

# **STANDARD BIDDING DOCUMENT**

## **PROCUREMENT OF ELECTRICAL WORK**

**Replacing Water Cooler at Various Block of District Court &  
Family Court, Diwalipura, Vadodara**

### **COMPLETE BIDDING DOCUMENT**



*GOVERNMENT OF GUJARAT*  
**ROAD & BUILDING DEPARTMENT**

Deputy Executive Engineer  
Vadodara Electrical (R&B) Sub Division  
Vadodara

Executive Engineer  
Vadodara Electrical (R&B) Division  
Vadodara

**Rs. :- 447147.00**

**Rupees :- For Lakh Forty Seven Thousand One Hundred Forty Seven  
Only.**

Superintending Engineer  
R & B Electrical Circle  
Gandhinagar

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**INVITATION FOR BID**  
**(IFB)**

## NATIONAL COMPETITIVE BIDDING

1. The Executive Engineer invites bids for the construction of works detailed in the table.  
The bidders may submit bids for any or all of the following works.

TABLE

SR. No.	Name of work	Approximate value of works (Rs.)	Bid security (Rs.)	Cost of document	Period of completion	Class of Registration
1	2	3	4	5	6	7
1	<b>Replacing Water Cooler at Various Block of District Court &amp; Family Court, Diwalipura, Vadodara</b>	447147.00	5000.00	600	<b>15 Days from the date of issue of W.O.</b>	E2 class and above (Electrical)

2. Prospective / Interested bidder may download the Bid Documents from website <https://www.nprocure.com> free of cost till the Time and Date as mentioned on online NIT at website <https://www.nprocure.com>.
3. However, Bidder who is submitting the Bid Online will have to pay the Bid Document Fee / Tender Fee through Demand Draft only of any Schedule Bank payable at Vadodara and in favour of 'Executive Engineer, Vadodara Electrical (R&B) Division, Vadodara'. Once the Bid is received online, Bid Document / Tender Fee will not be refundable.

The Demand Draft for Bid Document / Tender fee and FDR / Bank Guarantee against Bid Security / EMD shall be submitted in electronic format through online (by scanning) while uploading the bid, this submission shall mean that bid document / tender fee and Bid Security / EMD has been received. Accordingly, the offer of only those shall be opened whose Bid Document / Tender Fee and Bid Security / EMD have been received electronically. However, for the purpose of realization of Demand Draft, and FDR / Bank Guarantee bidder shall send the same in original through R.P.A.D. so as to reach to "Deputy Executive Engineer, Vadodara Electrical (R&B) Sub Division, Vadodara, 4<sup>th</sup> floor" on or before **29/06/2026**, 16:00 hrs.

Penaltative action for not submitting Demand Draft / FDR / Bank Guarantee in original to Executive Engineer / Tender Inviting Authority by bidder shall be initiated.

4. Bids received online, will be opened on the time, date and place as specified in the online NIT at website <https://www.nprocure.com> in the presence of the bidders or their authorized representatives, who wish to remain present.  
If the office happens to be closed on the day of opening of the bids as specified, the bids will be opened on the next working day at the same time and venue.
5. A pre bid meeting will be held on .....at .....hrs. at the office of ..... to clarify the issues and to answer questions on any matter that may be raised at that stage as stated in clause 9.2 of 'instructions to Bidders' of the bidding documents.
6. Bid Security (EMD) is equal to 1% of Estimated Amount put to bid / tender and should be rounded off to the next thousand rupees.
7. Other Information is as under:

