the same to be good by other contractor, and deduct expenses (of which the certificate of the Engineer-in-charge shall be final) from any sums that may then be due or may thereafter become due to the contractor or from his security deposit or the proceeds of sale thereof a sufficient portion thereof".

24-C Force Major Clause :

Neither party shall be liable to the other for any loss or damage occasioned by or arising out of acts of God, such as Unprecedented flood, Volcanic eruption, earthquake or other convulsion of nature and other acts such as but not restricted to general strike, invasion, the acts of foreign countries, hostilities, or war like operations before or after declaration of war, rebellion, military or usurped power which prevent performance of the contract and which could not have been foreseen or avoided by a prudent person.

Note : "Unprecedented flood" means the flood crossing the High Flood Level of the past _____ year(s) which is on the available record.

(Modified Vide R & B D. G. R. No. TNC - 1096 - IB - 143 - (16) - C dated 11-1-99)

25. Time of taking over :

The work shall for the purpose of all the provisions of these conditions be deemed to have been completed and taken over by the Governor of Gujarat when the Engineer, shall have certified in writing that it has been completed in accordance with the Contract conditions and such Certificate shall not be unreasonable withheld nor shall the Engineer delay its issue on account of commissions or defects which in his opinion do not effect the efficient use of the work, but such issue shall be without prejudice to the Contractor's liability to make good any such omissions and defects with the greatest possible expedition.

26. Death & Bankruptcy :

If the Contractor shall die, or become insolvent or bankrupt or have a receiving order made against him or compound with or make no proposal carrying on his business under inspection or for the benefit of his creditors, or commit an act of insolvency or bankruptcy, or being a corporation be ordered to be wound up or have a receiver of its business appointed the Governor of Gujarat shall be entitled forthwith by notice in writing to the Contractor his legal representatives to determine the contract and the Governor of Gujarat may in that event complete the contract in such time and manner and by such person as he shall think fit.

27. Disputes to be referred to Gujarat Public Works Disputes Arbitration Tribunal :

The disputes relating to this Contract in so far as they fall within the jurisdiction of Gujarat Public Works Disputes arbitration tribunal shall be referred to the said Tribunal of Gujarat State.

However the reference to Arbitration Tribunal under this clause will not stay fulfilment of obligations of the contractor or rights of the Engineer-in-charge under this contract, unless otherwise ordered to the contrary by the said Tribunal as Interim Relief measure.

(The following clause is to be deemed included in this conditions only when Plant or Machinery is included in the Contract).

28. Contract Drawings :

The contractor shall submit to the Engineer for his approval on or before the dates stipulated for this purpose in the specification copies of all the drawings of the general arrangements of the plant as set out therein and of such detail drawings as may be reasonably necessary.

Within Fourteen days from the receipt, by him of such copies the Engineer shall signify his approval or otherwise of the same and if he does not do so he shall be deemed to have approved thereof.

Within Fourteen days from the notification by the Engineer to the Contractor of his approval such copies, or in the absence of such notification within thirty days from the receipt of such copies, the copies in ink on tracing cloth or

ferrogallie prints mounted on cloth, of all drawings as approved shall be supplied to the engineer by the contractor respectively and shall thereupon be signed by the contractor and become the property of the Governor of Gujarat.

Such signed copies of the drawing shall not be departed from in any way whatsoever except with the written permission of the Engineer. During the execution of the works of the signed copies shall be always kept available for reference on the site.

In the event of the Contractor desiring to keep in his own possession a signed copy of the drawings as approved he shall supply three copies instead of two and in this case the Engineer shall sign the third copy and return the same to the Contractor.

29: Manner of Execution, Quality of materials etc. :

The plant shall be manufactured, constructed, provided, put in position and maintained in the best and most substantial and workman like manner and materials of the best and approved qualities having regard to their respective uses.

30. Tests on site :

In all cases where the special conditions are provided for tests on the site whether of plant, materials or workmanship the Governor of Gujarat except where otherwise specifically stipulated shall provide free of charge such labour, materials fuel stores, apparatus and instruments as may be requisitioned from time to time efficiently to carry out such tests in accordance with the condition.

Where electrical energy is required for tests on site and a supply is available on the site from an existing installation such electrical energy shall be supplied to the contractor by the Govt. free of charge at the pressure and frequency of the ordinary supply is available the electrical energy necessary for such tests shall be provided by the contractor.

31. Delivery of plants & materials :

No Plant materials shall be tendered for delivery until an intimation in writing shall have been given to the contractor by the Engineer that Governor of Gujarat is ready to take delivery.

32. Tests on completion :

On the completion of the works on the site in accordance with the contract the contractor shall give the Engineer notice in writing of such completion. The Engineer shall after receipt of such notice by notice in writing under his hand for date and an hour on that date for the making of the test on site if any such are provided for the contract.

The contractor shall carry out such tests upon the date and at the hour so fixed and if the Engineer or his authorised representative shall attend on that date at that hours such test shall be carried out in the presence of the Engineer or such representative.

If any portion of the plant fails under the tests to satisfy the contract conditions similar tests according to the contract of the portion so failing shall if required by the Engineer or by the Contractor be repeated within a time to be fixed by the Engineer and the provisions of this clause shall apply to such repeat test as if they were the original tests and the contractor shall pay to the Governor of Gujarat all reasonable expenses to which he may be put by such tests.

If the tests or any repeated tests so required as aforesaid be not made by the Contractor on the date fixed as aforesaid for the same by the Engineer may proceed to make such test himself at the contractor's risk and expense.

If in any test under this clause the plant tested shall fail to satisfy the contract conditions the Governor of Gujarat shall as from the date stipulated by the contract for completion nevertheless have the right of using such plant until the same shall satisfy such conditions and such use shall be at the contractor's risk. In the event of the question whether the works have been completed in accordance with the contract or any question regarding such completion being submitted to Arbitration as any portion of the plant the Engineer may certify to be capable of being used on condition of paying to the contractor a sum calculated (according to the period or the use) at the rate of 5 percent per annum upon the amount withheld or deducted in respect of such plant.

33. Rejection of Defective work :

If the works, or any portion thereof shall not in the opinion of the Engineer on the stipulated tests (if any) being made in accordance with the contract satisfy the contract condition within three months after the date of completion the engineer may give notice in writing to the contractor setting for the particular of the defects of particulars in respect of which the works in his opinion fail to comply with the contract conditions and requiring the contractor to make good, after or replace the same within such time to be specified in the notice as the engineer may consider reasonable and the contractor shall make good, after or replace the same as required by such notice and so as to make it comply with the requirements of the contract condition within the time so specified. Should he fail to do so within that time the Governor of Gujarat may make good alter or replace the same as so required and the cost of such making alteration good or replacement (less in the case of any replacement any sum which would have become due to the contractor under the contract in respect of the works replaced and which shall not have been paid to him) shall be paid by the contractor to the Governor of Gujarat on demand or should the Governor of Gujarat not make good, after or replace any defective works in respect of which such notice as aforesaid shall be given within six weeks from the date of the given of such notice the contractor shall repay to the Governor of Gujarat all sums (if any) paid by him to the Contractor in respect of such works. Nothing contained in this clause shall prejudice or affect the rights of the Governor of Gujarat under the contract whether in the way of enforcement of

penalties or otherwise in respect of any delay in the completion of this work.

34. Use of plant of works pending making good :

If at expiration of the time specified for making good, altering or replacing the plant of works in any notice given by the engineer to the contractor under the last preceding clause the contractor shall not have duly made good, altered or replaced the same in accordance with the contract the Governor of Gujarat shall be at liberty if he thinks fit to make use of the same for such time as shall be reasonably sufficient according to the circumstances to enable him, to make good after or replace the same (whichever he may see fit to do) provided that in respect of the period of such user, the Govt. of Gujarat shall not be entitled to any damages under clause 24 of these conditions and in the case of complete replacement the contractor shall be entitled to be paid in reasonable sum for the same.

35. Workman's compensation in case of injury :

The contractor shall be responsible for any compensation and shall pay to his workmen Compensation payable for injuries under, the workmen's Compensation Act, 1923 (VIII of 1923) hereinafter called the said Act. If such compensation is paid by Govt. as principal under sub-section (1) of section 12 of the said Act, on behalf of the Contractor, it shall be recoverable by Government from the contractor under sub-section (2) of the said section such compensation shall be recovered in the manner laid down in clause 3 and 19 of the condition of contract.

36. The Apprentices :

The contractors shall afford or procure as the case may be every facility to Indian apprentices for practical training in the factory.

Owned managed controlled or patronized by them, so as to enable the Indian Apprentices to acquire full knowledge of the technique and work of their trade industry, calling or profession.

37. Set-off Clause :

Any sums of money due to the Contractor (including the security deposit returnable to the contractor under this contract shall be appropriated by the Government and shall be set off against any claim of the Government for the payment of sum of a money arising out of or under any other contract made by the contractor with the Government. When no such amount for purpose of the recovery from the contractor against any claim of the Government is available such a recovery shall be made from the contractor as arrears of land revenue.

38. Appointment of Local Labourers :

The Contractor should as far as possible obtain the requirement of labourers skilled and unskilled from the nearest employment exchange, so as to utilize the local employment potential. If there are no local employment exchange or such exchanges are not able to provide the required labourers locally, suitable local labours should be utilized to the maximum extent possible.

39. Fairwages :

If a contractor fails to pay within '7' (seven) days to the labourer (s) worker(s) the minimum wages prescribed by the Government under the Minimum Wages Act, 1949 as in force from time to time the Executive Engineer or the officer of a equal rank shall be at liberty to deduct the amount payable to the labourer (s) workers from his (contractor's) bill or deposit(s) payable by the contractor after making due inquiries and shall not be entitled to any payment or compensation on account of any loss that he (contractor) may have to incur of the action as aforesaid. Before the action as aforesaid is enforced notice in writing to the contractor shall be issued by the Executive Engineer or the officer of the equal rank to pay the wages as per minimum Wages Act in force at the relevant time. If the contractor does not act as aforesaid within seven days then the action contemplated as above shall be taken against him.

40. Licence for contract labour :

Before starting the work, the contractor will have to obtain the licence from the District Assistant Labour Commissioner under the Contract Labour (Regulation and Abolition) Act, 1970 and contract Labour (regulation and Abolition) Gujarat Rules 1972 after paying necessary fees and deposit on the basis of the number of labourers to be employed on the work and will have to supply two true copies of the said licence to the Deputy Executive Engineer before the work is started.

41. Deduction of GST from bills :

The following Tax deductions shall be made from each bill payable to the contractor (1) 1% of the value of amount payable towards SGST, (2) 1% of the value of amount payable towards CGST, TDS Certificate for taxes deducted will be issued to the contractor. (F.D.G.R. No. GST/1017/1097/GST Cell dated 15-9-18)

Signature of contractor/s

Executive Engineer,
Division

SCHEDULE 'A'

Schedule showing (approximately) the materials to be supplied from the Public Works Store for work Contracted to be executed and the rates at which they are to be charged for

[illegible]

Note : 1. The person or firms submitting the tender should see that the rates in the above schedule are filled up by the Engineer-in-charge before the issue of the form prior to the submission of the tender.

Note 2 : Store to be supplied to contractors for a work free of cost should be mentioned in Schedule 'A' in addition to schedule 'B' and the specification attached to the contract agreement form.

Signature of contractor/s

Executive Engineer.

SCHEDULE 'B'

Memorandum showing items of works to be carried out :

(For works Estimated below Rs. 5 lakhs)

Items No.	Quantities estimated but may be more or less	Item of work	Estimated Rates		Unit	Total amount according to estimated quantities
			In figures Rs. Ps.	In words		
1	2	3	4	5	6	7
As per separate sheet attached						

I/We am/are willing to carry out the work at % above/below percent (should be written in figures and words) of the estimated rates mentioned above. Amount of my/our tender works out as under.

* Estimated amount

Put to tender Rs.

Deduct :% below Rs.

Net Rs.

In words

* Estimated amount

Put to tender Rs.

Add% above Rs.

Total Rs.

In words

* (Please strike out whichever is not applicable).

Note 1 - All work shall be carried out as per Public Works Department Handbook and other specifications of Division or as directed.

Note 2 - All the columns in Schedule should be filled in ink and the total of the entries in the last column should be struck by the contractor under his signature.

Note 3 - Rates quoted include clearance of site (prior commencement of work and at its close) in all respects and hold good for work under all conditions, site, moisture, weather etc.

Note 4 - To be continued on additional sheets, if found necessary.

Signature of contractor/s

Executive Engineer.

Items No.	Quantities estimated but may be more or less	Item of work आवक का विवरण	Tendered Rates		Unit	Total amount according to estimated quantities
			In figures Rs. Ps.	In words		
1	2	3	4	5	6	7
<div>As per separte sheet attached</div>						

(..... in words)

Note 2 - Rates quoted include clearance of site (prior commencement of work and at its close) in all respects and hold good for work under all conditions: site, moisture, weather etc.

Executive Engineer.

**SPECIFICATIONS FOR ELECTRICAL WORKS IN GOVERNMENT BUILDING
SUBJECT TO THE GENERAL CONDITION OF CONTRACT IN FORCE**

(1986)

GENERAL

1. Wiring Rules :

The installation generally shall be carried out in conformity with relevant Indian Standard Specifications and code of practices prevalent, Indian Electricity Rules, 1956 and Indian Electricity Act, 1910 as amended from time to time.

2. Definition :

The definition of terms shall be in accordance with Indian Standard code of Practice for Electrical wiring Installation IS- 732-1982 except for the definition of point in case of Internal Electrical Installation. For definition of point wiring and measurement of Electrical works IS-5908-1970 shall be referred to.

3. Voltage and Frequency of Supply :

All current consuming devices shall be suitable for frequency of 50 C/s and system of voltage meant for unless otherwise specified.

4. Layout of wiring and its discription :

(i) The wiring shall be carried out as per Schedule "power" wiring must be in screwed conduit and shall be kept separate and distinct from lighting wiring. All wiring must be done on the distribution system with main and branch distribution boards at convenient centres and without isolated fuses. All conductors shall be run as far as possible along the walls and ceiling as to be easily accessible and capable of being thoroughly inspected. The balancing of circuits will be arranged before hand by the Ex. Engineer Electrical Division.

(ii) Within one month of the taking over the installation, the contractor shall supply to the Ex. Engineer, Elect. Division a complete set of wiring diagrams of the same on drawings to be supplied when available by the Executive Engineer, Electrical Division, and to the satisfaction of the Ex. Engineer, Elct. Dn, and these wiring plans shall be "Drawings" within the meaning of the term as used in the General Conditions of contract.

5. Conductors :

All conductors unless otherwise specified shall not be less than 1.5 Sq. mm for point wiring and 2.5 Sq. mm for mains Conductors for power and lighting circuits shall be of adequate size to carry the designed circuit load without exceeding the permissible thermal limits for the installation, and such sizes will be stipulated in specifications and or drawings.

6. Cables :

6.1 All cables shall conform to releveant Indian Standards.

6.2 Conductors of all cable except the flexible cable shall be of aluminium. The smallest aluminium conductors for the final circuit shall have nominal cross sectional area of not less than 1.5 Sq. mm. The minimum size of the aluminium conductors for power wiring shall be 4 sq. mm

6.3.1 Conductors of flexible cables shall be of copper. The minimum cross sectional area of such a cables shall be 14.0193 mm. The flexible cable shall have uniform and adequate insulation.

6.3.2 Unless the flexible cables and conductors are protected by armour or though rubber or PVC Sheath, these shall not be used in workshops and other places where they are liable to mechanical damage.

6.3.3. Core flexible cables shall be used for connecting single phase Appliances for phase, neutral & earth connections.

7. Fall of Potential :

The cross sectional area of all conductors inside buildings shall be so proportioned to their lengths that the drop in voltage between main fuses and the farthest point or any lamp shall not exceed three percent of the voltage of the consumer's with all the consuming devices in use.

7.1 If the CABLE SIZE is increased to avoid the voltage drop in circuit current rating of the cable shall be more than that for which the circuit is designed. In each circuit or sub circuit every cable shall have a current rating not less than that of the fuse which protects the circuit or sub circuit respectively for current higher than the full load current.

8. Ratings of lamps and fans socket out lets : Points and exhaust ifans

8.1 Incandescent lamps installed in residential and non-residential buildings shall be rated at 60 wattas & 100 wattas respectively.

8.2 Table fans and ceiling fans shall be rated at 60 wattas, exhaust fan shall be rated according to their capacity.

8.3 5 Amp. socket outlet points and 15 Amp. sockets outlet points shall be rated at 100 wattas and 1000 wattas respectively for the purpose of load assessment unless actual values of the load are know or specified.

9. Tests :

9.1 Before the installation is commissioned following tests shall be carried out.

- (1) Insulation Resistance test
- (2) Polarity Tests of Switches
- (3) Earth continuity tests
- (4) Earth electrodes Resistance test

- 9.2.1.1 The insulation resistance shall be measured between earth and the whole system of conductors or any section thereof with all fuses in place and all switches closed, and except in earthed concentric wiring all lamps in position or both poles of the installation otherwise electrically connected together a direct current pressure of not less than twice the working pressure provided that it need not exceed 500 volts for medium voltage circuits where the supply is derived from the three wire D.C. or a poly phase A.C. System, the neutral pole of which is connected to earth either direct or through added resistance, the working pressure shall be deemed to be that which is maintained between the phase conductor and the neutral.
- 9.2.1.2 The insulation resistance shall also be measured between all conductors to one pole or phase conductor of the supply and all the conductors connected to the neutral or to the other pole or phase conductors of the supply with all lamps in position and switches in 'OFF' position and its value shall be not less than in that specified in Sub-Clause 9.2.1.3.
- 9.2.1.3 The insulation resistance in Megohms measured as above shall not be less than 50 Megohms divided by the number of outlet or when PVC insulated cables are used for wiring 12.5 megohms divided by number of outlets.
- 9.2.1.4 Where a whole installation is being tested, a lower value than that given by the formula, subject to a minimum of 1 megohm is acceptable.
- 9.2.1.5 A preliminary and similar test may be made before lamps, etc. are installed and in this event the insulation resistance to earth should be not less than 100 megohms divided by the number of outlet or when PVC insulated cables are used for wiring 25 megohms divided by number of outlets.
- 9.2.1.6 The term "Outlet" includes every switch except that a switch combined with a socket outlet, appliance or lighting fitting is regarded as one outlet.
- 9.2.1.7 Control rheostat heating and power appliance and electric sign may, if required, be dis-connected from the circuit during the test, but in that event the insulation resistance between the case or frame work, and all live parts of each rheostat, appliance and sign, shall be not less than that specified in the relevant Indian Standard Specification or where there is no such specification shall be not less than half a megohm.
- 9.2.2 Polarity Test :**
- 9.2.2.1 In a two wire installation a test shall be made to verify that all switches in every circuit have been fitted in the same conductor through out & such conductor shall be labelled or marked for connection to the phase conductor or to the non-earthed conductor of the supply.
- 9.2.2.2 In a three wire or a four wire installation a test shall be made to verify that every non-linked single pole switch is fitted in a conductor which is labelled or marked for connection to one of the phase conductor of the supply.
- 9.2.2.3 The installation shall be connected to the supply for testing. The terminals of all switches shall be tested by a test lamp one lead of which is connected to the earth. Glowing of test lamp to its full brilliance, when the switch is in 'on' position irrespective of appliance in position or not shall indicate that the switch is connected to the right polarity.
- 9.2.3. Earth Continuity Test :**
- The earth continuity conductor including metal conduits and metallic envelopes of cables in all cases shall be tested for electric continuity and the electrical resistance of the same alongwith the earthing lead but excluding any added resistance or earth leakage circuit breaker measured from the connection with the earth electrode to any point in the earth continuity conductor in the completed installation shall not exceed one ohm.
- 9.2.3.1 Earth Electrode Resistance Test :**
- Earth electrode Resistance test may be carried out by Megger Earth Testers containing a direct reading ohm-meter, a hand driven generator and auxiliary electrodes.
- 9.3 On completion of an electric installation (addition and alteration) a certificate shall be furnished by the contractor countersigned by the certified Supervisor under whose direction supervision the installation was carried out. This certificate shall be in the prescribed form as given in Appendix-'B' in addition to the test certificate required by Local Electrical Supply Authorities.
- 10. Joint and looping back :**
- Unless with the sanction of Ex. Engineer Electrical Divisions all joints in conductor shall be means of approved mechanical connectors in suitable and approved junction boxes but looping back system shall be preferable. In wiring unless otherwise specified Phase and live conduct shall be looped at the switch box where a neutral conductor can be looped from light, fan or socket. In non-residential buildings, neutral and earth continuity wire shall be brought to each of the switch boards should be of adequate size to accommodate at least one number of 5 Amps. socket outlet and control switch in future.
- 11. Switches :**
- Main Switchgears, Switch Board and their location :**
- 11.1 All main switches (other than those of iron clad pattern) carrying current of 10 Amp. and above shall be fitted for back connections and shall be suitably protected.
- 11.2 All switches and circuit breakers shall be constructed in accordance with the I.S. 4237-1967. General requirement for switchgear and control gear for voltage not exceeding 1000 Volts and other relevant I.S. provided also that

spring shall be either of phosphor bronze or if steel shall be copper or Nickel plated and that handle shall be so fastened that they do not tend to unscrew or become loose.

- 11.3 All main switches shall be either of metal clad enclosed pattern or of any insulated enclosed pattern which shall be fixed at close proximity to the point of entry of supply.
- 11.4 Switch boards shall not be erected above gas, stoves, or sinks or within 2.5 m of any washing unit in the washing rooms of laundries or in the bath rooms, lavatories, toilets or kitchens.
- 11.5 Switch boards, if unavoidably fixed in places likely to be exposed to weather, to drip or to abnormal moist temperature the outlet casing shall be weather proof and shall be provided with glands or bushing of adopted to receive screwed conduit according to the manner in which cables are run. PVC and double flanged bushes shall be fitted in the holes of the switches for entry and exit of wires.
- 11.6 A switch board not be installed so that its bottom is within 1.25 m above the floor unless the front of the switch board is completely enclosed by a door or the switch board is located in a position to which only authorised persons have access.
- 11.7 Switch boards shall be recessed in the wall if so specified in the schedule of work or in the special specification. The front shall be fitted with hinged panel of other suitable material such as bakelite in wood frame with locking arrangement, the outer surface of door being flush with the walls. Ample room shall be provided at the back for connections and at the front between the switchgear mountings and the door.
- 11.8 Equipments which are on the front of a switch board shall be so arranged that inadvertently personal contact with live parts is unlikely during the manipulation of switchgears, changing of fuses or like operations.
- 11.9 No holes other than the holes by means of which the panel is fixed shall be drilled closer than 1.3 cms. from any edge of the panel.
- 11.10 The various live parts, unless they are effectively screened by substantial barriers of non-hygroscopic, non-inflammable insulating material, shall be so spaced that space shall not be maintained between such parts and earth.
- 11.11 The arrangement of gear shall be such that they shall be readily accessible and their connections to all instruments and apparatus shall also be traceable.
- 11.12 In every case in which switches and fuses are fitted on the same pole, these fuses shall be so arranged that the fuses are not alive when their respective switches are in the off position.
- 11.13 No fuses other than fuses in instrument circuit shall be fixed on the back of or behind a switch board panel or frame.
- 11.14 All the metal switchgears and switch boards shall be painted, prior to erection with one coat of antirust primer. After erection they shall be painted with two coats of approved enamel or aluminium paint as required on all sides wherever accessible.
- 11.15 All switch boards connected to medium voltage and above shall be provided with 'Danger Notice Plate' conforming to relevant Indian Standards.
- 12. Control at Point of Commencement of Supply :**
- 12.1 There shall be a linked main switchgear with fuse on each live conductor of the supply mains at the point of entry. The wiring through out the installation shall be such that there is no break in the neutral wire except in the form of a linked switchgear. The neutral shall also be distinctly marked. In this connection Rule 32(2) of the Indian Electricity Rules, 1968 (See Appendix- 'A') shall also be referred.
- 12.2 The main switchgear shall be situated as near as practicable to be termination of service line and shall be easily accessible without the use of any external aid.
- 12.3 On the main switchgear, where the conductor of a two wire system or an earthen neutral conductor of a multi-wire system or a conductor which is to be connected thereto, an indication of a permanent nature shall be provided to identify the earthen neutral conductor. In this connection Rule 32(3) of Indian Electricity Rules, 1968 (see appendix 'A') shall be referred.
- 13.0 Switch Board & Distribution Boards :**
- Metal clad switch gear shall preferably be mounted on any of the following types of Board.
- 13.1 Hinged type Metal Boards :**
- These shall consist of a box made of sheet metal not less than 2 mm thick and shall be provided with a hinged cover to enable the board to swing open for examination of the wiring at the back. The joints shall be welded. A teak wood board, thoroughly protected both inside and outside with good insulating varnish conforming to IS- 1347-1952 specification for varnish shellac, for General purpose, and of not less than 6.5 mm thickness, shall be provided at the back for attachment of incoming and outgoing cables. There shall be a clear distance of not less than 2.9 cm between the teak wood board and the cover, the distance being increased for larger boards in order that on closing of the cover, the insulation of the cables is not subjected to damage and no short length of cables is subjected to excessive twisting or bending in any case. The board shall be securely fixed to the wall by means of rag bolts, plugs or wooden Gutties and shall be provided with a locking arrangement and an earthing stud. All wires passing through the metal board shall be bunched. Alternatively, hinged type metal boards shall be made of sheet covering mounted

on channel or angle iron frame.