- A. Agencies can prepare and edit their offers a number of times before the end of the tender submission date and time. After the tender submission date and time, the bidder cannot modify / edit / withdraw their submitted offer in any case. No written or online request in this regard shall be granted.
- B. Offers in physical form will not be accepted in any case.
- C. Demand Draft purchased by the other than bidder and issued after the last date of submission of Bids, will not be considered or accepted.
- D. The cost incurred by the contractor for this offer for clarification or attending discussion, conferences or site visits will not be reimbursed by the Employer or Engineer-in-Charge.
- E. Conditional tender shall not be accepted.
- F. Any changes, addition, alternation made in the prescribed form attached with tender are liable to be rejected.
- G. Any change in format or conditional Bank Guarantee will not be accepted and the bidder will be considered non-responsive.
- H. All the bidders are instructed to fill in information strictly in accordance with the format given in the checklist / qualification document / tender document.
- I. It is mandatory for the bidders to supply each and every information as asked strictly in electronic format at appropriate places only.
- J. Blank / insufficient information shall be treated as nil information and shall result in disqualification.
- K. Even if the bidder has been qualified in a similar or larger size of project in the past, it shall not be deemed to be a ground / reason for not giving required information for this work / bid.
- L. Information supplied for earlier projects shall not be considered while evaluation of this bid. The Government will not ask for any other information, unless it is found absolutely necessary by the competent authority.
- M. If found necessary, the contractor will be intimated for negotiation,

# **For the works costing up to 7.5 crore (ROAD), 7.0 crore (BUILDING & BRIDGE) kindly refer to SSR-10-2015-17-C dated 03-02-2017**

For the works costing under ~~7.5 crore for Road Works and~~ 7.0 crore for Electrical Works ~~Building and Bridge Works~~ following documents shall be submitted in electronic format only through online by scanning and the (i) Bid Document Fee / Tender Fee (ii) Bid Security / EMD should be sent in original to the Tender opening authority through RPAD, so as to reach the Deputy Executive Engineer on or before **29/06/2026**, 16:00 hrs..

- (i) Bid Document Fee / Tender Fee :- Rs. **600.00**
- (ii) Bid Security / EMD or Valid EMD Exemption Certificate of Appropriate Class of Registration of Approved Contractors :- Rs. **5000.00**
- (iii) Registration Certificate of Appropriate Class :- **E2 class and above (Electrical)**
- ~~(iv) Registration Certificate of Special Category - Road / Bridge / Building and Category I / II / III, if required~~
- (v) GST Number

~~(vi) Work Experience, if necessary:-~~

(vii) Latest Valid License Electrical Contractor License

(viii) Bank Solvency of 20% of Estimated Cost of Nationalized or Scheduled Bank issued in current calendar year i.e.2024

(ix) Other Documents, as req

## **SECTION - 1**

### **INSTRUCTIONS TO BIDDERS(ITB)**

## Section 1: Instructions to Bidders

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## **A. GENERAL**

### **1. Scope of Bid**

- 1.1 The Employer (Named in Appendix to ITB) invites bids for the Construction of works (as defined in these documents and referred to as 'the works') detailed in the table given in IFB. The bidders may submit bids for any or all of the works detailed in the table given in IFB.
- 1.2 The successful bidder will be expected to complete the works by the intended completion date specified in the Contract data.
- 1.3 Throughout these bidding documents, the terms 'bid' and 'tender' and their derivatives (bidder/ tenderer, bid / tender, bidding/ tendering, etc.) are synonymous.

### **2. Source of Funds**

- 2.1 The expenditure on this project will be met from ~~the budget of Govt. of Gujarat / Govt. of India for centrally sponsored projects.~~ **2059 PW M&R SR**

### **3. Eligible Bidders**

- 3.1 This Invitation for Bids is open to all eligible bidders.
- 3.2 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a statement that the Bidder is neither associated, nor has been associated, directly or indirectly, with the consultant or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the works, and any of its affiliates, shall not be eligible to bid.

### **4. Qualification of the Bidder**

- 4.1 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary. The proposed methodology should include a program of construction backed with equipment planning and deployment duly supported with broad calculations and quality assurance procedures proposed to be adopted justifying their capability of execution and completion of work as per technical specifications, within stipulated period of completion.
- 4.2 Deleted
- 4.3 Deleted
- 4.4 Deleted

### **#4.5 QUALIFICATION CRITERIA:**

#### **(Applicable for the works which require Post Qualification)**

- 4.5.1 Qualification will be based on Applicant's meeting all the following minimum pass/ fail criteria regarding the Applicant's general and particular experience, personnel and equipment capabilities and financial positions, as demonstrated by the applicant's responses in the forms attached to the letter of application ( specified requirement for joint ventures are given under para 4.6 below ) Subcontractors experience and resources shall not be taken in to account in determining the applicants compliance with the qualifying criteria

To qualify for more than one contract, the applicant must demonstrate having experience and resources sufficient to meet the aggregate of the qualification criteria for each contract given in paragraphs 4.5.4, 4.5.5 and 4.5.9 below

#### 4.5.2 Base year and Escalation

The base year shall be taken as Current financial year

Following enhancement factors will be used for the costs of works executed and the financial figure to a common base value for works completed in India.

<u>Year</u>	<u>Financial Year</u>	<u>Multiplying factor</u>
Base year of inviting tender	2024-2025	1.00
-1	2023-2024	1.10
-2	2022-2023	1.21
-3	2021-2022	1.33
-4	2020-2021	1.46
-5	2019-2020	1.61

Applicant should indicate actual figures of costs and amount for the works executed by them without accounting for the above-mentioned factors.

In case the financial figures and value of completed works are in foreign currency the above enhanced multiplying factors will not be applied. Instead, the current market exchange rate (State Bank of India BC Selling rate as on the last date of submission of the bid) will be applied for the purpose of conversion of the amount in foreign currency into India rupees.

#### 4.5.3. General Experience.

The Applicant shall meet with the following minimum criteria:

(a) ~~Achieved a minimum annual financial turnover (defined as billing for works in progress and completed in all classes of civil engineering construction works only) in any one year, over the last five years of the annual value of contract / contracts applied for~~ **As per Section 10 Eligibility Criteria.**

~~(b) Experience in successfully completing or substantially completing at least one contract of highway (road and / or bridge works) airport runway (Similar work definition as per Annexure C/PQ) of at least 40 percent of the value of proposed contract within the last five years.~~ **As per Section 10 Eligibility Criteria.**

The works may have been executed by the applicant as prime contractor or as a member of a joint venture or as a nominated sub-contractor. As subcontractor, he should have acquired the experience of execution of all major items of works under the proposed contract. In case a project has been executed by a joint venture, weight towards experience of the project would be given to each joint venture in proportion to their financial participation in the joint venture.

Substantially completed works means those works which are at least 90 % completed as on the date of submission (i.e. gross value of work done up to the

last date of submission is 90 % or more of the original contract price) and continuing satisfactorily.

For these, a certificate from the employers shall be submitted along with the application incorporating clearly the name of the work, contract value, billing amount, date of commencement of works, satisfactory performance of the contractor and any other relevant information.

**4.5.4. Personnel Capabilities.**

Availability for his work of personnel with adequate experience as required; as per Appendix.

**4.5.5. Equipment Capabilities**

~~Based on the studies carried out by the Engineer, the minimum suggested major equipment to attain the completion of works in accordance with the prescribed construction schedule are shown in the Appendix.~~

~~The bidders should, however, undertake their own studies and furnish with their bid, a detailed construction planning and methodology supported with layout and necessary drawings and calculations to allow the employer to review their proposals. The numbers, types and capacities of each plant/equipment shall be shown in the proposals along with the cycle time for each operation for the given production capacity to match the requirements.~~

**4.5.6. Financial Position**

The Applicant should give undertaking that he has access to, or has available, liquid assets (aggregate of working capital, cash in hand and uncommitted bank guarantees) and / or credit facilities up to 25 percent of the value of the contract / contracts applied.

**4.5.7.** The audited balance sheets for the last five years should be submitted, which must demonstrate the soundness of the applicant's financial position, showing long – term profitability including an estimated financial projection for the next two years If necessary, the employer will make inquiries with the applicant's bankers.

**4.5.8. Litigation History**

The Applicant should provide accurate information on any litigation or arbitration resulting from contracts completed or under execution by him over the last five years. A consistent history of awards against the Applicant or any partner of a joint venture may result in failure of the applicant.