Note : Such type of boards are particularly suitable for small switch-boards for mounting metal-clad switchgear connected to supply at low voltages.

13.2 Fixed type Metal Boards :

These shall consist of an angle or channel of iron frame fixed on the wall or on floor and supported on the wall at the top if necessary. There shall be a clear distance of one metre in front of the switch board. If there are attachments of base connections at the back of the switch board Rules 51(1) (c) of Indian Electricity Rules, 1956 shall apply.

Noten : Such type of boards are particularly suitable for large switchboard for mounting large number of switchgears or higher capacity metal clad switchgears or both.

13.3 Teakwood Boards :

For small installations connected to a single phase 230 volts supply teak wood boards may be caused as main boards or sub-board. These shall be of seasoned teak or other durable wood with solid back impregnated with varnish of approved quality with all joints dovetailed.

13.4 In large size medium voltage installations, before proceeding with the actual construction of the boards, a proper drawing showing the detailed dimensions and design including the disposition of the mountings, which shall be symmetrically and neatly arranged for arriving at the overall dimensions, shall be prepared and approved by the Engineer-in-charge.

13.5 Recessing of Boards :

Where so specified the switch boards shall be recessed in the wall. The front shall be fitted with a hinged panel of teak wood or other suitable materials, such as bakelite, or with unbreakable glass doors in teak wood frame with locking arrangement, the other surface of the doors being flush with the walls. Ample room shall be provided at the back for connection and at the front between the switchgear mountings.

13.6 Arrangement of Apparatus :

- Equipment which is on the front of a switch board shall be so arranged that inadvertently personal contact with live parts is unlikely during the manipulation of switches, changing of fuses or like operation.
- No apparatus shall project beyond any edge of panel. No fuse body shall be mounted within 2.5 cm. of any edge of the panel and no hole other than holes by means of which the panel is fixed shall be drilled closer than 1.3 cms from any edge of the panel.
- The various live parts, unless they are effectively screened by substantial barriers of non-hydroscopic, non-inflammable insulating material, shall be so spaced that an arc cannot maintain between such parts and earth.
- The arrangement of the gear shall be such that they shall be readily accessible and their connections to all instruments and apparatus shall also be easily traceable.
- In every case in which switches and fuses are fitted on the same pole, these fuses shall be so arranged that the fuses are not alive when their respective switches are in the 'OFF' position.
- No fuses other than fuses instrument circuit shall be fixed on the back of or behind a switchboard panel or frame.

13.7 Marking of Apparatus :

- Where a board is connected to voltage higher than 250 volts, all the apparatus mounted on it shall be marked in the following colours to indicate the different poles or phases to which the apparatus or its different terminals may have been connected.

Alternating Current

Three-phase-red,
Yellow, & blue,
Natural-black

Direct Current

Three wire system-2 outer wires
Positive red & negative blue
Natural-black

Where fuse-wire three phase wiring is done, the neutral shall be in one colour and the other three wires in another colour.

- Where a board has more than one switch each such switch shall be marked to indicate which section of the installation it controls.
- All markings required under the rule shall be clear permanent.

13.8 Main & Branch Distribution Board :

13.8.1 Main and branch distribution boards shall be of any type mentioned in 13.1

13.8.2 Main distribution boards shall be provided with a switch or air circuit breaker on each pole of each circuit, a fuse on the phase or live conductor and a link on the neutral or earthed conductor of each circuit. The switches shall always be linked.

13.8.3 Branch Distribution Board :

13.8.3.1 Branch distribution boards shall be provided with a fuse or a miniature circuit breaker or both the adequate rating-setting chosen on the live conductor of each circuit and the earthed neutral conductor shall be connected to a common link and be capable of being disconnected individually for testing purposes. At least one spare circuit of the same capacity shall be provided on each branch distribution board.

- 13.8.3.2 In residential installations, lights and fans may be wired on a common circuit such sub circuit shall not have more than total of ten points of lights, fans and socket outlets. The load of such circuit shall be restricted to 800 watts. If a separate fan circuit is provided, the number of fans in the circuit shall not exceed ten. Power sub-circuits shall be designed according to the load but in no case shall there be more than two outlets on each sub-circuits.
- 13.8.3.3 In industrial and other similar installations requiring the use of group control of switching operation, circuits, for socket outlets may be kept separate from fans and lights. Normally fans and lights may be wired on a common circuit, however, if need is felt separate circuits may be provided for the two. The load on any low voltage sub-circuit shall not exceed 3000 Watts. In case of new installation, all circuits and sub-circuits shall be designed by making provision of 20 per cent increase in load due to any future modification. Power sub-circuits shall be designed according to the load but in no case shall there be more than four outlets in each sub-circuits.
- 13.9 Installation of Distribution Boards :**
- 13.9.1 The distribution fuse-boards shall be located as near as possible to the centre of the load they are intended to control.
- 13.9.2 These shall be fixed on suitable stanchion or wall and shall be accessible for replacement of fuses.
- 13.9.3 These shall be of either metal-clad type, or all insulated type. But, if exposed to weather or damp situations, they shall be of the weather proof type and, if installed where exposed to explosive dust, vapour or gas, they shall be of flame proof type.
- 13.9.4 Where two or more distribution fuse boards feed low voltage these distribution boards shall be :
- (1) Fixed not less than 2 m apart or,
 - (2) Arranged so that it is not possible to open two at a time, namely they are interlocked and the metal case is marked 'Danger 415 Volts', or
 - (3) Installed in a room or enclosure accessible to only authorised persons.
- 13.9.5 All distribution boards shall be marked 'Lighting', 'Power', as the case may be and also marked with the voltage and number of phases of the supply. Each shall be provided with a circuit list giving details of each circuit which it controls and the current rating of the circuit and size of fuse-element.
- 13.9.6 Triple pole distribution boards shall not be generally used for final circuit distribution unless specific approval of Engineer-in-charge is obtained. In special cases where use of Tripole pole distribution boards are inevitable they shall be of H.R.C. fuse type only.
- 13.10 Wiring and Distribution Board :**
- 13.10.1 In wiring a branch board, total load of the consuming devices shall be divided, as far as possible, evenly between the number of ways of the boards leaving the spare circuit for future extension.
- 13.10.2 All connections between pieces of apparatus or between apparatus and terminals on a board shall be neatly arranged in a definite sequence following the arrangement of the apparatus mounted thereon, avoiding unnecessary crossing.
- 13.10.3 Cables shall be connected to a terminal only by soldered or welded or crimped lugs using suitable sleeve, lugs or ferrules unless the terminal is of such a form that it is possible to securely clamp them without the cutting away of cable strands.
- 13.10.4 All bare conductor shall be rigidly fixed in such a manner that a clearance of atleast 2.5 cms. is maintained between conductor of opposite polarity or phase and between the conductors and any material other than insulating material.
- 13.10.5 If required, a pilot lamp shall be fixed and connected through an independent single-pole switch and fuse to the bus-bars of the board.
- 13.10.6 In a hinged type board, the incoming and outgoing cables shall be fixed at one or more points according to the number of cables on the back of the board leaving suitable space in between cables and shall also, if possible be fixed at the corresponding points on the switch board panel. The cables between these points shall be arranged to form a "U" or "S" shaped loop which shall be of such length as to allow the switchboard panel to swing through an angle of not less than 90°.
- 14.0 Capacity of Circuits :**
- 14.1 Lights and fans may be issued on a common circuits and such a circuit shall not have more than a total of ten points of lights, fan and socket outlets, or a load of 800 watts whichever is less. The power circuits shall be designed with a maximum of two outlets per circuits generally when load is not known or specified. In non-residential buildings at important District centres however one outlet per circuit may be preferred. The circuit shall be designed based on the loading of the circuit where not specified the load shall be taken as 1 KW per outlet. Where the load is more than 1 KW it should be controlled by a Isolater switch or miniature circuit breaker.
- 15.0 Passing Through Walls and Floors :**
- 15.1 Where conductors pass through walls one of the following methods shall be employed. Care shall be taken to see that wires pass very freely through protective pipe or box and that the wires pass through in a straight line without

any twist or cross in wires, on other ends of such holes.

- (a) A teak wood box extending through the whole thickness of the wall shall be buried in the wall and casings or conductors shall be carried so as to allow 1.3 cms air space on three sides, of the casing conductor.
- (b) The conductor shall be carried either in a rigid steel conduit conforming to 'IS : 1653-1964 specification for Rigid Steel conduits of Electrical wiring (Revised) or a rigid non-metallic conduit conforming to 'IS : 2509-1963 specification for Rigid Non-Metallic conduits for Electrical Installations, or in a porcelain tube of such size which permits easy drawing in. The end of conduit shall be neatly bushed with porcelain, wood or other approved material.
- (c) Insulated conductors while passing through floors shall be protected from mechanical injury by means of rigid steel conduit (see 'IS 1653-1964) to a height not less than 1.5 m above the floors and flush with the ceiling below. This steel conduit shall be earthed and securely bushed.

15.2 Where a wall tube passes outside a building so as to be exposed to weather, the outer end shall be belt mounted and turned down wards, and properly bushed on the open end.

16.0 Fixing to Walls and Ceilings :

Plugs for ordinary walls or ceilings shall be of well seasoned teak or other aproved hardwood not less than 5 cm long 2.5 cm. square on the inner end and 2 cm. square on the outer end. They shall be cemented into walls to with 7.5 mm of the surface, thr remaining being finished according to the nature of the surface with plaster or lime punning.

16.1 Where owing to irregular crossing or other reasons the plugging of the walls or ceiling with wood plugs presents difficulties, the wood casing, wood batten, metal conduit, or cleat (as the case may be) shall be attached to the wall or ceiling in an approved manner. In the case of new building, wherever possible leak wood plugs shall be fixed in the walls before they are plastered.

16.2 To achieve neatness, plugging of walls or ceiling may be done by an approved type of asbestos, metallic or a fibre fixing plug.

17.0 Branch Switches :

Where the supply is derived from a three-wire or four-wire source, and distribution is done on the two wire system, all branch switches shall be placed in the outer or live conductor of the circuit and no single-phase switch or fuse shall be inserted in the middle wire, earth or earthed neutral conductor of the circuit. Single-pole switches (Other than for multiple control) Carrying not more than 15 amperes may be of tumbler type which shall be 'ON' when the handle known is down.

18.0 Fittings :

Where conductors are required to be threaded through tubes or channels formed in the metal work of fittings these must be free from sharp angles or projecting edges and such size that will enable them to be wired with the conductors used for the final sub Circuits without removing the boarding, taping or outer covering. As far as possible, all tubes and channels should be of sufficient size to permit 'Looping back' of wires cables and flexible cords other than those designed for high temperature shall not be used for wiring fittings except for portable fittings. All fittings must have not less than a half inch male nipple. Fittings and lamp holders for gas filled lamps shall be adequately ventilated.

18.1 Where light fitting is supported by one or more flexible cords, the maximum weight to which the twin flexible cords may be subjected shall be as follows :

Nominal cross sectional Area cord. mm ²	No. & Dia in mm of wires.	Max. Permissible weight Kg.
0.5	16/0.2	1.7
0.75	24/0.2	2.6
1.0	32/0.2	3.5
2.5	48/0.2	5.3
3.5	80/0.2	8.8
4	128/0.2	14.0

18.2 No inflammable shade shall form a part of light fitting unless such shade is well protected against all risks of fire. Celluloid shade or light fitting shall not be used under any circumstances.

18.3 Fitting of Wire :

The use of fitting wire shall be restricted to the internal wiring and the lighting fittings. Where fitting wire is used for wiring, for the sub-circuit loads shall be terminated in a ceiling zone or connector from which they shall be carried into the fittings.

19.0 Lamp Holders :

Lamp holders for use on brackets and the like shall be in accordance with 'IS : 1258-1967, specification for

Bayonet lampholders and all those for use flexible pendants shall be provided with cord grips. All lampholders shall be provided with shade carriers. Where centre contact edison screw lampholders are used, the outer or screw contacts shall be connected to the middle wire, the neutral, and the earthed conductor of the circuit.

20.0 Outdoor Lamps :

External and road lamps shall have weather proof fittings of approved design so as to effectively prevent the admission of moisture. An insulating distance piece of moisture proof materials shall be inserted in the fittings. Flexible cord and cord grip lampholders shall not be used where exposed to weather. In verandahs and similar exposed situations where pendants are used, they shall be of fixed rod type.

21.0 Lamps :

All incandescent lamps, unless otherwise required and suitably protected, shall be hung at a height of not less than 2.5 m above the floor level. They shall be in accordance with IS : 418 : 1957 specification for Tungsten Filament General Service electric lamps.

22.0 Fans, Regulators and Clamps :

22.1.0 Ceiling fans :

Ceiling fans including their suspension shall conform to IS 374-1960 specification for electric ceiling fans and regulators (Revised) & to the following requirements :

- (a) All ceiling fans shall be wired to ceiling roses or to special connector boxes, to which fans rod wires shall be connected and suspended from hooks or shackles with insulators between hooks and suspension rods. There shall be no joint in the suspension rod, but if joints be avoidable then such joints shall be screwed to special couplers of 5 cm minimum length and both ends of pipes shall touch together within couplers, and shall in addition be secured by means of split pins; alternatively, the two pipes may be welded.
- (b) Fans clamps shall be of suitable design according to the nature of construction of ceiling on which these clamps are fitted. In all cases fan clamps shall be fabricated from tested new metal of suitable sizes and they shall be as close fitting as possible. Fan clamps for reinforced concrete roofs shall be buried with the casting and due care shall be taken that they shall serve the purpose. Fan clamps for wood beams shall be of suitable flat iron fixed on two sides of the beam and according to the size and section of the beam one or two mild steel bolts passing through the beam shall hold both flat irons together. Fan clamps for steel joint shall be fabricated from tested flat iron to fit in rigidly to the bottom flange of the beam. Care shall be taken during fabrication that the metal does not crack while hammering to shape. Other fan clamps shall be made to suit the position, but in all cases care shall be taken to see that they are rigid and safe.

Note : All fan clamps shall be so fabricated that fans revolve steadily.

- (c) Canopies on top and bottom of suspension rod shall effectively hide suspensions and connections to fan motors, respectively.
- (d) The lead-in-wire shall be of nominal cross-sectional area not less than 1.0 mm² with copper and 1.5 mm² with aluminium and shall be protected from abrasion.
- (e) Unless otherwise specified, the clear distance between the ceiling fan and the floor shall be less than 2.75 m.

22.2.0 Exhaust Fans :

For fixing of an exhaust fan, a circular hole shall be provided in the wall to suit the size of the frame which shall be fixed by means of rag-bolts embedded in the wall. The hole shall be neatly plastered with cement and brought to the original finish of the wall. The exhaust fan shall be connected to exhaust fan point which shall be wired as neat to the hole as possible by means of a flexible cord, care being taken that the blades rotate in the proper direction.

23.0 Attachment of fittings and accessories :

- 23.1 In other than conduit wiring, all ceiling crosses, brackets, pendants and accessories attached to walls or ceilings shall be mounted on substantial teak wood block twice Varnished after all fixing holes are made in them. Blocks shall be not less than 4 cms. deep. Brass screws only shall be used for attaching fittings and accessories to their base blocks.

24.0 Interchangeability :

Similar part of all switches, lampholders, distribution fuse- boards ceiling roses, brackets, pendants, fans and all other fittings of the same type shall be interchangeable in each installation.

25.0 Conduit Wiring System :

25.1.1 Type and size of conduit - All conduit pipes shall be conforming to "IS : 1653-1964, furnished with galvanised or stove enamelled surface. All conduit accessories shall be of threaded type and under no circumstances pin grip type or clamp type accessories be used. No steel conduit less than 16 mm in diameter shall be used. The number of insulated conductors that can be drawn into rigid steel conduit are given in Table II.

25.1.2 Bunching of cables - Unless otherwise specified, insulated conductors of AC supply and DC supply shall be bunched in separate conduits.

25.1.3 Conduit-joints-Conduit pipes shall be joined by means of screwed couplers and screwed accessories only ("IS : 2667-1964).

Specification for Fittings for Rigid Steel Conduits for Electrical Wiring). In long distance strance straight runs of conduit, inspection type couplers at reasonable intervals shall be provided or running threads with couplers and jam-puts (in the latter case the bare threaded portion shall be treated with anti- corrosive preservative) shall be provided. Thread on conduit pipes in all cases shall be between 11 mm to 27 mm long sufficient to accommodate pipes to full threaded portion of couplers or accessories. Cut ends of conduit pipes shall have no sharp edges nor any or buries left to avoid damage to the insulation of conductors while pulling them through such pipes;

TABLE-II MAXIMUM PERMISSIBLE NUMBER OF 250-V
GRADE SINGLE CORE CABLES THAT CAN BE DRAWN INTO
RIGID STEEL CONDUIT

(CLAUSE 6.5.1.1)

Size of cable		Size of conduit (mm)															
Nominal	Number	16	:	20	:	25	:	32	:	40	:	50	:	63	:		
Gross-sectional area	and Diameter in mm of wires	(No. of cable Max)															
		S	B	S	B	S	B	S	B	S	B	S	B	S	B		
1.0	1/1.12	5	4	7	5	13	10	20	14	-	-	-	-	-	-		
1.5	1/1.40	4	3	7	5	12	10	20	14	-	-	-	-	-	-		
2.5	1/1.80	3	2	6	5	10	8	18	12	-	-	-	-	-	-		
4	1/1.24 (3/1.06*) (7/0.85)	3	2	4	3	7	6	12	10	-	-	-	-	-	-		
6	1/2.80 (7/1.06*)	2	-	3	2	6	5	10	8								
10	1/3.55+	-	-	2	-	5	4	8	7	-	-	-	-	-	-		
	7/1.40*	-	-	2	-	4	3	6	5	8	8	-	-	-	-		
16	7/1.70	-	-	-	-	2	-	4	3	7	6	-	-	-	-		
25	7/2.24	-	-	-	-	-	-	2	-	4	3	7	6	9	7		
35	7/2.50	-	-	-	-	-	-	-	-	2	-	5	4	6	5		
50	7/3.00+	-	-	-	-	-	-	-	-	2	-	5	4	6	5		

* For Cu. Conductors only.

+For Al. Conductors only.

NOTE : 1. The cable shows the maximum capacity of conduits for the simultaneous drawing-in of cables. The table applies to 250 volts grade cable. The columns headed 'S' apply to runs of conduit which have distance not exceeding 4.25

M between draw in boxes, and which do not deflect from the straight by angle of more than 15° . The columns headed 'B' apply to runs of conduit which deflect from the straight by an angle of more than 15° .

NOTE : 2 In case of inspection type draw-in box has been provided and if the cables is first drawn through one straight conduit, then through the drawn box, and then through the second straight conduit, such systems may be considered as that of a straight conduit even if the conduit deflects through the straight by more than 15° .

- 25.1.4 Protection against dampness** - In order to minimise condensation or seating inside the tube, all outlets of conduit system shall be properly drained and ventilated, but in such a manner as to prevent the entry of insects as far as possible.
- 25.1.5 Protection of conduit against rust** - The outer surface of the conduit pipes, including all bends, unions, tees junction boxes, etc., forming part of the conduit system shall be adequately protected against rust particularly when such system is exposed to weather. In all cases, no bare threaded portion of conduit pipe shall be allowed unless such bare threaded portion is treated with anti-corrosive preservative or covered with approved plastic compound.
- 25.1.6 Fixing of conduit** - Conduit pipes shall be fixed by heavy gauge saddles, secured to suitable wood plugs or any other approved plug with screws in an approved manner at an interval of not more than one metre but on either side of couplers or bends or similar fittings; saddles shall be fixed at a distance of 30 cm. from the centre of such fittings.
- 25.1.7 Bends in conduit** - All necessary bends in the system including diversion shall be done by bending pipes, or by inserting suitable solid or inspection type normal bends, elbows or similar fittings; or by fixing cast iron inspection boxes whichever is more suitable. Conduit fitting shall be avoided as far as possible. On conduit system exposed to weather, where necessary, solid type fitting shall be used. Radius of such bends in conduit pipes shall be not less than 7.5 cm. No length of conduit shall have more than the equivalent of four quarter bends from outlet, the bends at the outlets not being counted.
- 25.1.8 Outlets** - All outlets for fitting switches etc., shall be boxes, of suitable metal or any other approved outlet boxes for other surface mounting or flush mounting system.
- 25.1.9 Conductors** - All conductors used in conduits wirings shall preferably be stranded. No single-core cable or nominal Cross-sectional area greater than 130 mm^2 shall be enclosed in a conduit and used for alternating current.
- 25.1.10 Erection and earthing of conduit** - The conduit of each circuit or section shall be completed before conductors are drawn in. The entire system of conduit and permanently connected to earth conforming to the requirements specified under pipe in a workman like manner for a perfect continuity between each wire and conduit. Gas or water pipes shall not be used as earth medium. If conduit pipes are liable to mechanical damage, they shall be adequately protected.
- 25.2 Recessed Conduit wiring system with Rigid Steel conduits** - Recessed conduit wiring system shall comply with all the requirements for surface conduit wiring system specified in 6.5.1.1 to 6.5.1.10 and in addition, conform to the requirements specified in 6.5.2.1 to 6.5.2.4.
- 25.2.1 Making of chase** - The chase in the wall shall be neatly made and be of ample dimensions to permit the conduit to be fixed in the manner desired. In the case of buildings under construction, chases shall be provided in the wall, ceiling etc., at the time of their construction and shall be filled up neatly after erection of conduit and brought to the original finish of the wall.
- 25.2.2 Fixing of conduit in chase** - The conduit pipe shall be fixed by means of staples or by means of saddles not more than 60 cm. apart. Fixing of standard bends or elbows shall be avoided as far as practicable and all curves maintained by bending the conduit pipe itself with a large radius which will permit easy drawing-in of conductors. All threaded joints of rigid steel conduit shall be treated with some approved preservative compound to secure protection against rust.
- 25.2.3 Inspection boxes** - Suitable inspection boxes shall be provided to permit periodical inspection and to facilitate removal of wires, if necessary. These shall be mounted flush with the wall. Suitable ventilating holes shall be provided in the inspection box covers.
- 25.2.4 Type of accessories to be used** - All outlets such as switches and wall sockets, may be either or flush mounting type or surface mounting type.
- (a) **Flush mounting type** - All flush mounting outlets shall be of cast iron mild steel boxes with a cover of approved insulating material or shall be a box made of a suitable insulating material. The switches and

other outlets shall be mounted on such boxes as would be approved. The metal box shall be efficiently earthed with conduit by an approved means of earth attachment.

- (b) **Surface mounting type** - If surface mounting type outlet box is specified, it shall be of any approved insulating material and outlet mounted in an approved manner.

25.2.5 When crossing through expansion joints in buildings, the conduit sections across the joint may be through flexible conduits of the same size as the rigid conduit.

25.3 Conduit Wiring System with Rigid Non-Metallic Conduits :

Rigid Non-Metallic conduits are used for surface, recessed and concealed conduit wiring.

25.3.1 **Type and size** - All non-metallic conduits used shall conform to IS : 2509-1963 and shall be used with the corresponding accessories (See IS : 3419-1965) specification for Fittings for Rigid Non-Metallic Conduits).

25.3.2 **Bunching off cables** - Conductors of AC supply and DC supply shall be bunched in separate conduits. The number of insulated cables that may be drawn into the conduits are given in Table III. In this table space factor does not exceed 40 percent.

TABLE-III MAXIMUM PERMISSIBLE NUMBER OF 250 VOLTS GRADE SINGLE-CORE CABLE THAT MAY BE DRAWN INTO RIGID NON-METALLIC CONDUITS

Size of cable		Size of conduit (mm)					
Nominal	No. Diameter in	16	20	25	32	40	50
Crosssectional area	mm of wires	(No. of cable Max)					
mm ²							
1.0	1/1.12*	5	7	13	20	-	-
1.5	1/1.40	4	6	10	14	-	-
2.5	1/1.80	3	5	10	14	-	-
	3/1.06*						
4	1/1.24	2	3	6	10	14	-
	7/0.85*						
6	1/2.80	-	2	5	8	11	-
	7/1.06*						
10	1/3.55+	-	-	4	7	9	-
	7/1.40*-						
16	7/1.70	-	-	2	4	5	15
25	7/2.24	-	-	-	2	2	6
35	7/2.50	-	-	-	-	2	5
50	7/3.00+	-	-	-	-	2	3
	19/1.80						

* For Cu. Conductors only.

+For Al. Conductors only.

25.3.3 **Conduit joints** - shall be joined by means of screwed or plain couplers depending on whether the conduits are screwed or plain. Where there are long runs of straight conduit, inspection type couplers shall be provided at intervals. For conduit fittings and accessories reference may be made to IS : 3419-1965.

25.3.4 **Fixing of conduits** - The provision of 25.1.6 shall apply except that the spacing between saddles or supports is recommended to be 60 cms for rigid non-metallic conduits.

25.3.5 **Bends in conduit** - Wherever necessary, bends or diversions may be achieved by bending the conduits (See 6.5.3.9) or by employing normal bends, inspection bends, inspection boxes, elbows or similar fittings.

- 25.3.6 Conduit fittings shall be avoided, as far as possible on outdoor system.
- 25.3.7 **Outlets** - All the outlets for fittings, switches, etc., shall be boxes of substantial construction. In order to minimise condensation or sweating inside the conduit, all outlets of conduit system shall be properly drained and ventilated, but in such a manner as to prevent the entry of insects, etc. as far as possible.
- 25.3.8 For use with recessed conduit wiring system the provisions of 6.5.2.1 to 6.5.2.4 shall apply.
- 25.3.9 Heat may be used to soften conduit for bending and forming joints in case of plain conduits. As the material softens when heated, fitting of conduit in close proximity to hot surfaces should be avoided. Caution should be exercised in the use of the conduit in locations where the ambient temperature is 50°C or above. Use of such conduits in place where ambient temperature is 60°C or above is prohibited.

PVC INSULATED AND P.V.C. SHEATHED OR T.R.S. WIRING SYSTEM

26.0 GENERAL :

This system of wiring, is suitable for low pressure installation, and shall not be used in places exposed to sun and rain nor in damp places, provided they are sheathed in the special approved protective covering and well protected to withstand dampness.

26.1 Attachment to walls and ceiling :

- 26.1.1 All cables on brick walls, stone or plastered walls and ceiling shall be run on well seasoned, perfectly straight and well seasoned, perfectly straight and well varnished on four sides, teak wood or any approved hardwood battens not less than 10 mm finished thick, width of which shall be such as to suit total width of cables laid on the batten, prior to election, these shall be painted with one coat of varnish or approved paint of colour to match with surrounding. These battens shall be secured to wall and ceilings by flat head wood screws to raws plug or phill plug at an interval not exceeding 75 cm. Wood plug can be used only with special approval of the Engineer-in-charge. The flat head wood screws shall be counter within wood batten and smoothed down with file.

- 26.1.2 Where wiring is to be carried out along the face of the rolled steel joints a wooden batten of adequate width shall first be laid on the same and dipped to it as inconspicuously as possible. The wiring should then be fixed to this backing shall be suitably bushed to prevent the abrasion of the cables.

- 26.1.3 Attachment to false ceiling : In no case, the open wiring shall be run above the false ceiling without the approval of Engineer-in-charge.

- 26.20 **Link clips** : Only aluminium alloy clips/joint clips shall be used. The thickness shall be 0.32 mm (30 SWG) for lengths of 25 mm to 40 mm and 40 mm (28 SWG) for lengths of 50 mm to 80 mm. The width shall not be less than 6 mm in all these cases. Link clips/joint clips shall be so arranged that one single clip shall not hold more than two core or three single core TRS of PVC insulated and PVC sheathed upto 2.5 sq. mm above while a single clip shall hold a single twin core or two single core cables. The clips shall be fixed on varnished wood batten with iron pins and space at interval of 15 cm both in the case of horizontal and vertical runs.

- 26.3.0 **Bends in wiring** : The wiring shall not in circumstances be bent so as to form an abrupt right angle but must be rounded off at the corners to a radius not less than six times the overall diameter of the cable.

26.4.0 Protection of wiring from Mechanical Damage :

- 26.4.1 In cases where there are chances of any damage to wiring, such wiring shall be drawn complying with all the requirements of conduit wiring system.

- 26.4.2 Such protective covering shall in all cases be fitted on all down drops within 1.5 m from the floor, or from floor level upto the switch board whichever is less.

- 26.5.0 **Passing through floors** : All cables taken through floor shall be enclosed in heavy gauge steel conduit extending 1.5 m above the floor or upto the switch board whichever is less and flush with the ceiling below or by means of any approved type of metallic covering. The ends of all conduits or pipes shall be neatly bushed with porcelain wood or other approved material. The conduit pipes, shall be security earthed.

- 26.6.0 **Passing through walls** : When conductors pass through walls, any one of the following methods shall be employed. Care should be taken to see that wires pass very freely through protective pipe or box and that wires pass

through in a straight line without any twist or cross in wires on either ends of such holes.

- (a) A box of teak wood or approved hard wood extending through the hole thickness of the wall shall be buried in the wall and casings or conductors and casing or conductors shall be carried so as to allow 1.3 cm air space on the three sides of the casing or conductor.
- (b) The conductors shall be carried in an approved heavy gauge solid drawn or lap weld conduit or in a porcelain tube of such a size that it permits easy drawing in, the ends of conduit shall be neatly bushed with porcelain, wood or other approved material.

26.6.1 Where a wall tube passes outside a building so as to be exposed to weather, the outer end shall be mounted and turned downwards and properly bushed on the open end. The conduit shall be neatly arranged so that the cables enter them without bending.

26.7.0 **Buried cables :** The TRS or PVC sheathed cable shall not normally be buried directly in plaster. Where so specified in the special specification they may be taken in teak wood channeling of ample capacity or conduit pipe buried in the wall.

26.8.0 **Stripping of outer covering.** While cutting and stripping of the outer covering of the cable care shall be taken that the sharp edge of the cutting instrument does not touch the inner insulation of the conductors. The protective outer covering of the cables shall be stripped off near connecting terminal and this protective covering shall be maintained upto the close proximity of connecting terminals as far as practicable. Care shall be taken to avoid hammering on link clips with any metal instrument after the cables are laid. Where junction boxes are provided they shall be made moisture proof with a plastic compound.

27.0 PAINTING WORK IN GENERAL :

27.1 **Paints :** paints, oils varnishes, etc. of approved make in original to the satisfaction of the Engineer-in-charge shall only be used.

27.2 **Preparation of surface :** The surface shall be thoroughly cleaned and dusted before painting is started. The proposed surface shall be inspected by Engineer-in-charge or his authorised agent and shall have received the approval before painting is commenced.

27.3 **Application :** Paint shall be applied with brush. The paint shall be spread as smooth & even as possible. Particular care shall be paid to rivets, nuts, bolts and cover lapping. Before drawing out, it shall be continuously stirred in the smaller containers with a smooth stick while it is being applied.

Each coat shall be allowed to dry out sufficiently before a subsequent coat is applied.

27.4 **Scope :** Painting on old surface in indoor situations will not include primer coat except where specially mentioned in the schedule of work or special specification. However, where rust has formed on iron and steel surfaces the spots will be painted with one anti-rust primer coat.

27.5 **Precautions :** All furniture fixtures, glazing floors, etc. shall be protected by covering. All stains, smears, splashes, dropping of every kind shall be removed. While painting of wiring etc. it shall be ensured that painting of wall ceiling etc. is not spoiled in any way.

27.6 **Painting of conduit and accessories :** After installation surface of conduit pipes, fittings switch and regulator boxes, etc. shall be painted with two coats of approved enamel paint or aluminium paint as required to match the finish of surrounding wall, trusser, etc.

28. link clip :

The clip for batten wiring shall be of Aluminium conforming to I.S. specification No. 2415-1975.

APPENDIX - 'A'

Important Clauses of Indian Electricity Rules, 1956. Following clauses of Indian Electricity Rules, 1956 shall in particular be taken care of in the execution of electrical works

Clause No.	Subject
3.	Authorisation :
29.	Construction, installation, protection, operation and maintenance of electric supply lines and apparatuses.
31.	Cut-out on consumer's premises.
32.	Identification of earthed and earthed neutral conductors and position of switches and cutouts therein.
33.	Earthed terminal on consumer's premises.
34.	Handling of electric supply lines and apparatus.
41.	Distinction of circuits of different voltages.
42.	Accidental charge.
43.	Provisions applicable to protective equipment.
44.	Instructions for restoration of persons suffering from electric shock.
45.	Precautions to be adopted by consumers, owners, electrical contractors, Electrical workmen and suppliers.
46.	Periodical inspection and testing of consumer's installation.
48.	Precautions against leakage before connection.
50.	Supply to consumers.
51.	Provisions applicable to medium, high voltage installations.
58.	Point of commencement of supply.
59.	Precautions against failure of supply; Notice of failures.
61.	Connection with earth. (low and Medium Voltage system).
64.	Use of energy at high and extra-high voltage system.
67.	Connection with earth. (High & Extra-high voltage system).
68.	General conditions as to transformation and control of energy.
All clauses under Chapter VIII on Overhead Lines.	
137.	Mode of entry.
138.	Penalty for breaking seal.
139.	Penalty for breach of rule 45.
140.	Penalty for breach of rule 82.
141.	Penalty for breach of rules.

APPENDIX-'B'

Form of Completion Certificate

I/We certify that the installation detailed below has been installed by me/us and tested and that to the best of my/our knowledge and belief, it complies with Indian Electricity Rules, 1956, as well as the C.P.W.D. General Specification for Electrical Works, 1972.

Electrical installation at Voltage and system of supply

(1) Particulars of works :

(a) Internal Electrical Installation	No. Total Load of wiring.	Type or system
--------------------------------------	------------------------------	----------------

(i) Light point

(ii) Fan point

(iii) Plug point

(a) 3 pin 5 Amp.

(b) 3 pin 15 Amp.

(b) Others :

Description

HP/KW

(a) Motors: (i)

(ii)

⊗ Xi = (iii)

(c) Other Plants :

(d) If the work involves installation of over head line/or under ground cable :

(a) (i) Type & Description of overhead line.

(ii) Total length & No. of spans.

(iii) No. of street light & its description

(b) (i) Total length of under ground cable & its size.

(ii) No. of joint.

End joint :

Tee join :

St. through joint :

2) Earthing :

(i) Description of earthing electrode .

(ii) No. of earth electrodes :

(iii) Size of main earth lead :

3) Test Results :

(a) Insulation Resistance :

(i) Insulation resistance of the whole system
of conductors to earth.

Megohms.

(ii) Insulation resistance between the
phase conductors and neutral.

Megohms.

Between phase R and neutral

Megohms

Between phase Y and neutral

Megohms

Between phase B and neutral

Megohms

(iii) Insulation resistance between the phase conductors in case of polyphase supply.

Between phase R & phase Y

Megohms

Between phase Y & phase B

Megohms

Between phase B & phase R

Megohms

(b) Polarity Test :

Polarity of non linked single pole branch switches.

(c) Earth continuity Test :

Maximum resistance between any point in the earth continuity conductor including metal conduits & main earthing lead.

(d) Earth Electrode Resistance :

Resistance of each electrode.

i) ohms

ii) ohms

iii) ohms

iv) ohms

(e) Lighting Protective System :

Resistance of the whole of lighting-protective system to earth before any bonding is effected with electrode and metal in/on the structure.

ohms

Signature of Supervisor

Signature of Contractor

Name & Address

Name & Address

SPECIFICATIONS

All Specification, standard, publication etc. specified mean the latest standards, publication etc. pertaining to Electrical Installation and should conform to the following wherever applicable.

- 1) Indian Electricity Act, 1910 with its amendments.
- 2) Indian Electricity Rules, 1956 and its amendments.
- 3) Indian Electricity supply Act, 1948.
- 4) Regulation for Electrical Equipment in building by I.E.F. Landon.
- 5) The Factory Act, 1948 and its amendments.
- 6) I.S.-732-1982 Part-I, II & III code of practice for Electrical wiring and fittings in buildings for low and medium voltages.
- 7) I.S. 4064-1967 H.D. Air break switches and fuses for Voltages not exceeding 1100 volts.
- 8) I.S. 3043 - Earthing code of practice for
- 9) I.S. - 1554 Part-I - 1970 PVC insulated (Heavy duty) Electrical Cables for working voltages upto and including 110 volts.
- 10) I.S. : 694 - 1964 Part- II - PVC insulated cable with Aluminium conduits (revised) for voltages upto 110 volts.
- 11) I.S. : 5908-1970 - Electrical installations in buildings, method of measurements of.
- 12) I.S. : 4237-1967 - General requirement for switchgear and control gear for voltage not exceeding 1000 volts.
- 13) IS : 1653-1964 - Rigid steel conduits for electrical wiring (revised)
- 14) IS : 2509-1973 - Rigid steel conduits for electrical installation. (First revision).
- 15) IS : 1258-1967 - Bayonet lampholders (First revision)
- 16) IS : 418-1957 - Tungston-Filament General service electric lamps (Third revision).
- 17) IS : 374-1966 - Fans and Regulators, ceiling type, electric (second revision).
- 18) IS : 2667-1964 - Fittings for rigid steel conduits for electrical wiring.
- 19) IS : 3419-1976 - Fitting for rigid non-metallic conduits (First revision).
- 20) National Electric Code, 1986.

ANNEXURE I

Abstract of the Wiring Rules of the Institution of Electrical Engineer (referred to in the specification) DEFINITIONS (See Clause 2 of the Specification)

Systems :

All electrical system in which all the conductor and apparatus are electrically connected to a common source of supply.

- 1) **Earthed** : Effectually connected to the general mass of the earth. Solidly earthed means earthed without the intervention of a fuse, switch, circuit-breaker, resistor reactor or solenoid.
- 2) **Uninsulated Conductor** : A conductor without provision, by the interposition of a dielectric or otherwise, for its insulation from earth.
- 3) **Bare** : Not covered with insulating material.
- 4) **Dielectric** : any material which offers high resistance to the passage of an electric current.
- 5) **Bunch Conductor** : When more than one conductor is contained within a single duct or groove or when they are run enclosed and not spaced apart from each other.
- 6) **Points** : In wiring as per IS : 5908-1970-Method of measurements of electrical installation in buildings.
- 7) **Switch board** : An assemblage of switchgear with or without instruments, but the term does not apply to a group of local switches in a final sub-circuit where each switch has its own insulating base.

Note : In the electricity (Factories Act) special regulations, 1908 and 1944 the term "Switchboard" includes "Distribution board".

- 8) **Single pole switch** : A switch suitable for closing and or opening a circuit on one phase or pole only.
- 9) **Linked switches** : A switch the blades of which are so linked mechanically as to make or break all poles simultaneously or in a definite sequence.
- 10) **Fuse Switch** : A switch the moving part of which carries one or more fuses.
- 11) **Three Wire System** :
 - a) **Outer Conductor** : Those between which there is the greatest difference of potential. This use of the word outer must not be confused with the use of the word when applied to the external conductor of a concentric main.
 - b) **Neutral Conductors** : The term includes the neutral conductor of a 3 phase 4 wire system, the conductor of a single phase or d.c. installation which is earthed by the supply undertaking (or otherwise at the source of the supply) and the middle wire or common return conductor of a 3 wire d.c. or single phase a.c. system.
- 12) **Semi enclosed machine** : One in which the ventilating openings in the frame are covered with-
 - a) Grids expanded metal or wire gauge, with openings of less than 1/4 inch so as to obstruct free ventilation.
 - b) Wire gauge, in which the openings are less than 1/4 inch but not less than 3/32 inch (diameter or width)
 - c) Screens with smaller openings than the above.
- 13) **Totally - enclosed Machine** :

One in which the enclosing case and bearings are dust proof and which does not allow circulation of air between the inside and outside of the case.
- 14) **Pipe Ventilated Machine** : An enclosed machine in which the frame is so arranged that the ventilating air may be conveyed to it through a pipe attached to the frame, the ventilation opening maintained by the fanning action produced by the machine - itself.
- 15) **Forced draught machine** : An enclosed machine in which the ventilating air supply is maintained by an independent fan external to the machine itself.
- 16) **Protected Machine** : One having end shield bearings and in which there is free access to the interior without opening doors or removing covers.

SWITCHES AND CIRCUIT BREAKERS

(See clause II of Specifications)

17) Switches and Circuit Breakers :

Switches and circuit breakers (rules 2b, 36 and 37) whether fixed separately or combined with lamps, holders or fittings, must comply with the following requirements :

- (a) Overheating must not take place at the point of contact or elsewhere, when the full current flows

- continuously.
- (b) They must be so constructed or arranged that the contacts cannot accidentally close when left open.
- (c) The basis must be of incombustible, non-conducting and moisture proof material.
- (d) Circuit breaker as must be so arranged and placed that no combustible material is endangered by their action.
- (e) Unless placed in an engine room or in a compartment especially arranged for the purpose, they must their live parts covered. The covers must be of incombustible material and must be either non-conducting or of rigid metal and clear of all internal mechanism. For more than 6 amperes, at pressures exceeding 125 Volts metal covers must be lined with insulating material.
- (f) In positions where they are liable to injury or come into contact with goods, they must be further protected by an open fronted box or other suitable guard.
- (g) Handles must be insulated and so arranged that the hand cannot touch live metal, or be injured through and adjacent fuse blowing.
- (h) Switches having a handle projecting through an open slot in the cover, must not be used.

Signature of Contractor/s

Executive Engineer

SECTION F-1A

GENERAL REQUIREMENTS

1.1 Scope of works :

The work covered by electrical specification consists supplying and installing, electrical wiring system complete in strict accordance with this specification and the applicable drawing and subject to the terms and conditions of the contract. It includes.

- (a) Conduit and wiring system for fans, lighting points bells, clocks sockets, etc. including fixing of lighting fixtures and fans etc. and miscellaneous points.
- (b) Conduit and wiring system for exhaust fans, power sockets etc.
- (c) Panel boards, distribution boards, switch fuse units.
- (d) Complete power and lighting cable systems.
- (e) Grounding system.
- (f) Conduits system.
- (g) Street lighting system.
- (h) Other miscellaneous electrical work.

1.2 Completeness of Contract :

Any work fittings accessories or apparatus which may not have been specifically mentioned in the specification but which are necessary in the equipment for efficient working of the plant should be deemed to be included in the contract and should be executed and provided by the contractors. All plant and apparatus should be complete in all the details, where such details, are mentioned in the specifications or not.

Three prints and one permanent negative of each of the finally approved drawings incorporating all the modifications proposed by the Department should be submitted. No modifications should be made in a drawing already approved by the Engineer-in-charge without his prior consent.

Approval of the contractor's drawing will not relieve the contractor of any part of his obligation to meet all the requirements of the contract.

1.3 Guarantee :

The performance of all the equipments and the installations should be guaranteed at least for a minimum period of one year from the date of taking over the installation by the Department. All equipments must comply with the relevant IS-BS specifications.

1.4 Interchangeability :

All corresponding parts of similar plant and equipment should be interchangeable in every way.

1.5 Tools :

All special tools required for dismantling and assembly of the equipment covered by the contract shall be supplied as obligation under the contract.

A list of items to be supplied by the Contractor should be submitted alongwith the tender.

SECTION F-2A

Specifications for Electrical Installation in Buildings

1. GENERAL :

1.1 These specifications relate to the electrical installations in the buildings of P.W.D. Electrical. The specifications cover general requirements to be fulfilled. These general specifications are supplemented by the specifications for the particular buildings separately attached.

1.2 These specifications are governed by the General conditions of the contract attached hereto.

1.3 APPLICABLE RULES AND REGULATIONS :

1.3.1 Installation shall be carried out in conformity with the regulations for electrical equipments of buildings, published by the Institute of Electrical Engineers London (14th Edition 1966 and as amended upto date) herein after referred to as the I.E.E. wiring regulations. Where these specifications, or the special specifications for the particular building attached hereto are at variance with the I.E.E. regulations these specifications or special specifications as the case may be, shall be followed. The installation shall also comply with the requirements of the Indian Electricity Act, 1910 as amended upto date and rules issued thereunder and also the regulations for the Electrical Association of India. Where not specified otherwise, the installation should generally follow the Indian standard codes of practice and in their absence the relevant British Standard of practices. All the materials shall comply with the relevant Indian Standard or British Standard specifications.

1.4 DEFINITIONS :

1.4.1. The definitions of terms in the I.E.E. Regulations shall apply in general.

1.5 DRAWINGS :

1.5.1 The preliminary drawings only indicate the general scheme of requirement. The exact position of all points, control switch boxes, runs of wiring and/or conduits joint boxes, inspection boxes, mains, and sub-distribution boards, mains etc. shall be got approved by the Engineer-in-charge. All circuits shall be clearly numbered in wiring diagrams and building plans. The detailed design of a switch-board, special fixture or any other part of the electrical installation as may be called for by the engineer-in-charge shall also be supplied by the Contractor and should be got approved by the Engineer-in-charge. Three sets of completion drawings and wiring diagrams showing the installations as executed shall be supplied by the contractor alongwith the completion certificate.

1.6 MATERIALS :

All materials shall be new and of the best quality conforming to the relevant I.S.B.S. specifications. They must be the products of reliable manufacturers of many years or standings. All like parts of materials shall be interchangeable. In case of equipments such as circuit breakers, switch fuses etc. a descriptive and illustrated literature shall accompany the tender. The names of manufacturers of various materials shall be furnished in proforma in Appendix-I. Samples of materials wherever required should be approved by the Engineer-in-charge before use in the installation. One set of such approved samples shall be deposited with the Engineer-in-charge. All materials shall be rust-proof or rendered rust proof by application of suitable paints. The supply of all equipments, switchgears etc. shall be complete with accessories, fittings and mountings as may be required for their proper performance, and as specified in the relevant IS-BS Code of Practice and standards.

1.7 WORKMANSHIP :

1.7.1. Good workmanship and neat finished appearance are the prerequisites for complying with the clauses of these specifications. With a view to ensure fine workmanship the tenderers shall employ licenced wiremen, with an experience of not less than 5 years in the type of work they are engaged. The work should be done under supervisions of licenced Electrical Supervisors with good educational qualifications and considerable experience.

1.7.2 Tenderers shall furnish the names of Supervisor and their wiremen who will be engaged in this work with details of their experience.