**4.5.9. Disqualification**

Even though the applicants meet the above criteria, they are subject to be disqualified if they have:

Made misleading or false representation in the forms, statements submitted, and / or Record of poor performance such as abandoning the work, rescinding of contract for which the reasons are attributable to the non – performance of the contractor; consistent history of litigation awarded against the applicant or financial failure due to bankruptcy. The rescinding of contract of a joint venture on account of reasons other than non – performance, such as Most Experienced partner of joint venture pulling out, court directions leading to breaking up of a joint venture before the start of work, which are not attributable to the poor performance of the contractor will, however, not affect the qualification of the individual partners.

~~#4.6 JOINT VENTURE: (Maximum 3 Members i.e. 1 Lead & 2 Others) (Applicable only for estimated project cost of 50 Crore and above)~~

~~4.6.1. Joint ventures must comply with the following requirement: Not Applicable~~

~~(a) Following are the minimum qualification requirements:~~

~~(i) The lead partner shall meet not less than 50 percent of all criteria given in para 4.5.3 & 4.5.6 above. The joint venture must collectively satisfy the criteria of para 4.5.3 & 4.5.6 above. The experience of the other joint venture partners shall be considered if it is not less than 30 percent of the qualifying criteria in para 4.5.3 & 4.5.6 above.~~

~~(ii) Individually each member must satisfy the requirements of para 4.5.7 & 4.5.8 above.~~

~~(b) Bid shall be signed so as to legally bind all partners, jointly and severally, and shall be submitted with a copy of the joint venture agreement providing the joint and several liabilities with respect to the contract.~~

~~4.6.2. Qualification of a joint venture does not necessarily qualify any of its partners individually or as a partner in any other joint venture. In case dissolution of a joint venture, each one of the constituent firms may qualify if they meet all the qualification requirements, subject to the written approval of the Employer.~~

#### 4.7. Bid Capacity.

Applicants who meet the minimum qualification criteria will be qualified only if their available bid capacity at the expected time of bidding is more than the total estimated cost of the works. The available bid capacity will be calculated as under:

*Assessed Available Bid Capacity = (A\*N\*2-B), where*

A = Maximum value of work executed in any one year during the last five years (updated to the price level of the year indicated in appendix) taking into account the completed as well as works in Progress.

B = Value at current price level of the existing commitments and ongoing works to be completed during the **15 Days from the date of issue of work order** ( period of completion of work for which bids are invited );

N = Number of years prescribed for completion of the works for which the bids are invited.

*Note :- In Case of joint venture, the available bid capacity will be applied for each partner to the extent of his proposed participation in the execution of the work.*

**4.8 Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:**

- Made misleading or false representation in the forms, statements and Attachments the submitted in proof the qualification requirements; and / or

- Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delay in completion, litigation history, or financial failures etc.; and/ or
- Participated in the previous bidding for the same work and had quoted unreasonably high bid prices and could not furnish rational justification to the employer.

**5. *One bid per bidder***

5.1. Each bidder shall submit only one bid for one package. A bidder who submits or participates in more than one bid (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the bidder's participation to be disqualified.

**6. *Cost of Bidding***

6.1. The bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible and liable for those costs.

**7. *Site Visit***

7.1. The Bidder, at the Bidder's own responsibility and risk is encouraged to visit and examine the Site of work and its surrounding and obtain all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works.

The costs of visiting the site shall be at the Bidder's own expense.

## **B. BIDDING DOCUMENTS**

### **8. Content of Bidding Documents**

- 8.1 The set of bidding documents comprises the documents listed below and addenda issued in accordance with Clause 10:

Section	Particulars	Volume No.
-	Invitation for Bids	I
1	Instructions to Bidders	
2	Qualification Information, and other forms	
3	Conditions of Contract	
4	Contract Data	
5	Technical Specifications	II
6	Form of Bid	III
7	Bill of Quantities	
8	Securities and other forms	
9	Drawings	IV
10	Documents to be furnished by bidder	V

- 8.2. Volumes I, II, III and IV are available online and documents to be furnished by the bidder in compliance to section 2 will be prepared by him and furnished as Volume-V in two parts (refer clause 12).
- 8.3. The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, technical specifications, bill of quantities, forms, Annexes and drawings in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the bidder's own risk. **Pursuant to clause 26 hereof**, bids which are not substantially responsive to the requirements of the Bid Documents shall be rejected.