1.8 CO-OPERATIVE WITH CIVIL AND OTHER WORKS CONTRACTORS :

1.8.1. The tenderer, after the award of the contract, shall co-operate with the civil and other contractors and shall co-ordinate his work with the work of other contractors with the least amount of dislocation and interference to the other works. Tenderers shall go through the drawings carefully and shall furnish the Engineer-in-charge with all the details of openings in the walls etc. they may be required for concealing any of the electrical equipments or accessories. Where the contractor fails to furnish such information as may be required for the purpose of concealing the equipments etc. they shall be made at his (Contractor) cost and expense. Any alteration to parts of the building shall be carried out with prior permission of the competent authority. All chasies of the structural work shall be made good at the contractor's expense and brought to the original shape finish and colour.

1.9 TESTING :

The electrical contractor shall be completely responsible for the testing and commissioning of those installations covered by these specifications in compliance with the standard procedure, in obtaining permission of the Government Electrical Inspector. Any modification which is demanded by Government Electrical Inspector shall

have to be carried out within the scope of the contract. The contractor shall submit four copies of drawings of installations as per regulations for shall be provided by the contractor for carrying out the installation work. All tests shall be carried out in the presence of the Engineer-in-charge or his authorised representative and his approval obtained for the test results.

1.10 COMPLETION CERTIFICATE AND MAINTENANCE GUARANTEE :

1.10.1 After the completion of the installation and testing, the contractor should furnish a certificate in the proforma in Appendix-III, at the time of taking over the installation by the Department. The installation shall be guaranteed for period of 12 months from the date of taking over by the Department. During the period of guarantee all defects in material or in workmanship shall be rectified or replaced free of cost to the Department.

1.11 TENDERER'S ABILITY :

1.11.1 In order to enable the Department to assess the ability of the tenderer to execute the work, the tenderer shall furnish evidence of his experience and capacity to carry out the work of the magnitude and nature.

1.12 RATES :

1.12.1 The rates of items shall include all taxes, transport, loading and unloading charge and all such charges that may be required to be incurred for the supply and installation of the materials at site. The rates shall be firm and variations in the market are not entertained. Break up figures as required in the schedule of work shall also be furnished. As far as possible indigenous materials only shall be included for supply. Where it is unavoidable, imported items may be included and tenderer should clearly indicate materials, quantity, rate and amount of these items.

1.13 STORAGE SPACE :

No covered storage space will be provided by the Department. The contractor has to make his own arrangement. However, the Department may give an open space near the place of execution where the contractor can build his own stores for executing the work.

1.14 DEPARTURE FROM SPECIFICATIONS :

The tenderer should clearly indicate departure, if any, from the specifications with reasons for the same.

1.15 EXTRA ITEMS :

Rates for extra items shall generally be derived from the rates already available in the schedule. Where it is not possible, the rates shall be mutually agreed upon and the contractor shall furnish a detailed analysis of the rates claimed by him.

2 TECHNICAL SPECIFICATION :

2.1 Supply System :

The wiring installation shall be suitable for 3 phase 4 wire, 400-440 V 50 cycles system of supply. Colour code of different phase shall be followed as per standard.

2.2 Wiring for Lights and Fans :

2.2.1 Looping system of wiring shall be adopted. No joints shall be made at intermediate runs of cables and where they are unavoidable, such joints shall be through approved mechanical connections.

2.2.2 Point wiring :

Point wiring shall consist of the branch wiring from the switch board together with the controlling switch or push as far as and including the ceiling rose or any other approved connector or socket, outlets. In case of more than one light being controlled by one switch, the wiring upto the ceiling rose of the first light including the switch shall be considered as a 'Primary point'. Loop wiring from light shall be considered as a 'Secondary' point and rates shall be quoted separately, including final connections to fixtures and plugs.

2.2.3 Conductors :

No conductor for final sub circuit wiring for light and socket outlets shall have across-section less than that of 2.5 sq. m (aluminium).

2.2.4 Loading :

No final sub-circuit radiating from the fuse board of a sub-distribution board and wires with 25 sq. m. (Al.) cable shall carry more than 10 lights, fans or socket outlets or a connected load of 800 watts whichever is greater. The following wattages may be assumed for estimating the load on each sub-circuit unless otherwise known or specified.

Incandescent Lamps	100 watts
Ceiling fans	60 watts
5-A Socket Outlets (lighting)	100 watts
4. ft. fluorescent tube.	50 watts
5 ft. fluorescent tubes.	100 watts

In each sub-distribution board at least one way preferably two ways shall be left spare for future requirement. A wiring diagram giving the details of the exact utilization of the ways shall be prepared and fixed in the sub-distribution board itself or any other easily accessible place. The ways of sub-distribution boards shall be accordingly numbered.

2.2.5 Local Control Switches (General) :

Local control switches for circuit carrying not less than 5-5 shall be piano type and shall conform to relevant I.S. Standards. The switch shall be 'ON' when the knob is in the down position. All local control switches shall be connected in the phase or live conductor only and not in the neutral conductor, switches shall be fixed in iron clad box and shall be so placed that the centre of the switch box is 1.3 mtr. from the finished floor level unless otherwise stated. All switch boxes shall be provided with 1/8" thick perspex cover fixed to the switch box with chromium plated counter sunk screws (brass).

2.2.5A Switches (Two way) :

- (a) Two way switches shall be piano type single pole, double throw, 250V, suitable for flush mounting and of 5A capacity as per the drawings. All switches shall be recessed in an embeded metal box.
- (b) Each box shall have suitable outlet for fixing conduits directly.
- (c) Each box shall have perspex cover painted inside with the wall colour, if required.
- (d) Each switch shall be suitable for the position in a corridor stairway wiring.

2.2.5B Switch Boxes (General) :

Electrical circuits shall be written suitably on the cover of all switch boxes, as approved by the Engineer-in-charge (Elect) whenever different phase are terminated in a switch box bakelite partition shall be provided. Each case shall be provided with a G.I. Earth stud nut and washers for earth connectors.

2.2.6 Ceiling Rose :

Ceiling rose shall be used on circuits having a voltage normally exceeding 200V. Only one flexible cord shall be attached to a ceiling rose. Only 3-pin 5A socket outlet shall be provided in lighting circuits. All socket outlets shall be provided with a control switch and they shall be mounted in switch boxes in an approved manner.

2.2.7 Fittings :

These shall be of approved type as specified in the tender schedule. The subcircuits leads should terminate in a ceiling rose or conductor in the fitting and internal connection made therefrom. Wherever these fitting are suspended they shall be done so through the conduits and ball and socket joints. All fittings shall be grounded by a G.I. conductor not less than 16 S.W.G.

2.2.8 Flexible wiring :

Flexible cords of not less than 23/0076 size shall be used. The weight of suspension shall be governed by I.E.E. Regulations.

2.2.9. Ceiling Fans :

All ceiling fans shall be wired to ceiling rose and suspended from a hook shackle or clamp and insulated from the same. All joints in the suspension rod shall be screwed and secured by means of split pins. The fan clamps supplied by the Contractor shall be suitable for the ceiling or roof member as the case may be. For concrete roofs, fan hooks shall be buried in concrete during construction in an approved manner and securely bound to the reinforcement.

2.2.10 Conduits and Earthing :

All conduits feeding lighting and fan circuits shall be provided with earth continuity G.I. conductor as specified for power wiring. All conduits shall be as specified for power wiring.

2.3.1. Point wiring :

Point wiring for power shall be as defined under section 2.2.2 and shall include the switches and sockets.

2.3.2. Loading :

All distribution board for power wiring shall be not less than 15A per way. Loading per way shall not exceed normally 100 watts. The following loads may be assumed if exact figures are not known.

3-Pin 15A Outlets	1,000	Watts
3-Pin 5A Outlets	100	Watts

2.3.3 Wiring for Motors :

2.3.3.1 Final sub-circuits loop in motors shall be connected to separate ways of the Distribution board even if the current in the sub-circuit is less than 15A. No looping is permissible.

2.3.3.2 All wiring shall be carried in H.G. conduit as specified in I.S. specification for gauge for different sizes of conduits. When the motor is resiliently mounted flexible conduit with approved adaptors shall be used for the last few feet. Where cables are used sufficient loop shall be left.

2.3.3.3 All switch fuse units controlling circuits feeding motor shall be provided with H.R.C. fuses or as specified.

2.3.3.4 The frame of every motor and its association control gear shall be earthed by two separate and distinct connections to earth connector shall be capable of carrying 3 times the rating of fuse or 1.1/2 time the setting of the circuit breakers but in no case less than No. 8 S.W.G. or 7064" or equivalent cross section of copper. Where practicable, the earth connections shall be visible for periodical inspection. Gas or water pipes shall not be used for earth connections.

2.3.3.5 Socket Outlets and Control Switches 5A and 15A :

All socket outlets shall be of 3 pin type, the third pin being connected to the earth stud of nearest distribution board

by separate earthing wire. The socket shall conform to I.S. : 1293/1938, single pole, piano type. Each socket outlets shall be provided with a control switch of appropriate rating and as specified. The switch and socket shall be mounted inside the iron clad box provided with 1/8" perspex cover as directed by the Engineer-in-charge or as specified in schedule of quantities. Inside switch box ample space shall be available around switches for connecting wires to switches. All socket outlets for power shall be mounted at the skirting level unless otherwise specified or as directed by the Engineer-in-charge.

The three phase plug receptacles shall have their earth terminals connected by independent earth wires to ring main earth strips on the building. In buildings where explosion proof fixtures are installed single phase plug receptacles as well as light points shall be connected to ring main ground bus installed in the building by separate earth wires of approved size.

Socket outlet shall have some provision not to receive the matching plug unless the grounding pin is in correct position. The grounding pin of the plug shall make the contact first and break the contact last at the time of inserting or removing the plug respectively.

The grounding terminal shall be connected to the enclosed metal body by providing G.I. stud, nut washers welded to the box.

Each unit shall be suitable for flush mounting as required and indicated in the applicable drawings.

Combination unit of socket outlet and switch shall be complete with necessary internal wiring. The switch/socket shall be mounted on M.S. bracket enclosed in a box.

2.4 Conduit Wiring :

2.4.1 Where conduit wiring is adopted the type and size of the conduit shall be as indicated in the drawing. The minimum of the conduit shall be 19 mm.

2.4.2 The contractor shall thoroughly study the structural arrangements of the buildings and wherever, necessary shall in consultation with Department's representatives at site, make suitable adjustments in the cable routings, earthing arrangements, and location boxes, fitting etc. with a view to avoid interference with any part of the building, structure, equipment or any other work in the building or to effect any improvement in the arrangement.

2.4.3 Protection of conduit against rust :

Conduit shall be given two coats of oxide paint before they are placed in position. All exposed conduit shall be painted after installation with the colour as approved by the Engineer-in-charge. This do not apply to galvanised conduit.

2.4.3.A Protection against insects and damp :

In order to minimise condensation or sweating inside the conduit, system shall be properly drained and ventilated in such a manner as to prevent the entry of insects.

2.4.4 Conduit shall first be installed as a complete system without cables and shall be continuous from outlet to outlet from fitting to fitting and mechanically and electrically connected to all boxes and fittings.

2.5 SPECIFICATION FOR POWER CONTROL AND TELEPHONE CABLES :

I. SCOPE :

- i. The specifications cover the supply and installation of medium voltage power and control cables either on ground or trench depending on the conditions at site including accessories for the same. The work in general, consists of supplying, laying, jointing terminating and connecting all 1.1 KV APLSTS PVC power and control cables.
- ii. The contractor shall supply all accessories including jointing and terminating materials, compound, tapes supporting materials, cleats cables lugs, concrete stabs, bricks sand, cable markers etc, as required to make the installation work including digging and back filling of the trenches as required.

II. SPECIFICATION :

- i. All power cables to be supplied mentioned as 'APLSTS' in the Schedule should be mass impregnated, non-draining, paper insulated lead sheathed, double steel tape armoured and must comply with the latest ISI BS specifications.
- ii. All cabling materials such as cable compound, cable lugs, tapes shall be of approved quality acceptable to the type recommended by the manufacturer of the cable for which it is used and approved by the Department.
- iii. Installation of all equipment shall also conform to the applicable. Codes and practice as per the IS and shall be executed to comply with the latest Indian Electricity rules as regards the safety, earthing of equipments and other essential provisions specified therein.
- iv. Only approved make of cable shall be used. ICC and CCI will be preferred.
- v. The cables shall generally be laid as per is Code of practice.

III. GENERAL RULES CABLE LAYING :

- i. Installation shall be carried out in a neat, workmen like manner by skilled experienced and competent workmen in accordance with the standard practices.
- ii. Cables shall be laid preferably in one piece length to avoid joints. If straight joints are found necessary, these can be introduced with prior approval of the Engineer-in-charge. The cost of the straight joint however, shall

- not be borne by the Department. But in no case joint shall be within the conduit G.I. pipe and duct.
- iii. Proper care should be exercised in handling the cable to avoid formation of kink etc. and should it become necessary a cable be bent to a radius not less than 20 times the overall diameter of the cable.
 - iv. Method of installation, routing of cable etc. shall in every case be subject to the Department's approval and the contractor shall modify and or certify at no extra cost to the Department any portions of the installation which do not meet with the Department's approval. All damages to the civil and other works on this account shall be made good by the contractor at no extra cost to the Department.
The electrical contractor while notifying the building contractor for such work shall furnish the proper drawings, fully explaining the work involved or indicate at site actual work to be carried out as may be required by the building contractor. The electrical of any such work as soon as the electrical work with respect to the same has been completed.
 - v. Where cables pass through hume pipes, contractor shall fix hard wood bushed round the cables at the ends of hume pipes. Where the cables pass through the floors or chambers and in such other situations as the Engineer shall require, the contractor shall seal cable holes in a manner approved by Engineer-in-charge. Where cable pass through roads nallahs, etc. cables must be protected by Class 'A' Hume pipe of diameter not less than 6" (15cms.)
 - vi. The cable route shall be the shortest and these shall be minimum interference with built up areas, lawns etc.
 - vii. Care shall be exercised for providing suitable props for supporting other service lines on earth at the time of excavation. Where cutting of a lawn become inevitable it should be with the approval of the Engineer-in-charge.
 - viii. Excavation of the trenches shall be executed with verticle sides and the trenches shall be kept as straight as possible. The exact location of each trench shall be settled by the Engineer- in-charge. On the site when the contract is in-a position to commence each portion of the work.
The trench shall be not less than 1/2 meter wide and 90 cms deep. If more, cables are to be laid, the width should be suitably increased.
 - ix. After the cables are laid, the trench shall be filled in layers, the earth in each layer being well rammed by spraying water and consolidated and sufficient allowance made for settlement. The extra earth over the trench should be removed from the place of trench to a place as decided by the Engineer- in-charge at site.
 - x. Ends of cables shall be properly sealed to prevent entry of moisture prior to installation.
 - xi. Where it is as specified as 1/2 core cables the 1/2 core shall be a neutral conductor having reduced section
 - xii. For all multicore cables each core and tails shall be brought out, marked and or coloured in an approved manner.
 - xiii. Cables termination shall be done with suitable compression brass glands in the case of PVC cables and cast iron trifurating boxes in the case of APLSTS cables. The armour should be connected to the right main earth in building with duplicate earth wires as per the relevant IS/BS specification.
The core insulation over each conductor shall however be retained through out the run of the conductor upto the end where lugs shall be fitted thereon for connections. The lugs shall be fitted by means of approved solder and flux such as atcap, and Eyro No. 7 liberally used. The joint shall be mechanically strong and pressure tested.

2.6 DISTRIBUTION BOARDS AND PANELS :

General Requirements :

- 2.6.2 All distribution panels shall comply with I.E.E. Rules 60- 61. A clear distance of 0.91m metre in front of the switch board shall be kept. Where bare connections or attachments are provided at the back of the switch board the space behind the panel shall be either less than 0.299 metre or more than 0.762 main width there shall be a passage way from the furthest outstanding part of any attachment or conductor. If the space behind the switch board exceeds 0.70 main width there shall be a passage way from either end of the switch board clear to height of 1.928 m width 0.299 m. All wiring connection shall be made neatly and securely.
- 2.6.2 For circuits carrying more than 10 Amps, tinned cable sockets shall be used. All connections shall be so made as to form their own diagram Circuit shall be clearly numbered to correspond to wiring diagram Names of the distribution boards shall be painted as directed by the Engineer-in-charge. All the switch fuse units and isolators D.Bs. shall be complete with earthing studs lugs neutral bar link, H.R.C. fuses and of aproved make.
- 2.6.3 Skeleton type panels shall have a rigid form work adequately braced and supported. The switch and distribution boards shall be neatly arranged in the frame. The details of the frame work and the arrangement of switches shall be got approved by the Engineer-in-charge before the panel is fabricated.
- 2.6.4 All cubical type panels shall have rigid supporting frames adequately braced over which sheet metal shall be neatly secured. All switches, distribution boards etc. shall be neatly arranged on the panels and all connections made from the back of switches. The panels shall be rendered dust and vermin-proof. The interior of the panels shall not be accessible to unauthorised persons.
- 2.6.5 The recess type boards shall be embedded in wall in a cupboard with a metal hinged door with locking arrangement. In all recessed conduit work all distribution boards shall be recessed. Where recessing is not possible, free standing panel may be provided as approved by the Engineer-in-charge.
- 2.6.6 All individual components i.e. switch fuse units D.Bs. etc. shall be connected by earth continuity wire of appropriate size with the main earth bus of the panel D.B. etc. The panel switches or D.Bs. shall be earthed by the less than 2 distinctive paths to earth. Earthing of metallic parts of exposed metal shall not be effected through any structural metal work which houses the installation. Where metallic parts are not required to be earthed and are liable to become alive should the installation of the

contractor become defective such metallic parts shall be separated by durable non-conducting material from any structural work.

- (a) Power panels shall be 3 phase, 4 wire, 400/230 volts for the distribution of 3 phase or single phase power loads. Lighting panels shall be 3 phase 4 wire 400/230 volts for single phase lighting load distribution on all 3 phase.
- (b) All panels shall be done or protected front type with no mechanical or electrical defects.
- (c) Bus bars shall be of electrolytic copper or aluminium as specified and the properly finned sizes as indicated on applicable drawings as required.
- (d) All knock outs for branch circuits, conduit entries shall be drilled in and filled as required. For lighting panels the top and bottom cover plates shall be removable type.
- (e) Main disconnect device for all panel boards shall be of switches of disconnect type and of the size as indicated shall be mounted directly below the panel or through a short thread conduit of required size.
- (f) The main disconnect for all panel boards shall have an entry suitable for PVC armoured cable from bottom.
- (g) All panel boards shall be provided with an earthing terminal and lug for connection to the grounding system.
- (h) Temperature rise of all electrical parts shall not be more than 300° with full load amperes at room temperature.
- (i) Buses shall be securely supported so that ordinary vibrations will not cause any of the parts to become loose.
- (j) All barriers and supports of current carrying parts shall be of moisture resistant insulating material and shall not be adversely affected by arcing.
- (k) The locations of panels shown in the drawings are only tentative, Panels may be located at a place approved by the Engineer-in-charge.
- (l) All civil works connected with fixing such as grouting chasing and making good shall be the tenderor's responsibility.
- (m) Wires adequate capacity with proper size of lugs shall be used for inter connectos.
- (n) Panel should be self supported on angle channel iron frame work. It should be preferably of bolted construction in case of transportation and flexibility. The frames shall be of the required size for the mounting of the equipment on it. It shall be bolted or grouted rigidly after levelling and alignment.
- (o) The cupboard and D.B. should be of such size so to be accommodated in the existing room as per I.S. rules and I.S. codes of practice for installations of Medium voltage switch gear.
- (p) Fabrication drawing showing the detailed dimensions and panels and its components indicating the frame work, earthing positioning of switches, D.Bs, cable boxes, adpater chambers etc. shall be furnished to the Engineer-in-charge for his approval. All material to be got approved by the Engineer-in-charge. Panel should be guaranteed for satisfactory operations for a period of one year after handing over.
- (q) The panel should be painted with anticorrosive paint suitable for humid and salty atmosphere on two coats of primer.

Switch Gears, Powers Panels D. B. and S. F. Us.

- 2.6.8 The main busbar shall have continuous current rating as specified with neutral bar having half of full load rating of the phase busbar. The sizes of the bus bars shall be so selected that the current density in bar does not exceed 150 amps. per sq.m. for copper. The length of bus-bar chamber should be as suitable length to fix all the switches etc. as per the prevailing standards, clear spacing of two adjacent buses shall be 1 1/2" minimum bar should be itaped all alongwith colour coated 11KV grade PVC tape. The maximum internal of support for each unsupported length shall exceed 600 mm.

The bus bar shall be of copper/aluminium and fabricated to the relevant standards specification. In case aluminium bus bar is used special with high conductivity aluminium bus bar alloy E 91 C frame conforming to E.S.S. 2898 shall be used. The current density shall not exceed 800A per sq. inch. Hylam barriers will be provided over the joints to prevent any short circuit. The bus enclosings shall be made out not less than 16 gauge M.S. sheet construct on with angle iron support. All interconnections between bus bars S.F. Us. and D. Bs. shall be of adequate size and details of such inter connection shall be furnished to the Engineer-in-charge for his approval.

The bus-bar shall be air insulated extensible type rectangular one. The bus bars chamber shall be dust tight by providing gaskets secured properly so as to render it vermin proof.

The Combination Fuse-switch unit should comply with IS 4064 BS 861 and BBS 2510 wherever applicable. It should be suitable to accommodate High Rupturing Capacity Cartridge Fuselinks complying with IS 2208 or BS 88 and having a certified rupturing capacity of not less than 35 MVA at 440 volts (AC5 duty). The switch gear (panels, D. Bs. etc.) shall be installed generally as per IS-Part-1 3072 and as specified and shown in drawings.

All fuse switch units shall be provided with non-deteriorating HRC fuse links complying with IS 2208-1962 and having rupturing capacity of 35 MVA at 415 volts or as specified.

All switches above 60 amps. rating shall be provided with suitable size adapted boxes. All switches mounted on the top of the busbars shall be provided with detachable type reverse entry adapter boxes. Suitably engraved labels shall be provided for each circuit as well as for the board.

A meters sector switches and LMH metre shall be provided where specifically mentioned. Small wiring for the inter-connecting shall be colour coded and provided with numbered fuses for easy identification of circuits.

- (a) The distribution boards should be totally enclosed metal clad complying with B. S. 214. The M. S. sheet steel enclosures for recessed D. Bs. shall be of not less than 14 gauge.
- (b) The D. B. shall be with hinged door and the locking arrangements as approved by the Engineer-in-charge.
- (c) All the components shall be enclosed in the enclosure. The mounting of D. B. shall be got approved by the Engineer-in-charge before carrying out the installation.
- (d) The D. Bs. shall have proper size cut outs for conduits entry or cable entry as required and these shall be made on site.
- (e) Adequate spacing shall be provided inside the D. Bs. for easy removal of the fuses and carry out the inter connection.
- (f) A set of insulating barriers have to be provided between incoming breakers switches and fuses.

Switchfuse Units :

- (a) All the D.P.T.P. and T.P.N. switch fuse units shall be totally enclosed iron clad quick make, quick break type to best Indian make conforming to the I.S. or B.S. 3185 specifications. All the switch fuse units shall have mechanical interlock with a door, so that the door cannot be opened when the switches are in 'ON' position. The switches should be of double break solation type to ensure safety.
- (b) Each T.P. & T.P.N. switch fuse unit shall be earthed with two distinct earth connections.
- (c) Suitable insulator shall be provided between phase.
- (d) There shall be suitable natural link in the fuse box.
- (e) All T. P. & T.P.N. switch fuse units shall be rated for 500 volts and D. P. (required for single phase supply) and S.P.N. switches for 250 volts.
- (f) The H.R.C. cartridge fuse shall conform to H.S. 88 (1952).
The O.C.Bs. ACB shall be suitable for 400/440 volts 3 phase 50 cycle supply capable of interrupting a fault MVA of not less than 31. The circuit breaker shall conform to the BSS-936-1940 BSS 3659 with such tripping arrangement as may be required under special specifications for the building. Efficient and fool-proof mechanical interlocking shall be provided for the safe operation and maintenance. The rate shall be inclusive of the first filling of oil.

2.7 Instrumentation :

The instruments and meters wherever necessary shall be housed in special sheet steel box located between switch fuses units and bus bar chambers. The instruments etc. shall be mounted on the hinged cover with their dial flushed. All instruments shall have protective H. R. C. fuse links. All interconnections and small wiring shall be neatly dressed arranged and duly coloured for easy identification of circuits.

Meters shall be provided as required in the Schedule. Meters shall be dead head and be suitable for 400/440 volt 3 phase 4 wire 50 cycle (unbalanced load) supply.

Each selector switch shall be 3 point and of minimum 250 volts grade with silver tipped contacts suitable for metering circuits, current transformers shall be of 5VA burden and commercial metering accuracy. Indicating lamps shall be panel mounting type preferably of 250V grade. Every unit shall be prewired and interconnected to the system for its required indicating performance. Indicating lamps shall have independent circuit fuse.

2.8 FIXING OF LIGHTING FIXTURES :

1. Location of fixtures their manner of fixing mounting height etc. are indicated in relevant drawing. Actual location and levels shall however be arrived at site in co-ordination with other service etc. and prior approval of the Engineer-in-charge regarding the actual location. Manner of fixing shall be obtained before the work is taken up in hand.
2. In all cases the contractor shall provide necessary interconnection wiring earthing painting etc. all necessary for complete installation. The contractor shall also test and commission the fixtures during completion of the work.
3. General arrangement of fixtures layout is indicated in drawings. Care shall be taken to see that all light fixtures are in a row in a room or particular area, are in absolute line and plumb and are symmetrically disposed with respect to finished surfaces of walls columns beams etc.
4. The inter-connections wiring from the light outlet point upto the fixture shall be carried out by means of flexible copper wire of section not less than 1.5 mm².
5. All fixtures suspended by means of conduits shall be done with all and socket joints or as per approved design.

2.9 Telephone System :

1. Empty conduiting shall be done, recessed or exposed to surface along with pull boxes, junction boxes and telephone outlet boxes, in areas and location as indicated in the relevant drawing as per materials and methods as described in regard to conduiting under section "Wiring in Conduits" except the G.I. pull wires of gauge not less than 20 SWG shall be kept pulled through conduits in all sections so that in future telephone wires can be pulled easily.
2. Location shown on the drawing are approximate and final location shall be decided in the field by the Engineer-in-charge.

SECTION G**SPECIFICATION FOR EARTHING.****1. Installation of Earthing Plates :**

All installation of earthing shall conform to Indian Electricity Rules, IS-3043 latest edition and I.E.E. The copper earth plates should be tinned before installation. The earth plates of copper 60 cm x 60 cm x 3.515 mm thick size as mentioned in the schedule be in separate pits at least 150 cms to 300 cms. away from the building at a depth necessary to reach moist earth surface but with a minimum depth of 2.5 mtr from the finished ground level upto the top vertical edge of earth electrode. The earth plate shall be thoroughly cleaned to remove all dirt from the surface and be tinned properly for electrical contact with the main ground. Each earth pit should be provided with 38 mm. dia G.I. pipe 2.5 Mts. long or more depending upto the depth of pit, put over the vertical edge of earth plate (with top end of pipe provided with a closed to coupler). Alternative layers of salt and coke shall be provided surrounding the plate. The pits shall be filled when the plates are in position and with the approval of Engineer-in-charge.

To facilitate watering the pit, a concrete compartment should be made with funnel with mesh and cover plate as per rules provided in ISI regulation. The masonry enclosures shall be 25 cm x 25 cm x 25 cm (deep) with C. I. lid of 23 cm x 30 cms size. After installation, the earthing resistance of each earth plate should be measured by resistance meggar in the presence of Engineer-in-charge, three days after the completion of earthing work, and the value should conform to regulations.

Signature of contractor/s

Executive Engineer,
Division.

LIST OF THE APPROVED PRODUCTS FOR THE YEAR 2013-2014

CHAPTER - I

WIRING

1.1 SHOCKPROOF ACCESSORIES

(A) Concealed / Surface Type

Any 'I.S.I.' marked Which is Approved by Department

CATEGORY - I

1. ALLWYN - APPROVED

M/s Allwyn Electricals Industries, 78, Kakad Industrial Estate, Lady Jamshedji Road, Mahim - Mumbai - 400016

2. SAFECON'S

M/s KALA ELECTRICAL INDUSTRIES, 12/A, Eagal Market, 90 Feet Road, Saki Naka, Mumbai - 400072

3. MILLION & MILTEC

M/s. Mutha Electricals
1940/4, Khadia Cross Road, Gandhi Road, Ahmedabad - 01

4. LEGEND & WIT

M/s. VINAYAK ELECTRICAL INDUSTRIAL, Dal Mill, Opp. Charch, Behind Sonia Wadim SURENDRANAGAR - 363001

5. VIMAL

M/s Solanki Industries, 22/180, Motilalnagar, Opp. Old best colony, Goregaon (W), Mumbai

CATEGORY - II

(1) VINAY

M/s Vinay Electricals, 18-A, Singh Industrial, Estate, Bldg. No.1, Rammandir Road, Goregaon (W), Mumbai - 40014

CATEGORY - III

(1) TOYAMA

M/s. Toyama Electric Ltd
36(A), Kiadb Industrial Estate, Hoskote, Bangalore - 562114

(2) ORPAT

M/s. Ajanta Industrial Estate, Rajkot
Highway Post Box No. 115, Morbi

(B) Mini Modular Type [Approved]

1. ANCHOR [NOVA / XL]

Anchor Elect. P.Ltd., Marathon Innova C Wing, Opp. Peninsula Corporate Park, Opp. G.K.Marg, Lower Parel (W) Mumbai

2. POINTER

H.O. B-15, Atlanta Evershine, Evershine
Nagar, Malad (W), Mumbai - 400054

3. PRISM - POINTER

M/s Prism Industries (Refer to Ch.1.1.(B), Cat.-III (2))

4. ORPAT (Refer to Ch.1.1.(A), Cat.-III (2))

5. VIMAL (Refer to Ch.1.1.(A), Cat.-III (5))

6. GELCO - Cat. II

GELCO ELECTRONICS PVT LTD
3.7.8 & 16 Amarnath Estate, Nr. Krishna Gopal Estate,
Naroda Road, Ahmedabad - 380025

(C) Modular Type APPROVED

1. L&T ORIS

M/s LARSON & TURBRO LIMITED
501, SAKAR-I, OPP GANDHIGRAM RAILWAY
STATION, AHMEDABAD - 380009

2. LEGEND & WIT (Refer to Ch.1.1.(A), Cat.-I (4))

3. INDOSIMON

M/s. EON Electric Limited
B/68, Sector 83, NOIDA - 201305, U.P., INDIA

4. RANI

M/s. Param Switchgear (P.) Ltd.
11, CSG Anand Niketan New Delhi-110021.

CATEGORY - I

1. PRECISION

M/s Precision Electricals Shiv Sagar estate,
A-Block (Basement) Dr. A.B.Road Worli, Mumbai - 400018

2. POINTER - ITALIA (Refer to Ch.1.1.(B), Cat.-III (2))

3. ALEX

M/s Alex Industries, 3, Neminath Industrial
Estate no.3 Navghar Road, Vasai (E) Dist. Thane - 401210

4. PRISM - POINTER (Refer to Ch.1.1.(B), 3)

5. VIMAL (Refer to Ch.1.1.(A), Cat.-I (5))

6. S.G.

CATEGORY - II

1. ANCHOR-RIDER (Refer to Ch.1.1.(B)-3)

2. GELCO (Refer to Ch.1.1.(B)-Cat.III (6))

3. POINTER - SPECTRA (Refer to Ch.1.1.(B) Cat.III - (3)

4. ELLYS

M/s ELLE Electrical P.L. Cama Industrial Area, Walbhat Road,
Next to Rajaram Tarphe, Goregaon (E), Mumbai - 400063

5. HI-FI

M/s Aerolite Industries, 5, Sati Industrial Estate,
I.B. Road, Goregaon (E), Mumbai - 400063

6. WONDER [EVER/PLAYBOY/COOLICY/FORTUNE/DASH/ GOLD]

M/s Wonder Industries, G-14, O.I.D.C. Udhog
Nagar Industrial Estate, GIDC, Ringanwada, DAMAN (U.T)

7. ALLWYN (Refer to Ch.1.1.(A) Cat. I (1))

8. INDOASIAN

M/s Indo Asian Fusegear Limited, 203-204, Shreedhar Avenue,
11, Sardar Patel Colony, Nr. Sardar Patel Statue, Naranpura,
Ahmedabad

9. VINAY (Refer to Ch.1.1.(A) Cat.-II (1))

10. LEADER

M/s Leader Electrical P.L., Leader House, 9-B, Mahal Industrial
Estate, P.B.No. 9483, Mahakali Caves Road, Andheri (E),
Mumbai - 400 093

11. LK

L.K. Switchges, 165, G.I.D.C. Makarpura, Baroda - 390001

12. NORTHWEST

North West Switchgear Ltd.,
14/3, Mathura Road, Faridabad Haryana - 121003

13. MK

CATEGORY - III

1. HAVELL'S - CRABTREE

M/s Havell's India Ltd. 202-205, SHIVALIK II, Nr. Shivrangani,
Cross Road, Satellite 132 Ft. Ring Road, Ahmedabad - 380015

2. TOYAMA (Refer to Ch.1.1.(A) Cat.-III (1))

3. ANCHOR [ROMA / WOOD / AVE] (Refer to Ch.1.1.(B)-I)

4. PHILIPS

M/S. Philips Electronics India Ltd., 7, Justice Chandra
Madhab Road, Kolkata-700020.

5. ABB

M/S ABB Limited 2nd Floor, Est. Wing, Khanija Bhavan, 49,
Race Course Road, Bangalore - 560 001

6. ORPAT (Refer to Ch.1.1.(A) Cat.-III-(2))

7. SALZER

M/s SALZER ELECTRONICS LTD,
Samichettipalayam, Coimbatore-641047.

8. C&S GEWISS

M/s. Control & Switchgears Contactors LTD.
9th Floor, HERITAGE, Nr. Gujarat Vidyapith,
Ashram Road, Ahmedabad - 380 009

1.2 RIGID PVC PIPES / OVAL PIPES & FITTINGS, FIA Approved & ISI marked Which is Approved by Department.

1. VRAJ

M/s VRAJ PLASTIC INDUSTRIES,
41, 42 & 43 Amarnath Estate, Nr. Gokulesh Petroleum, Narol
Cross Road, Ahmedabad - 382 405

2. PRECISION (Refer to Ch.1.1.(C) Cat.-II-I)

3. NIHIR

M/s. NIHIR POLYMERS INDUSTRIES, 62, Umed Part Society,
Sola Road, Ghatlodia, Ahmedabad - 380 061.

4. HIMA / AMIT

M/s Hima Sales Corporation, Opp. Relish Pharma, Nr. Nilkanth
Hotel, Ta. Kalol, Dist. Gandhinagar. RAKANPUR

5. VINAY (Refer to Ch.1.1.(A) Cat.-II (1))

6. POLYCARB

M/s Polycarb Wires Pvt. Ltd., HICO House, 1st Floor, 771,
Pandit Satwalekar Marg, Mahim (W), Mumbai - 400016

7. BLP

M/s. Bhaglakmi Plastic Industries, 32, Asharva Ind. Estate,
Opp. Khodiyar Estate, Narol, Ahmedabad

8. POWER FLOW INDIA / CROWN PLAST

M/s. CROWN INDUSTRIES
Plot No. 6, Opp. Torrent Power Sub Station B/11,
Shahwadi Bus Stop, Narol Ahmedabad-382405

9. 9 - NINE / ADITYA

M/s. Aaditya Polymake, 550, Rajpur Road, Opp. Volga airtech, Sarkhaj Bavla Highway, changodar, Ahmedabad.

10. **MARUTI**
18, Kamal Estate, Bombay Conductors, VATVA, AHMEDABAD
11. **PRESTO PLAST**
M/s. HARSH POLYMERS PVT LTD
1/11C, Proctor Road, Grant Road, [East], MUMBAI - 400007
12. **SHRINATH**
13. **AMIT**

Amit Electro Plast. 431, 4th Floor, Sarvodaya Comm. Center
Salapas Road, Nr. G.P.O., Ahmedabad.

14. **MAXCEL PLAST**
M/s. Maxcel Plast 133, SHREE Ram Ind. Estate, B/h. C.M.C.
Anup Eng. Compound, Nr. Soni's Chawl Cross Road, ODHAV,
Ahmedabad - 382415.

1.3 OVAL / CASING & CAPING & PVC TRUNKING

1. **VRAJ** (Refer to Ch.1.2.(1))
2. **PRECISION** (Refer to Ch.1.1 (C) Cat.-I (1))
3. **NIHIR** (Refer to Ch.1.2.(3))
4. **HIMA / AMIT** (Refer to Ch.1.2.(4))
5. **VINAY** (Refer to Ch.1.1. (A) Cat.-II (1))
6. **POLYCAB** (Refer to Ch.1.2.(5))
7. **MODI'S**
M/s. Modi's Group of Companies, 34, Palace manor, 31 & 32,
Balfour Road, Kelly's, Chennai - 600010.
8. **9 NINE / AADITYA** (Refer to Ch.1.2.(9))
9. **MARUTI** (Refer to Ch.1.2.(10))
10. **PRESTO PLAST** (Refer to Ch.1.2.(11))
11. **POWER FLOW INDIA / CROWN PLAST** (Refer to Ch.1.2.(8))
12. **SHRINATH**
13. **M.K.**
14. **AMIT** (Refer to Ch.1.2 Cat. III (13))
15. **MAXCEL PLAST** (Refer to Ch.1.2 (14))

LAMPS & FITTINGS

2.1 FILAMENT LAMPS / FLOURESCENT TUBES

(A) CAT.I

ANY ISI MARKED WHICH IS APPROVED BY DEPARTMENT (B) CATEGORY - II

1. **ARYA**
M/s. Arya Filaments P.L., 344, Vishnupuri
Annex. A.B.Road, Indore - 452 001
2. **GE**
M/s GE India Industrial Pvt. Ltd., 405, "Kirtiman", Kinariwala
House, B/H Citibank, Off. C.G.Road, Ahmedabad - 380 009
3. **BAJAJ**
M/s Bajaj Electricals Limited, 106, 1st Fl., Sakar-III, Nr. Ashram
Road, Navrangpura, Ahmedabad 380 014
4. **OSRAM**
M/s Osram India P.L. Delhi Road, Sonapat - Haryana - 131001
5. **ANCHOR** (Refer to Ch.1.1.(B) Cat.-III (1))
6. **JILCO**
M/s JAIN INDUSTRIAL LIGHTING CORP
B-70/22, DSIDC Complex, Lawrence Road, New Delhi - 35
7. **INDOASIAN** (Refer to Ch.1.1.(C) Cat.-II (8))

CATEGORY - III

1. **SURYA**
M/s. Surya Roshni Ltd. (Lighting Division)
308, Shefali Centre, Nr. Paldi Char Rasta, Ahmedabad - 380006
2. **PHILIPS** (Refer to Ch.1.1.(C) Cat.-III (4))
3. **CROMPTON**
M/s. Crompton Greaves, C.Q. Hube, 6th Floor, Dr. Annie
Besant Road, Worli, Mumbai - 400030
4. **HALONIX**
M/s. Halonix Limited, 59A, 59D, Noida Special Economic Zone,
Phase - II, Noida, Dist. Gautam Budhniagar - 201305 [UP]
5. **WIPRO**
M/s Wipro Ltd., A/210, Fairdeal House, Opp. St. Xavier's Ladies
Hostel, Navrangpura, Ahmedabad
6. **HPL**
M/s B/707, Premium House, Nr. Gandhi Gram Rly. Station,
B/H Natraj Cinema, Ashram Road, Ahmedabad - 380009

2.3 SODIUM WAPOUR LAMPS

CATEGORY - I

ANY ISI MARKED WHICH IS APPROVED BY DEPARTMENT CATEGORY - II

1. **ARYA** (Refer to Ch.2.1. Cat.-II (1))
2. **ANCHOR** (Refer to Ch.1.1.(B) Cat.-III (1))
3. **BAJAJ** (Refer to Ch.2.1.Cat.-II (3))
4. **OSRAM** (Refer to Ch.2.1. Cat.-II (4))
5. **JILCO** (Refer to Ch.2.1. Cat.-II (6))
6. **PUSHKAR / AKSHAR**
M/s. Pushkar Industries 87/1, Village Shiholdi,
Vaso Alindra Road, Ta. Matar, Dist. Kheda - 387380
7. **VAPOLITE**

CATEGORY - III

1. **HAVELLS'** (Refer to Ch.1.1. (C) Cat.-III (1))
2. **SURYA** (Refer to Ch.2.3. Cat.-III (1))
3. **GE** (Refer to Ch.2.1. Cat.-II (2))
4. **PHILIPS** (Refer to Ch.1.1. Cat.-III (2))
5. **CROMPTON** (Refer to Ch.2.1. Cat.-III (3))
6. **HALONIX** (Refer to Ch.2.1. Cat.-III (4))
7. **WIPRO** (Refer to Ch.2.1. Cat.-III (5))
8. **C&S GEWISS** (Refer to Ch.1.1.(C) Cat.-III (8))
9. **SHAKTI**
M/s Shakti Fixture Industries 212/B, Bombay Talkies
Compound Malad (W), Mumbai - 400 064

2.4 COMPACT FLOURESCENT LAMPS

CATEGORY - I

1. **ANCHOR** (Refer to Ch.1.1.(B) Cat.-III (1))

CATEGORY - II

1. **SPANCO**
M/s Spanco Semiconductors, 10/11, Bhagat Industrial Estate,
Nr. 18No. ESI Hospital, Jay Bharat Rangshala Compound,
Saraspur, Ahmedabad - 380018
2. **GRE**
M/s. GRE Electronics Pvt. Ltd.,
Plot No. 423, G.I.D.C.-II, Dediyaan, Mehsana - 384002
3. **OSRAM** (Refer to Ch.2.1. Cat.-II (4))
4. **JILCO** (Refer to Ch.2.1. Cat.-II (6))
5. **STANDARD**
M/s. Standard Electrical Ltd
202-205, Shivalik - II, Nr. Shivrangni Cross Road,
Satellite, 132 feet Ring Road, Ahmedabad - 15
6. **CILVER**
7. **INDOASIA**
8. **OREVA**
M/s. Ajanta Manufacturing Ltd.
8A, National Highway, Morbi-363642.

CATEGORY - III

1. **HAVELLS'** (Refer to Ch.1.1. (C) Cat.-III (1))
2. **SURYA** (Refer to Ch.2.1. Cat.-III (1))
3. **PHILIPS** (Refer to Ch.1.1. (C) Cat.-III (3))
4. **CROMPTON** (Refer to Ch.2.1. Cat.-III (3))
5. **HALONIX** (Refer to Ch.2.1. Cat.-III (4))
6. **WIPRO** (Refer to Ch.2.1. Cat.-III (5))
7. **ASIAN**
M/s ASIAN ELECTRONICS LTD, 11-14,
Tej Complex, Nr. Lions Hall, Opp. Ashoka Chambers,
Mithakhali, Ellisbridge, Ahmedabad - 380 006 - India
8. **HPL** (Refer to Ch.2.1. Cat.-III (6))

2.5 METAL HALIDE LAMPS

CATEGORY - I

ANY ISI MARKED WHICH IS APPROVED BY DEPARTMENT CATEGORY - II

1. **ARYA** (Refer to Ch.2.1. Cat.-II (1))
2. **ANCHOR** (Refer to Ch.1.1. (B) Cat.-III (1))
3. **BAJAJ** (Refer to Ch.2.1. Cat.-II (3))
4. **OSRAM** (Refer to Ch.2.1. Cat.-II (4))
5. **PUSHKAR / AKSHAR** (Refer to Ch.2.3. Cat.-III (8))

CATEGORY - III

1. **SURYA** (Refer to Ch.2.1. Cat.-III (1))
2. **CE** (Refer to Ch.2.1. Cat.-II (2))
3. **PHILIPS** (Refer to Ch.1.1. (C) Cat.-III (2))
4. **CROMPTON** (Refer to Ch.2.1. Cat.-III (3))

5. HALONIX (Refer to Ch.2.1, Cat.-III (4))

6. WIPRO (Refer to Ch.2.1, Cat.-III (5))

7. HAVELL'S (Refer to Ch.1.1, (A) Cat.-III (1))

8. C&S GEWISS (Refer to Ch.1.1, (C) Cat.-III (8))

9. SHAKTI (Refer to Ch.2.3, Cat.-II (9))

2.6 ENERGY SAVING FLOURESCENT TUBE & CFL FITTINGS
(Box Type/Industrial Type/Mirror Optic/Mirror Light/Street Light)

1. FUTURE LIGHTING

M/S. FUTURE LIGHTING INDIA LTD. 8TH FLOOR, TOWER "C", 247 PARK, L.B.S. MARG, VIKHROLI (W) MUMBAI - 400083

2. CAMAY

M/S. CAMAY ELECTRONICS, CAMAY HOUSE, CHANDNI CHOWK, FULWADI DHORE, JETPUR - 380370

3. EUROLITE

M/S. RUBYCON ELECTRICALS & ELECTRONICS INDUSTRIES SURVEY NO 246/4, OPP. G.I.D.C. PHASE-I SIHOR - 364240 BHAVNAGAR - GUJARAT

4. ENERGY VISION

M/S ENERGY VISION, 38/568, SHASTRINAGAR, KHATODARA COLONY, SURAT - 395002

5. EUROLITE (Refer to Ch.2.6, Approved (3))

CATEGORY - I

1. PULSE

M/s Pulse Electronics & Control, B/1, Maruti Tenament, Opp. Shriji Bapa Complex, Nr. Rabari Colony, Vastral to Odhav Canal Road, Ahmedabad

2. HAVELL'S (Refer to Ch.1.1, (A) Cat.-III (1))

3. AKHIL

M/S SATYA ENGINEERING WORKS P.L.A-111, MANGOL PURI IND. AREA PHASE - II, NEW DELHI - 110034

4. Optic Lighting

M/s Optic Lighting P.L. Rajiv House 4, Smritikunj, Nr. Navrangpura Post Office, Navrangpura, Ahmedabad - 409

5. Pulse / Nano (Refer to Ch.2.6, Cat.-I (1))

6. Aash Cube

M/s Aashcube Lighting P.L. C/41, 195, Krishna Estate B/h Anuplach, Opp. B.I.D.C. Gorwa, Vadodara - 390016

CATEGORY - II

1. JABLA

M/S JABLA ELECTRICAL INDUSTRIES, 29 B/C JAY KHODIYAR INDUSTRIAL ESTATE, NR. SUBHASH ESTATE, RAMOL ROAD C.T.M. AMRAIWADI, AHMEDABAD - 380026

2. GELCO (Refer to Ch.1.1, (B) Cat.-III (5))

3. INAVA

M/s. Inava Instruments International, 94, Ratnajyot Ind. Estate, Irfi Lane, Vile Parle (W), Mumbai - 400056

4. PIERLITE

M/s. Pierlite India P.L. Rakhial Road, Ahmedabad.

CATEGORY - III

1. SPANCO (Refer to Ch.2.4, Cat.-II (1))

2. HPL

M/s. HPL Electric & Power Ltd., Plot No. 78-B, Phase-IV, Sec.-57, JSI IDC, Indl. Area, Kundli Dist. Sonapat, (Haryana)-131028.

3. FIXOLITE

M/s. FIXOLITE INDUSTRIES, Jhon Robert Compound Sewri Fort Road, Sewri (E), Mumbai - 400015

4. PRESTOLITE

M/s Prestolite Corporation, 57/5, Khalil Sth Compound, Off M.G. Road, Gurgaon (W)

5. SHAKTI (Refer to Ch.2.3, Cat.-III (9))

6. C&S GEWISS (Refer to Ch.1.1, (C) Cat.-III (8))

[ENERGY SAVING T-5 TUBE FITTING / CFL INDOOR TYPE]

CATEGORY - II

1. SPANCO (Refer to Ch.2.4, Cat.-II (1))

2. GELCO (Refer to Ch.1.1, (B) Cat.-III (5))

3. TEKNOLITE

M/s Teknovision Allied Product P.L. 16, Waman Patil Industrial Estate, Nr. Dukes Factory, Nr. Chembur, Mumbai-71

4. ARYA (Refer to Ch.2.1, Cat.-II (1))

5. SHAKTI (Refer to Ch.2.5, Cat.-III (9))

6. JILCO (Refer to Ch.2.1, Cat.-II (5))

7. ANCHOR (Refer to Ch.1.1, (B) Cat.-III (1))

8. GLOMORE

M/s Devraj Enterprises (P) Ltd., 401, Sobhna Apartment, 4th Floor, Above Mandavi Bank, Chandravarkar Road, Borivali (W), Mumbai - 400092

9. C&S GEWISS (Refer to Ch.1.1, (C) Cat.-III (8))

10. SILVER (Refer to Ch.2.6, Cat.-II (10))

11. ACON

M/s. Suvet Electronics "Sorab Villa", Nr. Popular House, Ashram Road, Ahmedabad - 9

12. INAVA (Refer to Ch.2.6, Cat.-II (3))

13. PRESTOLITE (Refer to Ch.2.6, Cat.-III (4))

14. INDOASIAN (Refer to Ch.1.1, (C) Cat.-II (8))

15. SHAH

M/s Shah Electronics, A-3, Manoharvila, New Naroda, Nicol Road, Nr. Naroda Canal, Nicol, Ahmedabad - 382330

16. Pulse / Nano (Refer to Ch.2.6, Cat.-I (1))

17. AKHIL (Refer to Ch.2.6, Cat.-I (3))

CATEGORY - II

[ENERGY SAVING T-5 TUBE FITTING / CFL OUTDOOR TYPE]

1. GELCO (Refer to Ch.1.1, (B) Cat.-III (5))

2. SHAKTI (Refer to Ch.2.3, Cat.-III (9))

3. JILCO (Refer to Ch.2.1, Cat.-II (5))

4. SILVER (Refer to Ch.2.6, Cat.-II (10))

5. AKHIL (Refer to Ch.2.6, Cat.-I (3))

6. ACON (Refer to Ch.2.6, Cat.-II (11))

CATEGORY - III

[ENERGY SAVING T-5 TUBE FITTING / CFL INDOOR TYPE]

1. HAVELL'S (Refer to Ch.1.1, (C) Cat.-III (1))

2. HALONIX (Refer to Ch.2.1, Cat.-III (5))

3. GRE (Refer to Ch.2.4, Cat.-II (2))

4. WIPRO (Refer to Ch.2.1, Cat.-III (5))

5. THORN

M/s. Thorn Lighting India P.L. C/o, 10 parshwanath Apt., Somnath Park Lane, Opp. Tele. Exchange, Sahibaug, Ahmedabad - 380004

6. SURYA (Refer to Ch.2.1, Cat.-III (1))

7. ASIAN (Refer to Ch.2.6, Cat.-II (4))

8. G.E. (Refer to Ch.2.1, Cat.-II (2))

9. PHILIPS (Refer to Ch.1.1, (C) Cat.-III (4))

10. CROMPTON (Refer to Ch.2.1, Cat.-III (3))

11. BAJAJ (Refer to Ch.2.1, Cat.-II (3))

12. PASOLITE

M/s. Pasolite Electricals P.L. 7, Kilari road, 14th cross, Bangalore- 560053

13. PRESTOLITE (Refer to Ch.2.6, Cat.-III (4))

14. HPL (Refer to Ch.2.6, Cat.-III (2))

15. SHAKTI (Refer to Ch.2.3, Cat.-III (9))

ENERGY SAVING T-5 TUBE FITTING / CFL [OUTDOOR TYPE]

CATEGORY - III

1. HAVELL'S (Refer to Ch.1.1, (C) Cat.-III (1))

2. GRE (Refer to Ch.2.4, Cat.-II (2))

3. SURYA (Refer to Ch.2.1, Cat.-III (1))

4. PIERLITE (Refer to Ch.2.6, Cat.-II (4))

5. PHILIPS (Refer to Ch.1.1, (C) Cat.-III (4))

6. CROMPTON (Refer to Ch.2.1, Cat.-III (3))

7. WIPRO (Refer to Ch.2.1, Cat.-III (5))

8. THORN (Refer to Ch.2.6, Cat.-III (5))

9. BAJAJ (Refer to Ch.2.1, Cat.-II (3))

10. SHAH (Refer to Ch.2.6, Cat.-II (15))

11. PRESTOLITE (Refer to Ch.2.6, Cat.-III (3))

12. HPL (Refer to Ch.2.6, Cat.-III (2))

13. FIXOLITE (Refer to Ch.2.6, Cat.-III (3))

14. SHAKTI (Refer to Ch.2.3, Cat.-III (9))

15. TEKNOLITE (Refer to Ch.2.6, Cat.-III (3))

2.7 FLOURESCENT TUBE FITTINGS [ELECTRONICS BALLAST]
(Box Type/Industrial Type/Mirror Optic/Mirror Light/Street Light)

APPROVED

1. ACTION

M/S. ADHUNIK SWITCHGEARS P.L. UNIT-1, 902/290, SHALIMAR IND. AREA DELHI - 110088

CATEGORY - I

ANY ISI MARKED WHICH IS APPROVED BY DEPARTMENT

1. PULSE (Refer to Ch.2.6, Cat.-I (2))

CATEGORY - II

1. GELCO (Refer to Ch.1.1. (B) Cat.-III (5))
2. PRESTOLITE (Refer to Ch.2.6. Cat.-III (4))
3. GLOMORE (Refer to Ch.2.6. Cat.-II (8))
4. TEKNOLITE (Refer to Ch.2.6. Cat.-II (3))
5. ARYA (Refer to Ch.2.1. Cat.-II (1))
6. INDOASIAN (Refer to Ch.1.1. (C) Cat.-II (8))
7. JILCO (Refer to Ch.2.1. Cat.-II (5))
8. CILVER (Refer to Ch.2.6. Cat.-II (10))
9. ANCHOR (Refer to Ch.1.1. (B) Cat.-III (1))
10. G.E. (Refer to Ch.2.1. Cat.-II (2))
11. PASOLITE (Refer to Ch.2.6. Cat.-II (12))
12. ACON (Refer to Ch.2.6. Cat.-II (11))
13. ACQUATE

M/S ACQUATE Engitech Limited, Plot No 147/148, GIDC Ankleshwar, Dist. Bharuch Gujarat - 393002

14. BAJAJ (Refer to Ch.2.1. Cat.-II (3))
15. AKHIL (Refer to Ch.2.6. Cat.-I (3))
16. SUNBEAM

M/s. Sunbeen Electricals, 292/7/B Shastri Laghu Udhog Nagar, Maheshwar Mill Road, Tevdiyura, Shahibaug, Ahmedabad-380004.

CATEGORY - III

1. PHILIPS (Refer to Ch.1.1. (C) Cat.-III (3))
2. CROMPTON (Refer to Ch.2.1. Cat.-III (4))
3. SURYA (Refer to Ch.2.1. Cat.-III (1))
4. HAVELL'S (Refer to Ch.1.1. (C) Cat.-III (1))
5. WIPRO (Refer to Ch.2.1. Cat.-III (5))
6. HALONIX (Refer to Ch.2.1. Cat.-III (4))
7. GRE (Refer to Ch.2.4. Cat.-II (2))
8. SHAH (Refer to Ch.2.6. Cat.-II (15))
9. FIXOLITE (Refer to Ch.2.6. Cat.-III (2))
10. HPL (Refer to Ch.2.6. Cat.-III (2))
11. PIERLITE (Refer to Ch.2.6. Cat.-II (4))
12. C&S GEWISS (Refer to Ch.1.1. (C) Cat.-III (8))
13. SHAKTI (Refer to Ch.2.5. Cat.-III (9))

2.9 SODIUM VAPOUR LAMP FITTINGS
(POST TOP LANTERN / STREET LIGHTS)

CATEGORY - I

1. GLOMORE (Refer to Ch.2.6. Cat.-II (8))
2. EUROLITE - APPROVED (Refer to Ch.2.6. Cat. Approved (3))
3. SUNBEAM (Refer to Ch.2.7. Cat.-II (16))
4. OPTIC LIGHTING (Refer to Ch.2.6. Cat.-I (4))

CATEGORY - II

1. SPANCO (Refer to Ch.2.4. Cat.-II (1))
2. ARYA (Refer to Ch.2.1. Cat.-II (1))
3. JILCO (Refer to Ch.2.1. Cat.-II (5))
4. CILVER (Refer to Ch.2.6. Cat.-II (10))
5. ANCHOR (Refer to Ch.1.1. (B) Cat.-III (1))
6. G.E. [COMMON FITTING] (Refer to Ch.2.1. Cat.-II (2))
7. ACQUATE (Refer to Ch.2.7. (18))
8. PULSE/NANO (Refer to Ch.2.6. Cat.-I (1))

CATEGORY - III

1. HAVELL'S (Refer to Ch.1.1. (C) Cat.-III (1))
2. PIERLITE (Refer to Ch.2.6. Cat.-II (4))
3. SURYA (Refer to Ch.2.1. Cat.-III (1))
4. G.E. (SR/SPPT/OLYMPIA / RANGER / GEN-X / SKYGEN / MET-40/SPECTRA / QUNA / NOVA T-5 STREET / OPTYLANE) (Refer to Ch.2.1. Cat.-II (2))
5. PHILIPS (Refer to Ch.1.1. (C) Cat.-III (4))
6. CROMPTON (Refer to Ch.2.1. Cat.-III (3))
7. GRE (Refer to Ch.2.4. Cat.-II (2))
8. HALONIX (Refer to Ch.2.1. Cat.-III (4))
9. WIPRO (Refer to Ch.2.1. Cat.-III (5))
10. THORN (Refer to Ch.2.6. Cat.-III (5))
11. BAJAJ (Refer to Ch.2.1. Cat.-II (3))
12. FIXOLITE (Refer to Ch.2.6. Cat.-II (3))
13. PASOLITE (Refer to Ch.2.6. Cat.-III (13))
14. TRANSRAIL

A-201/209, Boomerang Complex, Chandivali Farm Road, Andheri [E], Mumbai - 400072

15. PRESTOLITE (Refer to Ch.2.6. Cat.-III (3))
16. HPL (Refer to Ch.2.6. Cat.-III (2))
17. C&S GEWISS (Refer to Ch.1.1. (C) Cat.-III (8))
18. SHAKTI (Refer to Ch.2.3. Cat.-III (9))

2.10 FLOOD LIGHTS WITH BC / ES / IMV / SV / MH / LAMPS
(POST TOP LANTERN / STREET LIGHTS)

CATEGORY - I

ANY ISI MARKED WHICH IS APPROVED BY DEPARTMENT

1. EUROLITE (Refer to Ch.2.6. Cat. Approved (3))
2. SUNBEAM (Refer to Ch.2.9. Cat.-I (3))

CATEGORY - II

1. SPANCO (Refer to Ch.2.4. Cat.-II (1))
2. GLOMORE (Refer to Ch.2.6. Cat.-II (18))
3. ARYA (Refer to Ch.2.1. Cat.-II (1))
4. ANCHOR (Refer to Ch.1.1. (B) Cat.-III (1))
5. G.E. [COMMON FITTING] (Refer to Ch.2.1. Cat.-II (2))

CATEGORY - III

1. SURYA (Refer to Ch.2.1. Cat.-III (1))
2. HAVELL'S (Refer to Ch.1.1. (C) Cat.-III (1))
3. GRE (Refer to Ch.2.4. Cat.-II (2))
4. PIERLITE (Refer to Ch.2.6. Cat.-III (8))
5. G.E. (SF / GEMF/BLAZE / ZION / GLANZ / EI-2000+/ CONJA-JR / HELO FLOOD / ARINA) (Refer to Ch.2.1. Cat.-II (2))
6. PHILIPS (Refer to Ch.1.1. (C) Cat.-III (4))
7. CROMPTON (Refer to Ch.2.1. Cat.-III (3))
8. WIPRO (Refer to Ch.2.1. Cat.-III (5))
9. TRANSRAIL (Refer to Ch.2.9. Cat.-III (14))
10. HALONIX (Refer to Ch.2.1. Cat.-III (4))
11. BAJAJ (Refer to Ch.2.1. Cat.-II (3))
12. PRESTOLITE (Refer to Ch.2.6. Cat.-III (4))
13. FIXOLITE (Refer to Ch.2.6. Cat.-III (3))
14. HPL (Refer to Ch.2.6. Cat.-III (2))
15. C&S GEWISS (Refer to Ch.1.1. (C) Cat.-III (8))
16. SHAKTI (Refer to Ch.2.3. Cat.-III (9))

2.11 Halogen Tube Fittings

ANY ISI MARKED WHICH IS APPROVED BY DEPARTMENT

1. EUROLITE (Refer to Ch.2.6. Cat. Approved (3))

Category - II

1. ARYA (Refer to Ch.2.1. Cat.-II (1))
2. PIERLITE (Refer to Ch.2.6. Cat.-II (4))

Category - III

1. HAVELL'S (Refer to Ch.1.1. (C) Cat.-III (1))
2. WIPRO (Refer to Ch.2.1. Cat.-II (4))
3. HALONIX (Refer to Ch.2.1. Cat.-III (4))
4. TRANSRAIL (Refer to Ch.2.14 Cat.-III (7))
5. SHAKTI (Refer to Ch.2.3. Cat.-III (9))

2.11 (A) METAL HELIDE LAMP FITTINGS

CATEGORY - I

1. GLOMORE (Refer to Ch.2.6. Cat.-II (8))
2. EUROLITE (Refer to Ch.2.6. Cat. Approved (3))
3. OPTIC LIGHTING (Refer to Ch.2.6. Cat.-I (4))

CATEGORY - II

1. BAJAJ (Refer to Ch.2.1. Cat.-II (3))
2. ARYA (Refer to Ch.2.1. Cat.-II (1))
3. JILCO (Refer to Ch.2.1. Cat.-II (5))
4. PASOLITE (Refer to Ch.2.6. Cat.-III (13))
5. PIERLITE (Refer to Ch.2.6. Cat.-II (4))

CATEGORY - III

1. HAVELL'S (Refer to Ch.1.1. (C) Cat.-III (1))
2. THORN (Refer to Ch.2.6. Cat.-III (5))
3. GRE (Refer to Ch.2.4. Cat.-II (2))
4. TRANSRAIL (Refer to Ch.2.9. Cat.-III (14))
5. SURYA (Refer to Ch.2.1. Cat.-III (1))
6. WIPRO (Refer to Ch.2.1. Cat.-III (5))
7. HALONIX (Refer to Ch.2.1. Cat.-III (4))

2.12 ELECTRONIC BALLAST

CATEGORY - I

1. AMIT (Refer to Ch.1.2. (13))
2. INAVA (Refer to Ch.2.6. Cat.-II (13))
3. ANCHOR - APPROVED (Refer to Ch.1.1. (B) Cat.-III (2))
4. CILVER (Refer to Ch.2.6. Cat.-II (10))
5. PULSE (Refer to Ch.2.6. Cat.-I (1))
6. JILCO (Refer to Ch.2.1. Cat.-II (5))
7. EUROLITE - APPROVED (Refer to Ch.2.6. (3))
8. CAMAY (Refer to Ch.2.6. Approved (2))

CATEGORY - II

1. SPANCO (Refer to Ch.2.4. Cat.-II (1))

2. GLOMORE (Refer to Ch.2.6. Cat.-II (8))
3. TEKNOLITE (Refer to Ch.2.6. Cat.-II (3))
4. GELCO (Refer to Ch.1.1. (B) Cat.-III (6))
5. INDOASIAN (Refer to Ch.1.1. (C) Cat.-II (8))
6. ARYA (Refer to Ch.2.1. Cat.-II (1))
7. ASIAN (Refer to Ch.2.4. Cat.-III (7))
8. OSRAM (Refer to Ch.2.1. Cat.-II (4))
9. ACON (Refer to Ch.2.6. Cat.-II (11))
10. INTELUX
M/s Intelux Electronics P.L. Unit No 2, Electronics Co. Op. Estate
Pune - Satara Road, Pune - 411009

11. OCLEG
M/s. OCLEG CONTROLS, 93-94, Amar Estate, B/h Lubi Elect.,
Memco, Naroda Road, Ahmedabad

12. Pulse/Nano (Refer to Ch.2.6. Cat.-I (1))

CATEGORY - III

1. HAVELL'S (Refer to Ch.1.1. (C) Cat.-III (1))
2. GRE (Refer to Ch.2.4. Cat.-II (2))
3. PIERLITE (Refer to Ch.2.6. Cat.-II (4))
4. PHILIPS (Refer to Ch.1.1. (C) Cat.-III (3))
5. CROMPTON (Refer to Ch.2.1. Cat.-III (4))
6. WIPRO (Refer to Ch.2.1. Cat.-III (7))
7. HALONIX (Refer to Ch.2.1. Cat.-III (5))
8. SHAH (Refer to Ch.2.6. Cat.-II (15))
9. HPL (Refer to Ch.2.1. Cat.-III (6))
10. FIXOLITE (Refer to Ch.2.6. Cat.-III (3))
11. C&S GEWISS (Refer to Ch.1.1. (C) Cat.-III (8))
12. SHAKTI (Refer to Ch.2.3. Cat.-III (9))

CHAPTER III

SWITCHGEARS & DISTRIBUTION BOARDS

3.1 CAST IRON CLAD SWITCHES WITH REWIREABLE FUSE

CATEGORY - I

ANY ISI MARKED WHICH IS APPROVED BY DEPARTMENT

CATEGORY - II

1. TRISHUL
M/s Aum Electrical Industries, 1014, GIDC,
Waghodia - 391760 Gujarat
2. MODI
M/S MODI INDUSTRIES, 61, Mahaveer Estate, Nr. Anupam
Cinema, Khokhara, Ahmedabad-380008
3. NEW / NILANG
M/s Nilang Engineering Works, Plot No. 156/2, A-31 Kailashnagar
Estate, Opp. New Tele. Exchange, F Road, G.I.D.C. Vatva,
Ahmedabad - 382445
4. PEW
M/s Patel Engineering Works, 23, Vrundavandham, Society, Opp.
P.d. Pandya College, Nr. Smruti Mandir, Ghodasar, Ahmedabad
5. SUPER
M/S SUPER SWITCHGEARS, SHED - C-5/6, GIDC VITTHAL
UDHYOG NAGAR, V.V.NAGAR, - 388121
6. AEW
M/s. Ambica Engineering Works, L-81, G.I.D.C. Estate,
Nr. Water Tank, Odhav, Ahmedabad - 382415

CATEGORY - III

1. KEW
M/s KEW FUSEGEAR PVT. LTD C 1 B/338/38, G.I.D.C. Estate,
Makarpara, Vadodara - 390010

2. STENLY

3.2 METAL CLAD SWITCHES WITH REWIREABLE FUSE (63A - 100 A) APPROVED

1. ACTION / ADHUNIK (Refer to 2.7 Approved (1))

CATEGORY - I

1. REIKO
M/S R.L. Electrical Industries, 8, Sri Ram Marg, Opp. Central
Bank, Moujpur Road, Shahdara, Delhi-110053 (INDIA)

CATEGORY - II

1. KEW (Refer to Ch.3.1. Cat.-III (1))
2. TRISHUL (Refer to Ch.2.12. (3.1) Cat.-II (1))
3. MODI (Refer to Ch.2.12. (3.1) Cat.-II (2))
4. PEW (Refer to Ch.2.12. (3.1) Cat.-II (4))
5. SUPER (Refer to Ch.2.12. (3.1) Cat.-II (5))
6. NEW / NILANG (Refer to Ch.2.12. Cat.-II (3))
7. BENTEC

M/s Bentec Electrical & Electronics P.L. No 7, Maharaja Estate,
B/4, Bhagyoday Hotel, Sarkhej - SanND Highway,
Sarkhej - Ahmedabad - 382210

8. ACTION (Refer to 2.7 Approved (1))

CATEGORY - III

1. HAVELLS (Refer to Ch.1.1. (A) Cat.-III (1))
2. INDOASIAN (Refer to Ch.1.1. (C) Cat.-II (8))
3. STANDARD (Refer to Ch.2.4. Cat.-II (5))
4. L&T

M/s L & T House, Ballard Estate, P.O. Box No. 278 Mumbai-01.

5. CROMPTON (Refer to Ch.2.1. Cat.-III (4))
6. C&S (Refer to Ch.1.1. (C) Cat.-III (8))

7. GUTS

M/s. GUTS CIRCUIT BREAKERS PVT LTD., Manas Anand Bldg
No.1, Plot No 804, Dongiri Pada, Godbunder Road,
Thane West - 400601

8. HPL (Refer to Ch.2.1. Cat.-III (6))

3.3 METAL CLAD SWITCHES WITH HRC FUSE

CATEGORY - II

1. KEW (Refer to Ch.3.1. Cat.-III (1))
2. PIERLITE [ELECON] (Refer to Ch.2.6. Cat.-II (4))
3. PEW (Refer to Ch.2.12. (3.1) Cat.-II (4))
4. SUPER (Refer to Ch.2.12. (3.1) Cat.-II (5))
5. CROMPTON (Refer to Ch.2.1. Cat.-III (3))
7. NEW / NILANG (Refer to Ch.2.12. (3.1) Cat.-II (3))
8. ELECTRO POWER

M/s. Electro Power, B-22, Jay Estate, Opp. Keval weigh bridge
Rakhial, Ahmedabad - 380023

CATEGORY - III

1. HAVELLS (Refer to Ch.1.1. (A) Cat.-III (1))
2. INDOASIAN (Refer to Ch.1.1. (C) Cat.-II (8))
3. STANDARD (Refer to Ch.2.4. Cat.-II (5))
4. C&S GEWISS (Refer to Ch.1.1. (C) Cat.-III (8))
5. L&T (Refer to Ch.3.2. Cat.-III (4))
6. Siemens

M/s. Siemens Ltd L.V. Control & Distribution
Products Thane Belapur Road, Thane - 601

7. GE. (Refer to Ch.2.1. Cat.-II (2))
8. GUTS (Refer to Ch.3.2. Cat.-III (7))
9. HPL (Refer to Ch.2.1. Cat.-III (6))

3.4 MOULDED CASE CIRCUIT BREAKERS

CATEGORY - I

ANY ISI MARKED WHICH IS APPROVED BY DEPARTMENT

1. L.S. APPROVED
2. ACTION / ADHUNIK (Refer to Ch.2.7 Approved (1))

CATEGORY - II

1. BENTEC (Refer to Ch.3.1. Cat.-II (7))
2. CROMPTON (Refer to Ch.2.1. Cat.-III (3))

CATEGORY - III

1. HAVELLS (Refer to Ch.1.1. (C) Cat.-III (1))
2. STANDARD (Refer to Ch.2.4. Cat.-II (5))
3. BCH

M/s. BCH Electric Limited 93, City Centre, Nr. Swastik Char
Rasta, C.G. Road, Ahmedabad - 380 009

4. C&S GEWISS (Refer to Ch.1.1. (C) Cat.-III (8))
5. INDOASIAN (Refer to Ch.1.1. (C) Cat.-II (8))
6. L & T (Refer to Ch.3.2. Cat.-III (4))
7. SIEMENS (Refer to Ch.3.3. Cat.-III (6))
8. GE. (Refer to Ch.2.1. Cat.-II (2))
9. GUTS (Refer to Ch.3.2. Cat.-III (7))
10. HPL (Refer to Ch.2.6. Cat.-III (3))

3.5 AIR CIRCUIT BREAKERS

APPROVED

ANY ISI MARKED WHICH IS APPROVED BY DEPARTMENT

1. BIECCO
M/s. Biecco Lawrie Limited, 95, maker tower "F", 9th Floor,
Cuffee Parade, Mumbai - 400005
2. HPL (Refer to Ch.2.1. Cat.-III (6))
3. L S

CATEGORY - III

1. C&S (Refer to Ch.1.1. (C) Cat.-III (8))
2. INDOASIAN (Refer to Ch.1.1. (C) Cat.-II (8))
3. G.E. (Refer to Ch.2.1. Cat.-II (2))

4. CROMPTON (Refer to Ch.2.1. Cat.-III (3))
5. L & T (Refer to Ch.3.2. Cat.-III (4))
6. Siemens (Refer to Ch.3.3. Cat.-II (6))
7. HAVELLS (Refer to Ch.1.1. (C) Cat.-III (1))
8. HPL (Refer to Ch.2.6. Cat.-III (2))

3.6 CHANGE OVER SWITCHES APPROVED

1. ACTION / ADHUNIK (Refer to 2.7 Approved (1))

CATEGORY - I

1. MODI (Refer to Ch.2.12. Cat.-II (2))
2. REIKO (Refer to Ch.3.2. Cat.-I (1))

CATEGORY - II

1. PEW (Refer to Ch.2.12. (3.1) Cat.-II (4))
2. KEW (Refer to Ch.3.1. Cat.-III (1))
3. BENTEC (Refer to Ch.3.1. Cat.-II (7))
4. NEW / NILANG (Refer to Ch.2.12. (3.1) Cat.-II (3))
5. SUPER (Refer to Ch.2.12. (3.1) Cat.-II (5))
6. ANCHOR (Refer to Ch.1.1. (B) Cat.-III (1))
7. ELECTRO POWER (Refer to Ch.3.3. Cat.-II (8))
8. SIGMA

M/s. MCB Electronic Controls, C-176, Mayapuri Industrial Area, Phase-II, New Delhi-110064.

9. AEW (Refer to Ch.3.1. Cat.-II (6))

CATEGORY - III

1. HAVELLS (Refer to Ch.1.1. (C) Cat.-III (1))
2. STANDARD (Refer to Ch.2.4. Cat.-II (5))
3. C&S GEWISS (Refer to Ch.1.1. (C) Cat.-II (12))
4. INDOASIAN (Refer to Ch.1.1. (C) Cat.-II (8))
5. L & T (Refer to Ch.3.2. Cat.-III (4))
6. Siemens (Refer to Ch.3.3. Cat.-II (6))
7. Crompton (Refer to Ch.2.1. Cat.-III (3))
8. GE (Refer to Ch.2.1. Cat.-II (2))
9. GUTS (Refer to Ch.3.2. Cat.-III (7))
10. HPL (Refer to Ch.2.1. Cat.-III (2))
11. PIERLITE - ELCON (Refer to Ch.2.6. Cat.-II (4))

3.7 MCB & MCB DISTRIBUTION BOX APPROVED

1. TOYAMA (Refer to Ch.1.1. (A) Cat.-III (1))
2. MILLION & MILLTEC (Refer to Ch.1.1. (A) Cat.-I (3))
3. BALKAM

M/s Balkam India Ltd., B-33, Old Vishnu Garden, New Delhi - 110 018.

4. ESCO

M/S ELECTRO SPARES & Co. 1894/A/1 Inside Pade Pole Gandhi Road, Ahmedabad - 380 001.

5. SMPL

M/s SARD METALS P.L. Plot No.45, Sector No.23, Sohna Road, Faridabad - 121005

6. ELLICO

M/S General Electronics & Controls, C/71, G.I.D.C. Odhav, Ambicnagar Road, Ahmedabad - 382415.

7. ACTION (Refer to 2.7 Approved (1))
8. MAXCELPLAST (Refer to 1.2 (14))

CATEGORY - I

1. VIMAL (Ref. to Ch. 1.1(A) Cat.-I (5))
2. S.G
3. VINAYAK

CATEGORY - II

1. GELCO (Refer to Ch.1.1. (B) Cat.-III (6))
2. GRE (Refer to Ch.2.4. Cat.-II (2))
3. RANI (Refer to Ch.1. (C) (4))
4. KEW (Refer to Ch.3.1. Cat.-II (1))
5. AECO-MEFA
M/s Punjab Switchgears P.L. B-30, Phase - V Focal Point, Dhandari Kalan, Ludhiana - 141010
6. NEW / NILANG (Refer to Ch.2.12. (3.1) Cat.-II (3))
7. VINAY (Refer to Ch.1.1. (A) Cat.-II (1))
8. LEADER (Refer to Ch.1.1 (C) Cat.-II (11))
9. SUPER (Refer to Ch.2.12. (3.1) Cat.-II (5))
10. ANCHOR (Refer to Ch.1.1. (B) Cat.-III (1))
11. ELECON-CLIPSAL
M/s GERARD ELECTRIC INDIA PVT.LTD.
Rakhial Road, Ahmedabad -380 023
12. OCLEG (Refer to Ch.2.12. Cat.-II (11))

13. BENTEC (Refer to Ch.3.1. Cat.-II (7))
14. SIGMA (Refer to Ch.3.6. Cat.-II (8))

CATEGORY - III

1. HAVELLS (Refer to Ch.1.1. (C) Cat.-III (1))
2. STANDARD (Refer to Ch.2.4. Cat.-II (5))
3. C&S (Refer to Ch.1.1. (C) Cat.-II (12))
4. INDOASIAN (Refer to Ch.1.1. (C) Cat.-II (8))
5. ABB (Refer to Ch.1.1 (C) Cat.-III (5))
6. L&T (Refer to Ch.3.2. Cat.-III (4))
7. GUTS (Refer to Ch.3.2. Cat.-III (7))
8. GE (Refer to Ch.2.1. Cat.-II (2))
9. HPL (Refer to Ch.2.1. Cat.-III (6))
10. NANO,
M/s Ajay Electrical Industries, B-257,
naraina ind. area, phase - I, New Delhi

11. MDS

12. PIERLITE SAFETY (Refer to Ch.2.6. Cat.-II (4))

3.8 ELCB & RCCB

APPROVED

1. ACTION / ADHUNIK (Refer to 2.7 Approved (1))

CATEGORY - I

1. PULSE CONTROL (Refer to Ch.2.6. Cat.-I (1))
2. MILLION & MILLTEC (Refer to Ch.1.1. (A) Cat.-I (3))
3. ELLICO (Refer to Ch.3.7. Approved (6))
4. S.G

CATEGORY - II

1. GELCO (Refer to Ch.1.1. (B) Cat.-III (6))
2. GRE (Refer to Ch.2.4. Cat.-II (2))
3. RANI (Refer to Ch.1. (C) (4))
4. BENTEC (Refer to Ch.3.1. Cat.-II (7))
5. AECO-MEFA (Refer to Ch.3.7. Cat.-II (5))
6. ANCHOR (Refer to Ch.1.1. (B) Cat.-III (1))
7. SUPER (Refer to Ch.2.12. (3.1) Cat.-II (5))
8. ELECON-CLIPSAL (Refer to Ch.3.7. Cat.-II (11))
9. OCLEG (Refer to Ch.2.12. Cat.-II (11))
10. Pulse / Nano (Refer to Ch.2.6. Cat.-I (1))
11. SIGMA (Refer to Ch.3.6. Cat.-II (8))

CATEGORY - III

1. GUTS (Refer to Ch.3.2. Cat.-III (7))
2. STANDARD (Refer to Ch.2.4. Cat.-II (5))
3. C & S (Refer to Ch.1.1. (C) Cat.-III (8))
4. INDOASIAN (Refer to Ch.1.1. (C) Cat.-II (8))
5. ABB (Refer to Ch.1.1. (C) Cat.-III (5))
6. HAVELLS (Refer to Ch.1.1. (C) Cat.-III (1))
7. L&T (Refer to Ch.3.2. Cat.-III (4))
8. HPL (Refer to Ch.2.1. Cat.-III (6))
9. NANO (Refer to Ch.3.7. Cat.-II (10))
10. PIERLITE (Refer to Ch.2.6. Cat.-II (4))
11. MDS

3.9 TIME SWITCHES

1. GELCO (Refer to Ch.1.1. (B) Cat.-III (6))
2. L&T (Refer to Ch.3.2. Cat.-III (4))
3. OCLEG (Refer to Ch.2.12. Cat.-II (11))
4. INDOASIAN (Refer to Ch.1.1. (C) Cat.-II (8))
5. MDS
6. ELLICO

3.10 ENERGY METER

9. NANO Approved (Refer to Ch.3.7. Cat.-III (10))

CATEGORY - I

1. NIPPEN
M/s NIPPEN ELECTRICAL INSTRUMENTS CO. 12-A, Joy Engg. Compound, Marol Maroshi Road, Andheri (E), Mumbai - 59
2. HPL (Refer to Ch.2.1. Cat.-III (6))
3. L&T (Refer to Ch.3.2. Cat.-III (4))
4. GE (Refer to Ch.2.1. Cat.-II (2))
5. TRINITY
119, Trinity Co. Op. Hsg. Soc. 1st Floor,
C.H. Street Bhoitalao, Mumbai- 400002
6. NANO (Refer to Ch.3.7. Cat.-III (10))
7. GELCO (Refer to Ch.1.1. (B) Cat.-III (6))

CATEGORY - II

1. BENTEC (Refer to Ch.3.1. Cat.-II (7))
2. ANCHOR (Refer to Ch.1.1. (B) Cat.-III (1))

3. HPL (Refer to Ch.2.6.Cat.-III (2))

3.11 BUSBAR CHAMBER

CATEGORY - I

1. PEW - APPROVED (Refer to Ch.3.1. Cat.-II (4))

2. REIKO - (Refer to Ch.3.2. Cat.-I (1))

CATEGORY - II

1. NEW / NILANG (Refer to Ch.2.12.(3.1) Cat.-II (3))

2. AEW

CHAPTER - IV

CABLES & WIRES

4.1 ALLUMINIUM & COPPER XLPE CABLES(ALL Type)

1. UPTO 35 SQ.MM ANY ISI MARKED WHICH IS APPROVED BY DEPARTMENT

1. L & T

2. ALLCAB

M/s. ALLWIN INDUSTRIES, Serve No. 251, Plot No.7,
B/h. Devsion Ceramic, Shapur - Veraval Dist. Rajkot

3. GELCO (Refer to Ch.1.1. (B) Cat.-III (5))

4. AVOCAB

M/s Chandresh Cables Ltd. 1108, Village Chhatral, Ta. Kalol
Dist. Gandhinagar, North Gujarat

5. KUNTH CAB

M/s ORBIT POWER & CONTROL CABLES (I) 56 A, Dilshad
Garden Industries Area, Shahdara, Delhi - 110095

6. JEELEX

46/02, New Ahmedabad Industrial Estate, Nova Petrol Chem,
Moraiya, Sanand, Ahmedabad

7. WINFLEX & WINCAB

K.P.Industries, 53,54, Krishna Estate, Panna Estate Road,
B/h. BOC Gases, Nr. Son's Chai Rakhial Ahmedabad - 380023

8. VARSHA

M/s VARSHA CABLES PVT LTD. Plot No.65, A-2, Hootagalli
Industrial Area, DIC Layout, Mysore - 570018

9. KATARIA

M/s. KATARIA INDUSTRIES PVT LTD
Off-34-44, Industrial Area, Ratlam - 457001, M.P. [INDIA]

10. ZENIUM CABLES

M/s ZENIUM CABLES LTD 118, GAURAV Garden, Opp. Bharat
Petrol Pump, Mira Bhayander Road, Mira Road, Mumba-401107

11. BONTON

M/s Bonton Cables (INDIA) P.L. A-114-115,
RICO Industrial Area, Phase - I, Bhiwadi, Rajasthan

12. HAVELLS (Refer to Ch.1.1. (C) Cat.-III (1))

13. NIKI

M/s NIKI Cables Industries, E/9 B Panchratna Appt. Opp.
Sunview Tower, Memnagar, Ahmedabad-52

14. LEADER (Refer to Ch.1 (C) Cat.-II (10))

15. FINOLEX

M/s Finolex Cables India 108, Mahakant Building, Opp. V.S.
Hospital, Ashram Road, Ahmedabad - 380 006

16. SHREEJI

Cali Plast Processor, 47, Narayan Estate, Near Raipur Mills,
Saraspur, Ahmedabad - 380 018

17. SONA GOLD

Cali Plast Processor, 47, Narayan Estate, Near Raipur Mills,
Saraspur, Ahmedabad - 380 018

18. HITEX PLUS

M/s. Jay Cable Industries, Plot No. 80, Tribhuvan Industrial
Estate, Opp. Road No. 11, Kathwada GIDC, Kathwada,
Ahmedabad - 382430

19. KAMALEX

M/s. Bhumi Cables & Wires Pvt. Ltd. Plot No. D-101/102,
Road-C, Lodhika G.I.D.C., (Metoda) Kalaward Road, Rajkot.

20. CABCOM

M/s. CabCom India, 304, 3rd Floor, Aggarwal Citi Mall
(Opp. M2K Pitam Pura Multiplex), Road No. 44, Pitampura,
Delhi - 110034

21. DICAB

M/S DIAMOND POWER INFRA. LTD.
PHASE II, VILLAGE VADALA, TA. SAVLI, VADODARA

22. JAINFLEX

M/s. Jainflex Cables P.L., A-2/1, Sabarmati Industrial Society,
Sabarmati, Ahmedabad - 380005

23. KEI

M/s KEI INDUSTRIES LIMITED 803, Siddharth Complex, Nr.
Hotel Express, R.C. Dutt Road, Baroda- 390007

24. MECAB

M/s MECAB Cables P.L. 635/A, Phase IV,
GIDC, VATVA, Ahmedabad - 382445

25. LOOKMAN

M/S ODIAN INDUSTRIES, Opp. Ravi Vidhyalaya, Nr. Gandhi
Society, Jamnagar Road, Madhapar, Rajkot - 380 006

26. PRIMECAB

M/s. Ravin Cables Limited, 302, Akruti Trade Centre, 3rd Floor,
Road No. 7, MIDC., Marol Andheri (E), Mumbai-400 093.

27. RALLISON

M/s RALLISON ELECTRICAL P.L. 205, Shreyas Complex,
Opp. Jain Derasar Navrangpura, Ahmedabad - 380009

28. BINTEX

M/s Jay Industries, Bintex House, Bhavnagar
Road, Nr. Rajmoti Ind. Rajkot

29. EKTA

M/s Soot Innovation Wires & Cables P.L.,
195/1, 197/1, Jharmajri Baddi, Dist. Solan (M.P.)

30. TEREKEL

M/s Teracom Limited, Teracom House, B-
84, Sector No 60, Noida - 201301 U.P. (India)

31. MITUSHI

M/s Sight Sound Electronic (I) P.L.
A-128, Wazirpur Industrial Area, Delhi-110052.

32. TERACAB INDIA

M/S TERA CABLES & IND. P.L., VILLAGE - KALANA,
PO. CHHARODI FARM, SANAND, AHMEDABAD

33. HI-FLEX

M/S Helly Plast Industries, 17/18, Nirman Industries Estate,
Fupadia, Opp. Samshan Gruh, A.K. Road, Surat-8.

34. BHARAT CAB

M/S Vardhman Cables & Controls, Belgaum.

35. CORE CABLE

M/S Core Cables Pvt. Ltd. 202, arpan Complex,
Opp. Swaminarayan Mandir, Kalawad Road, Rajkot-360001.

36. RPKABEL

M/S R R Kabel Limited, 305/A, Windsor Plaza, R.C. Dutt Road,
Alkapuri, Vadodara-390007.

37. ADCAB

M/S Atlas Cables & Accessories P.L. Plot No. D/2, Sector No.
12, Heavy Ind. Area, Gandhidham Gujarat.

38. POPULAR

M/S Popular Industries, 12, Sudama Estate, B/h. Calico Nagar,
Narol-sarkhej Road, Narol, Ahmedabad.

ALLUMINIUM & COPPER XLPE CABLES (ALL Type)
ABOVE 35 SQ.MM & UP TO 185 SQ.MM

1. ALLCAB (Refer to Ch.4.1. (2))

2. VARSHA (Refer to Ch.4.1. (8))

3. KUNTHCAB (Refer to Ch.4.1. (5))

4. MITUSHI (Refer to Ch.4.1. (31))

5. RALLISON (Refer to Ch.4.1. (27))

6. LOOKMAN (Refer to Ch.4.1. (25))

7. NIKI (Refer to Ch.4.1. (13))

8. KEI (Refer to Ch.4.1. (23))

9. FINOLEX (Refer to Ch.4.1. (15))

10. CABCOM (Refer to Ch.4.1. (20))

11. KAMALEX (Refer to Ch.4.1. (19))

12. MECAB (Refer to Ch.4.1. (24))

13. DICAB (Refer to Ch.4.1. (21))

14. HAVELLS (Refer to Ch.1.1. (C) Cat.-III (1))

15. BONTON (Refer to Ch.-4.1 (11))

16. SONAL GOLD (Refer to Ch.4.1. (17))

17. SHREEJI (Refer to Ch.4.1. (16))

18. WINFLEX (Refer to Ch.4 (7))

19. HI-FLEX (Refer to Ch.4.1. (33))

20. CORE CABLE (Refer to Ch.4.1. (35))

21. HITEX PLUS (Refer to Ch.4.1. (18))

22. JAINFLEX (Refer to Ch.4.1. (22))

23. PRIMCAB (Refer to Ch.4.1. (26))
24. TERACAB INDIA (Refer to Ch.4.1. (32))
25. L&T
26. AVOCAB (Refer to Ch.4.1 (4))
27. TEREXEL (Refer to Ch.4.1. (30))
28. BHARATCAB (Refer to Ch.4.1. (34))
29. ZENIUM CABLES (Refer to Ch.4.1 (10))
30. RRCABLE (Refer to Ch.4.1. (36))
31. WINFLEX & WINCAB (Refer to Ch.4.1. (7))
32. ADCAB (Refer to Ch.4.1. (37))
33. POPULAR (Refer to Ch.4.1. (38))
- ALLUMINIUM & COPPER XLPE CABLES (ALL Type) ABOVE 185 SQ.MM**
1. HAVELL'S (Refer to Ch.1.1. (C) Cat-III (1))
2. ALLCAB (Refer to Ch.4.1. (2))
3. KUNTHCAB (Refer to Ch.4.1. (5))
4. TEREXEL (Refer to Ch.4.1. (30))
5. TERACAB INDIA (Refer to Ch.4.1. (32))
7. AVOCAB (Refer to Ch.4.1 (4))
8. GEMSCAB
M/S GEMSCAB IND. LTD. PREM SADAN - 11, RAJENDRA PLACE NEW DELHI - 110008
9. PRIMECAB
M/s Ravin Cables Limited, 302, Akruti Trade Centre, 3rd Floor, Road No.7, MIDC, Marol Andheri (E), Mumbai - 400 093
10. PELEC
43, Sudama Estate, B/h. Swastik Bansidhar Mills, Narol Cross Road, Ahmedabad - 382405
11. HITEX PLUS (Refer to Ch.4.1. (16))
12. POPULAR (Refer to Ch.4.1. (38))
13. LOOKMAN (Refer to Ch.4.1. (25))
14. KEL (Refer to Ch.4.1. (28))
15. RALLISON (Refer to Ch.4.1. (27))
16. CORE CABLE (Refer to Ch.4.1. (35))
17. POWER CAB
M/s. SMRUTI CABLES PVT. LTD. Plot No 2, Block No 243, Nr. Ramdev Exports, Santej Vadsar Road, Ta. Kalo, Dist Gandhinagar - 382721
18. ZENIUM CABLES (Refer to Ch.-4 (10))
19. RRCABLE (Refer to Ch.4.1. (36))
20. ADCAB (Refer to Ch.4.1. (37))
- FLEXIBLE WIRES & CABLES / INDUSTRIES WIRES / FRLS WIRES / PVC WIRES / CO-AXIAL CABLE, SUBMERSIBLE CABLE / ZHFR CABLE ETC**
- ANY ISI MARKED WHICH IS APPROVED BY DEPARTMENT**
1. ALLCAB (Refer to Ch.4.1.(2))
2. AVOCAB (Refer to Ch.4.1 (4))
3. HAVELLS (Refer to Ch.1.1. (C) Cat-III (1))
4. KONARK
M/s. Servo Cable Industries 90/5, Mandir Marg, Indl. Complex, Haiderpur, New Delhi-110052
5. KUNTHCAB (Refer to Ch.4.1. (5))
6. BHARAT CAB (Refer to Ch.4 (3))
7. VINAY (Refer to Ch.1.1. (A) Cat-II (1))
8. EKTA
M/s Scot Innovation Wires & Cables P.L., 195/1, 197/1, Jharmajri Baddi, Dist. Solan (M.P.)
9. TERA-CAB-INDIA (Refer to Ch.4.1 (4))
10. EcoTEK ZHFR
M/s SHAKUN POLYMERS LIMITED, 501/502, IVORY TERRACE, R.C. DUTT ROAD, ALKAPURI, VADODARA - 390007
11. NIKI (Refer to Ch.4.1 (13))
12. JAINFLEX (Refer to Ch.4.1 (22))
13. BINTEX (Refer to Ch.4.1 (26))
14. DARSHAN PLUS
M/S DARSHAN CABLE INDUSTRIES C/I 135/A, PHASE - I, VATVA GIDC ESTATE NR PUSHPAK ESTATE, AHMEDABAD
15. INDOASIAN (Refer to Ch.1.1. (C) Cat-II (8))
16. LEADER (Refer to Ch.1.1. (C) Cat-II (10))
17. GEMSCAB (Refer to Ch.-4.2 (3))
18. ACTION / ADHUNIK (Refer to 2.7 Approved (1))
19. ANCHOR (Refer to Ch.1.1. (B) Cat-III (1))
20. BONTON (Refer to Ch.-4. (11))

21. POPULAR (Refer to Ch.-4. (38))
22. NEOCAB
M/s R.S. Industries, Anand Industria Estate, Borsad Chokdi, Anand - 388001
23. CAPTON & Aromac
M/s. MILAN INDUSTRIES, Plot No 12, Sarthi Complex, Opp. G.V.M.M., ODHAV, Ahmedabad
24. RUBICON
M/s. RUBICON CABLES INDUSTRIES, C-1/89/5, Nr. Pushpak Estate Cross Road, G.I.D.C. Phase - 1, VATVA, Ahmedabad - 382445
25. EON
M/s. Eon Electric Limited
B-88, Sector 83, Noida - 201305, U.P., INDIA
26. VIMAL, (Refer to Ch.-1.1(A) Cat. - I (5))
27. HPL (Refer to Ch.2.1. Cat.-III (6))
28. NANO, (Refer to Ch.3.7. Cat.-II (14))
29. ZENIUM CABLES (Refer to Ch.-4 (10))
30. CORE CABLE (Refer to Ch.4.1 (35))
31. KAMALEX (Refer to Ch.4.1 (19))
32. CABCOM (Refer to Ch.4.1 (20))
33. MECAB (Refer to Ch.4.1 (24))
34. RALLISON (Refer to Ch.4.1 (27))
35. SHREEJI (Refer to Ch.4.1 (16))
36. SONA GOLD (Refer to Ch.4.1 (17))
47. HITEX PLUS (Refer to Ch.4.1 (18))
38. VARSHA (Refer to Ch.4.1 (8))
39. L & T
40. FINOLEX (Refer to Ch.4.1 (15))
41. RRCABLE (Refer to Ch.4.1. (36))
42. ADCAB (Refer to Ch.4.1. (37))
43. WINFLEX & WINCAB (Refer to Ch.4.1. (7))
44. JAINSON
M/s. Jainson Cables India P.L. Surve No. 16, Plot No. 16A & B Ahmedabad Mehsana Highway Village Chandarda Post Ghumasan, Ta. Kadi, Dist. Mehsana-382718
45. GELCO - SUBMERSIBLE CABLE (Refer to Ch.4.1. (3))

CHAPTER - V

FANS

5.1 CEILING FANS & TABLE FANS

1. ORPAT - APPROVED (Refer to Ch.1.1. (A) Cat-III (2))
2. USHA
M/S. USHA INTERNATIONAL LTD 1st Floor, Super Market, Nr. Naitraj Cinema, Ashram Road, Ahmedabad - 380 009
3. ANCHOR (Refer to Ch.1.1. (B) Cat-III (1))
4. CROMPTON (Refer to Ch.2.1. Cat.-III (4))
5. BAJAJ (Refer to Ch.2.1. Cat.-II (3))
6. Philips (Refer to Ch.1.1. (C) Cat-III (4))
7. KHAITAN
M/s Khaitan Electricals, 101/102, Mahakant Complex, Opp. V.S. Hospital, Ashram Road, Ahmedabad - 380 006
8. DECON
M/s Decon Lighting, Y-43, Okhla Phase - II New Delhi-110023
9. HAVELL'S (Refer to Ch.1.1. (C) Cat-III (1))
10. ALMONDARD
11. CINNI
12. REMI
13. KEDIA
14. NOVA
15. GEC
16. ORIENT
17. INDO PLUS
M/s The Universal Appliances (India) Naggarh Dist. Sonu (H.P.)
- ENERGY SAVING 50 WATT CEILING FAN**
1. HAVELL'S (Refer to Ch.1.1. (C) Cat-III (1))
2. CROMPTON (Refer to Ch.2.1. Cat.-III (4))
3. BAJAJ (Refer to Ch.2.1. Cat.-II (3))
4. USHA (Refer to Ch.-5. (2))
5. ORIENT
6. SATYA
7. KELTRON

8. RIDER
9. OCLEG
10. ELLICO
11. PULSE

EXHAUST FANS, BRACKET FANS & PEDESTAL FANS

(A) CATEGORY - I

1. ANCHOR (Refer to Ch.1.1. (B) Cat.-III (1))
2. ORPAT (Refer to Ch.1.1. (A) Cat.-III (2))
3. ANSU
4. NOVA
5. EPC
6. REMI
7. KHAITAN
8. INDOPLUS (Refer to Ch.5.1. (17))

CATEGORY - II

1. USHA (Refer to Ch.5 (2))
2. HAVELL'S (Refer to Ch.1.1. (C) Cat.-III (1))
3. CROMPTON (Refer to Ch.2.1. Cat.-III (4))
4. BAJAJ (Refer to Ch.2.1. Cat.-II (3))
5. ALMONARD
6. ORIENT
7. SATYA
8. G.E.C.

CHAPTER - VI

SMC PRESS MOULDED BOX FOR STREET LIGHTS

1. SINTEX - APPROVED
M/S SINTEX INDUSTRIES LTD KALOL
(NORTH GUJARAT) PIN - 382 721
2. EVEREST - APPROVED
M/S EVEREST ELECTRICALS 133, PRINCESS STREET, GOPAL
NIWAS, 1ST FLOOR, ROOM NO 9/10/11, MUMBAI - 400002
3. ESCO - APPROVED (Refer to Ch.3.7. Approved (4))
4. NATIONAL
M/s. R.M. Enterprise 203/B, Gurukul Tower, Jaywant Sawant Road,
Dahisar [W] Mumbai - 400068
5. EPP
M/s. EP Composites P.L. Plot No. 2646, Kranti Gate Main Road,
GIDC Lodhika Ind. Estate, Kalawad Road, Metoda, Rajkot-360021.

AIRCONDITIONERS, WATER COOLERS APPROVED

1. DIKIN
M/s. Dalkin Airconditioning India P.L. 12th Floor, Building No. 9,
Tower A, DLF Phase III, Gurgaon-122022. Haryana.
2. MISHIBISHI ELECTRIC
M/s. Mitsubishi Electric India P.L., Primate 303/A, 3rd Floor,
Judges Bungalow Cross Road, Bodakdev, Ahmedabad.
3. ONIDA
MIRC Electronics, ONIDA House, G-1, MIDC
Mahakali Caves Road, Andheri [E] Mumbai - 400093
4. OGENRAL
5. BLUE SATAR
6. PANOSONIC
7. VOLTAS
8. CARRIERS
9. AMTREX

SERVO CONTROLLED VOLTAGE STABILIZER & ELECTRONICS POWER CONDITIONERS

1. GRE (Refer to Ch.2.4. Cat.-II (2))
2. GELCO (Refer to Ch.1.1. (B) Cat.-III (6))
3. SUVIK
M/S SUVIK ELECTRONICS P.L. SECTOR NO. 28, INDUSTRIAL
ESTATE, GANDHINAGAR.
4. KEPREJ
M/S KEPREJ ELECTRONICS, SECTOR NO. 28, INDUSTRIAL
ESTATE, GANDHINAGAR.
5. SERVOTECH
M/s. SERVOTECH POWER SYSTEM PVT LTD. D-212,
Sector-2, DSIDC, Bawana Indl. Area, Delhi.
6. CONSUL
CONSUL CONSOLIDATED PVT LTD 4/329A, Old Mahabalipuram
Road, Chennai - 600041

7. Pulse / Nano (Refer to Ch.2.6 Cat.-I (1))

CAPACITOR

1. HAVELL'S (Refer to Ch.1.1. (C) Cat.-III (1))
2. MATRIX
M/s Matrix Control & Engineering P.L. E-725, DSIDC Industrial
Complex, Narela, Delhi-110040
3. PMX
M/s. Power Matrix Solution P.L. 4018 & 4019, Bhandup Ind.
Estate, Pannalal Compound, Off. LBS Road, Bhandup [W], Mumbai
4. JILCO (Refer to Ch.2.1. Cat.-II (6))
5. UNIVERSAL
M/s. Care Enterprise FF-9, Shalimar Complex,
Mahalaxmi Five Road, Paldi, Ahmedabad-380007.

ON LINE UPS

1. GRE (Refer to Ch.2.4. Cat.-II (2))
2. SUVIK (Refer to Ch.-6 (3))
3. KEPREJ (Refer to Ch.-6 (4))
4. OCLEG (Refer to Ch.2.12. Cat.-II (11))
5. CONSUL (Refer to Ch.-6 (6))
6. SERVOTECH (Refer to Ch.-6 (5))
7. NUMERICUPS
M/s. Numeric Power System Limited umeric House No. 5 Sir P.Si
Sivasamy Salai, Mylapore, Chennai-600004. India
8. KELTRON

WATER HEATERS

CATEGORY - I

1. BAJAJ (Refer to Ch.2.1. Cat.-II (3))
2. USHA (Refer to Ch.-5 (2))
3. INDO PLUS (Refer to Ch.5.1. (17))

CATEGORY - II

1. JILCO 2. SPHEREHOT 3. RECOLD 4. VENUS

MOTOR PUMPS

MOTOR PUMP STARTERS & STARTER ACCESSORIES

APPROVED

1. GELCO (Refer to Ch.1.1. (B) Cat.-III (6))
2. OCLEC
3. PULSE
4. ELLICO
5. L.S.

CATEGORY - II

1. CROMPTON (Refer to Ch.2.3. Cat.-III (4))
2. JYOTI
3. AEW
4. PECO
M/s. Peco Industries Estate, Nr. Gota Flyover, Gota Road,
Ahmedabad-382481

CATEGORY - III

1. HAVELL'S (Refer to Ch.1.1. (C) Cat.-III (1))
2. BCH (Refer to Ch.3.4. Cat.-III (3))
3. C&S GEWISS (Refer to Ch.1.1. (C) Cat.-III (6))
4. L & T (Refer to Ch.3.2. Cat.-III (4))
5. Siemens (Refer to Ch.3.3. Cat.-II (6))
6. ALSTHOM
7. SUECO

POWER AND CONTROL PANEL / PANEL ACCESSORIES

1. C&S GEWISS (Refer to Ch.1.1. (C) Cat.-III (8))
2. GELCO (Refer to Ch.1.1. (B) Cat.-II (9))
3. TRINITY (Refer to Ch.3.10. Cat.-I (5))
4. NIPPEN (Refer to Ch.3.10. Cat.-I (1))
5. STANDARD (Refer to Ch.2.4. Cat.-II (5))
6. L&T (Refer to Ch.3.2. Cat.-III (4))
7. OCLEG (Refer to Ch.2.12. Cat.-II (11))
8. ELICO - APPROVED
9. L.S. - APPROVED
10. PRATHAM - APPROVED
11. SAHIL - APPROVED
12. MEGAWIN - APPROVED
13. ACTION / ADHUNIK (Refer to Ch.-2.7 Approved (1))
14. SKY

M/s. Sky Control System 160, Vikas Estate, Opp. Anil Starch Mill

Road, Nr. Vima Yojna Hospital Bapunagar, Ahmedabad-380025.

SINGLE PHASE MONO BLOCK PUMPS

CATEGORY - II

1. AMIT (Refer to Ch.1.2. (13))
2. LUBI
B/h Lubi Elect., Memco, Naroda Road, Ahmedabad
3. UNEEL
M/s UNNATI INDUSTRIAL CORPORATION, D-61, Diamond Park, G.I.D.C. Nr. Nana Chlodra, N.H.No.8, Naroda - Ahmedabad - 382330
4. PRIMA
M/s. Prima Pumps P.L. 34, G.V.M. Au. Vasahat, Odhav, Ahmedabad - 382410
5. SABAR
M/s. SABAR PUMP PVT LTD, 3704/A, G.I.D.C. Estate, Phase - IV, B/h. New Nirma Chemicals, Vatva Ahmedabad - 382445

CATEGORY III

1. CROMPTON (Refer to Ch.2.1. Cat.-III (4))
2. SIEMENS (Refer to Ch.2.3. Cat.-III (6))
3. KIRLOSKAR

OPEN WELL TYPE HORIZONTAL MONO BLOCK PUMPS

CATEGORY - I

1. PRIME
2. SABAR

CATEGORY - II

1. UNEEL (Refer to Ch.9 (3))
2. AMRUT
M/s Amrit Engineering P.L., P.O. No. 4141, 2nd Floor, Motilal Centre, Nr. Dinesh Hall, Ashram Road, Ahmedabad - 3800009
3. AMIT (Refer to Ch.1.2. (13))
4. LUBI (Refer to Ch.9. (2))
5. CROMPTON (Refer to Ch.2.3. Cat.-III (4))
6. DUKE
7. PRIMA
8. KIRLOSKAR

STARTER PANELS [APPROVED]

1. GELCO (Refer to Ch.1.1. (B) Cat.-III (6))
2. SAHIL
M/s SAHIL ELECTRO SYSTEM, 163, Vikas Industrial Estate, Opp. Anil Starch Mills, Nr. Vimayojna Hospital, Nutan Mills Road, Ahmedabad - 380025
3. HAVELL'S (Refer to Ch.1.1. (C) Cat.-III (1))
4. OCLEG (Refer to Ch.2.12. Cat.-II (11))
5. L & T (Refer to Ch.3.2. Cat.-III (4))
6. SAMUDRA
M/s Samudra Power Products, Plot No. 32, Road No. 5/A, G.I.D.C. Kathawada, Ahmedabad - 380415
7. SUECO
M/s. SHREE UMIYA ELECTRICAL CO. 304, SHAILLY HOUSE, HARIHAR PARK SOCIETY Nr. OLD HIGH COURT, RAILWAY UNDERBRIDGE, NAVRANGPURA, AHMEDABAD - 380009
8. ELLICO

CATEGORY - III

1. C&S GEWISS (Refer to Ch.1.1. (C) Cat.-III (8))
2. BCH (Refer to Ch.3.4. Cat.-III (3))

SUBMERSIBLE PUMPS

CATEGORY - I

1. AROMA
M/s ARIHANT PUMPS PVT. LTD., Near Ladbi Nala, Deesa Highway, Palanpur - 385 001
2. PLUGA - APPROVED
M/S Shroffs Engineering Limited, 850/2, G.I.D.C. Estate Makarpura, Vadodara - 390 010
3. JEE-APPROVED
M/s. Jee Pumps (Guj.) P.L. Plot No L1 & 2, G.I.D.C. Nr. Water Tank, Odhav - Ahmedabad - 382415
4. FALCON - APPROVED
M/s. Falcon Submersible P.L. Survey No 39/4, Vavdi Industrial area, Gondal Road, Rajkot - 360004

CATEGORY - II

1. CROMPTON (Refer to Ch.2.1. Cat.-III (4))
2. DUKE
M/s. Duke Plasto Technique P.L. N.H. 14, Deesa Highway Opp. Hotel Green Wood, Badarpura, Palanpur - 385511
3. SABAR (Refer to Ch.9. (5))
4. JASCO
M/s. JASCO PUMPS PVT LTD 47, Phase - I, G.I.D.C., Mangal Estate, Naroda, Ahmedabad - 382330

CATEGORY - III

1. UNEEL (Refer to Ch.9 (3))
2. AMRUT (Refer to Ch.9 (2))
3. LUBI (Refer to Ch.9 (2))
4. DUKE (Refer to Ch.9 Cat.-II (2))
5. KSB
6. KIRLOSKAR

CHAPTER - X

SUBSTATION EQUIPMENTS APPROVED

1. BIECCO (Refer to Ch.3.5. (Approved)-I)
2. HAVELL'S (Refer to Ch.1.1. (C) Cat.-III (1))
3. VOLTAMP
4. MATRIX
5. MEGHAWIN
6. PMX

CATEGORY - II

1. UNIVERSAL
M/s Universal Power Xmer Ltd. 26/A, 2nd Phase, Peenya Industrial Area, Bangalore - 560058
2. SKP

CATEGORY - III

1. CROMPTON (Refer to Ch.2.3. Cat.-III (4))
2. L & T (Refer to Ch.3.2. Cat.-III (4))
3. KIRLOSKAR
4. ALSTOM
5. C&S EFACCE

TRANSFORMER

TRANSFORMER SHOULD COMPLY E.C.B.C. CODE CRITERIA

1. TRANSFORMER - APPROVED

M/s. Danke Electricals Ltd. 778/780, G.I.D.C. Estate, Waghodia - 391760, Baroda - Gujarat

CATEGORY - I

1. POWERLITE
2. INSTA POWER
3. SHILCHAR
4. VARDHMAN ELECTRO-MECH

CATEGORY - II

1. UNIVERSAL
2. DICAB
3. KOKILA
M/s. Kokila Electricals T.B. Hospital Road, Vijapur-382770 Dist. Mehsana
4. ARYA-ELECTRONICS (AE)
Plot No. 188/1, GIDC-IV Sihor Ghanghali Road, B/h. Sitaram weight Bridge, Sihor Dist. Bhavnagar.
5. RAYCHEM RPG
Raychem, RPG House, 463, Dr. Annie Basant Road, Worli, Mumbai-400039.

CATEGORY - III

1. VOLTAMP
2. POWERLITE
M/s. Powerlite Electricals, Plot No 627, Nr. Gayatri Temple, Phase - 4, G.I.D.C. Estate, Naroda, Ahmedabad - 382330
3. CROMPTON
4. L & T
5. SIEMENS
6. G.E.
7. KIRLOSKAR
8. ALSTOM
9. SKP

Note : Other products are supposed to be included, as per latest approval of Superintending Engineer, Electrical (R. & B.) Circle, Gandhinagar as on or before last date of submission of tender.

CHAPTER - 11 NEW ITEMS APPROVED

No.	Name of Company	Brand Name	Description of Make	Remarks
1	M/s Vijayshree Electromech (p) Ltd 103, vedant complex, 7 Kalpana Society, B/h, N.V.P.O off C.G. Road, Navrangpura, Ahmedabad - 009	WELLTECH	1. Swaged Steel Tubular pole / Steel Octagonal pole / Steel conical pole/ GRP / FRP Pole 2. SMC/DMC Junction box/G.I. Race way -Tyrunking/GRP Cable Tray/G.I. Cable Tray	Cat.II Approved
2	M/s Bajaj Electricals Limited Ahmedabad	BAJAJ	1. High Mast / Octagonal pole / GRP poles / Decorative Poles/ Conical G.I. Pole	Cat.III
3	M/s Jay Copper & Alloys P.L. Plot No 2219, Nr. Shah Alloys Ltd., Science City To Khatraj Road, Village - Santah - 382721	ELECTRO-EARTH	1 Galvanizing Earthing [Chemical Earthing - 1/2/3 Mtr 2 Copper Earthing [Chemical Earthing - 1/2/3 Mtr	Approved Approved
4	M/s Prestolite Corporation (Refer. Ch.2.6 Cat.-III (3))	PRESOLITE	1 High Mast pole upto 30 Mtr.	Approved
5	M/s Surya Roshni Ltd Ahmedabad	SURYA	1 High Mast / Octagonal Pole	Cat. III
6	M/s. Kemrook India	KEMROK	1 FRP Lighting pole	Approved
7	M/s. Accurate Eng. LTd.	ACCURATE	1 High Mast / Tower	Approved
8	M/s. Sumip Composites Pvt.Ltd	SUMIP	1 FRP Light Pole / FRP Cable Tray / Trefoil Clamp / Luminaries / FRP Leader	Approved
9	M/s Aster	ASTER	HIGH Mast Pole	Cat. II
10	M/s. Ammini Eng. System P.L.	AMMINI	Out Door Street Light	Approved
11	M/s GELCO ELECTRONICS P.L. (Refer. Ch.1.1 Cat.-III (B) (6))	GELCO	Motor control cubical panel, Electrical Starter for A.C. etc.	Approved
12	Transrail Lighting Ltd A-201/209, Boomerang Complex, Chandivali Farm Road, Andheri [E], Mumbai - 400072	TRANSRAIL	1 High mast Pole 2 Street Light Pole (Conical / Hexagonal / Octagonal / swaged pole)	Cat. III Cat. III
13	M/s. Halonix (Refer. Ch.2.1 Cat.-III (4))	HALONIX	1 Land Scene & Garden Light / High Mast / All type luminers	II
14	M/s. Megawin	MEGAWIN	# United Sub-Station upto 12kw # Control relay panels custom built # SF 6 Ring main units upto 36 kv # Auto reclosers & capacitor switch upto 36 kv # Air insulated load break switchgear upto 36 kv # Metal porcelain clad VCB switchgear upto 36 kv	Approved
15	M/s. THRON LIGHTING C/o. 10, Parshwanath Aptt. Somnath Park Lane, Opp. Tele Exchange Sahibaug, Ahmedabad-380004.	THRON	Street Light / Landscape & Garden Light	II
16	M/s. Control & Switchgears Contractors Ltd. 9th Floor, HERITAGE, Nr. Guj. University, Ashram Road, Ahmedabad-380009.	C & S	# Indoor Air insulated Metal Clad Switchgear with VCB # Compact SF6 insulated Ring main units for Indoor & Outdoor installation	II
18	M/s. Kaselec Schreder Pvt.LTd. 69 Friends Colony, West, New Delhi - 110065	SCHREDER	# Indoor & Outdoor Decorative Pole & Bracket # Premium Light Fixture # Furyol - 140 W compolls with dimmable electronics ballast # Contemporary / classic / Traditional City Lighting # Urban Lighting	II
19	M/s. Regent Beleuchtungs Korper AG Domacherstrasse 390 P O Box 246 OH 4018 Basel Swizerland C/o Bharat Elect. Corporation, 3, Abhigam, Opp Dr. House, Nr. Parimal Rly. Crossing, Ahmedabad	REGENT	# Indirect / direct lighting / free standing up lighters # Compact recessed & surface mounted luminaries # Modular recessed & surface mounted luminaries # Wall - ceiling & pendent mounted luminaries # Row lighting system # Spot Lighting & track system # Luminaires with increased IP rating & special luminaries # Emergency Luminaries / Outdoor luminaries # Access- ories & light sources	II

No.	Name of Company	Brand Name	Description of Make	Remarks
20	M/s. Sylvania India Ltd ORG Towers, 2D Sector 126, Expressway, Noida (U.P.) - 201304	SYLVANIA	# Down lighter # Fluorescent Recessed # Florescent surface mounted/suspended # Spot Lights # Track # Ambient/Decorative # Pendants # Battens / Trunking system # High protection # High Bay / Low Bay # Amenity / Bollard # In Ground / wall lights # Flood light # Pole top	III
20	M/s. Ligman Lighting India. Pvt. Ltd. Plot No. 4th Floor, Gulmohar Plaza, Gulmohar park, ITI Road, Aundh Pune-411007.	LIGMA	# Architeural Outdoor Lighting	III
21	M/s. Philips India Ltd M/s. Philips Electronics India Ltd	PHILIPS	# Indoor Lighting # Public Lighting System # Sports Lighting # Urban Decorative Lighting # Landscape Lighting # Special Application Lighting # Lighting Control for Indoor & Outdoor Lighting system	III
22	M/s. ABB (Refer. Ch.1.1 (C) Cat.-III (4))	ABB	# Composed Substation # Ring Main unit	III
23	M/s. WIPRO (Refer. Ch.2.1 (C) Cat.-III (5))	WIPRO	# High Mast Motorized & Not Motorized # Pole - Octagonal, Decorative, Swaged and All type of tubular pole	III
24	M/s. Aspire Composites, Survey No 172, Plot No 27, Opp. Reliance Petrol Pump, Madhapur-Anjar Highway Village Madhapur, Bhuj-Kutch	ASPIRE	FRP Industrial Lighting Products	Approved
25	M/s. REX POLYEXTRUSION LTD, Kumar Plaza, 1st Floor, 1077, North Shivajinagar, Opp. K.W.C. College, Sangli - 416416	REX	# DOUBLE WALL CORRUGATED PIPE # NON THREADABLE COMMUNICATION & ELECT. INST. CONDUIT PIPES	Approved
26	M/s DURA-LINE INDIA PVT LTD, Plot No. 24-25, Verna Electronics City Phase-IIA, Verna Salceta GOA-403722 (North Goa)	DURA-GUARD	# Conduit Systems for Electrical Installation & Communication Installation Non Threadable of size upto 200mm OD	Approved
27	M/s Trupati Plastomatic Pvt. Ltd F-543 Road, No 6 D VKI Area, Jaipur - 302013	GEMINI	# HDPE Corrugated Sheathing Ducts & HDPE Double Wall Corrugated Pipe (DWC)	Approved
28	M/s Aashcube Lighting P.L. (Refer. Ch.2.6 Cat.-I (7))	Aash Cube	# Gate / Bollard Light	Cat.I
29	M/s Havell's India Ltd, (Refer to Ch. 1.1 (C) Cat.-III (1))	HAVELL'S	# Hume Free Electronics Regulator	Approved
30	M/s. GRE Electronics Pvt.Ltd. Plot No. 423, G.I.D.C.II, Dediyaan Mehsana-384002	GRE	# Hume Free Electronics Regulator	Approved
31	M/s GELCO ELECTRONICS PVT LTD (Refer to Ch. 1.1 (B) Cat.-III (6))	GELCO	# Hume Free Electronics Regulator	Approved
32	M/s. VALMONT STRUCTURES P.L. 909/910, FILIX LBS Marg, Bhandup (w) Mumbai-400078.	VALMONT	# High Mast, Octagonal Pole, Conical Pole, decorative Pole, Stadium Mast	Cat.III
33	M/s. MAXCEL PLAST 133, Shree Ram Ind. Estate, B/h. C.M.C. Anum Eng. Compound, Nr. Soni's Chawl Cross Road, ODHAV, Ahmedabad-382415.	MAXCEL PLAST	# YUVA Gang Box, Modular Box, Mudlar Plastic, Concealed Box, G.I. Metal Modular Box, Plastic Fan Box, Point Box, Polycarbonate Lamp Holder, Nice Holder Plate / Fan Plate, Pipe Filings Accessories.	Approved
34	M/s. THE UNIVERSAL APPLIANCE (India) Nalagarh Dist. Sona (H.P.)	INDO PLUS	# Geyser ISI [Geyser Metal 1.5, 10, 15, 25 Ltr.] # [Geyser ABS 5 Star Rating-15, 25 Ltr.] [Geyser ABS 1.5, 10, 15 Ltr. 50 Ltr. Powder Coated] # Immersion Heater ISI [1.5, 2.0 KW] # Heat Converter ISI [Super ISI, Super Dlx ISI, U Type (HOT AIR ISI)]	Approved Approved Approved Approved
35	M/s. PECO Industries, (Refer to Ch. 9 Cat.-II (4))	PECO	# HRC Fuse & Fuse Link	

_____ : Also Available at : _____



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