### **9. Clarification Bidding Documents**

- 9.1 A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or through E-mail at the Employer's address indicated in the invitation to bid. The Employer will respond to any request for clarification which he received earlier than 15 days prior to the deadline for submission of bids. Employer's response will be published on website including a description of the enquiry but without identifying its source.

#### **~~9.2. Pre-bid meeting~~**

- ~~9.2.1. The bidder or his official representative is invited to attend a pre-bid meeting which will take place at the address, venue, time and date as indicated in the appendix.~~

- ~~9.2.2. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.~~
- ~~9.2.3. The bidder shall be required to submit any questions in writing or e-mail to reach the Employer not later than 03 days before the meeting.~~
- ~~9.2.4 Minutes of the meeting, including the question raised (Without identifying the source of enquiry) and the responses given will be published without delay on the tender website i.e. [www.nprocure.com](http://www.nprocure.com). Any modification of the bidding documents listed in sub-Clause 8.1 which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 10 and not through the minutes of the pre-bid meeting.~~
- ~~9.2.5. Non attendance at the pre bid meeting will not be a cause for disqualification of a bidder.~~

#### **10. Amendment of Bidding Documents**

- 10.1 Before the deadline for submission of bids, the Employer may modify the bidding documents by issuing addenda.
- 10.2. Any addendum thus issued shall be part of the bidding documents. The Employer will assume no responsibility for the same.
- 10.3. To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may, at his discretion, extend as necessary the deadline for submission of bids, in accordance with Sub-Clause 20.2 below.

**11. Language of the Bid**

11.1 All documents relating to the bid shall be in the English language.

**12. Documents Comprising the Bid**

12.1. The bid be submitted by the bidder as Volume V of the bid document (refer Clause 8.1) shall be in two separate parts:

*Part I shall be named "Technical Bid" and shall comprise*

- (i) Bid Security in the form specified in Section 8
- (ii) Qualification Information and supporting documents as specified in Section 2
- (iii) Certificates, undertakings, affidavits as specified in Section 2
- (iv) Any other information pursuant to Clause 4.5 of these instructions
- (v) Undertaking that the bid shall remain valid for the period specified in Clause 15.1

*Part II shall be named "Financial Bid" and shall comprise*

- (i) Form of Bid as specified in Section 6
- (ii) Priced Bill of Quantities for items specified in Section 7

12.2. The Bidder shall submit the details / information pertaining to each part i.e. technical as well as financial and must be submitted online only.

12.3. Following documents will be deemed to be part of the bid.

Section	Particulars	Volume No.
	<i>Invitation for Bids (IFB)</i>	
1	Instruction to Bidders	Volume I
3	Conditions of Contract	
4	Contract Data	
5	Specifications	Volume II
9	Drawings	Volume IV

**13. Bid Prices**

13.1 The Contract shall be for the whole works as described in Sub-Clause 1.1, based on the priced Bill of Quantities submitted by the Bidder.

13.2 The bidder shall fill in rates and prices and line item total (both in figures and words) for all items of the Works described in the Bill of Quantities along with total bid price



(Both in figures and words). Items for which no rate or price is entered by the bidder will not be paid for by the Bill of Quantities.

- 13.3 All duties, taxes, and other levies **excluding GST** payable by the contractor under the contract, or for any other cause shall be included in the rates, prices and total Bid Price submitted by the Bidder. **(GST Extra)**

13.4 Deleted

- ~~13.5 The rates and prices quoted by the bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of Clause 47 of the Condition of Contract **(Irrespective of the time limit and Bid Amount)**~~

**14.** *Currencies of Bid and Payment*

- 14.1 The unit rates and the prices quoted by the bidder shall be entirely in Indian Rupees. All payments shall be made in Indian Rupees.

**15.** *Bid Validity*

- 15.1 Bids shall remain valid for a period of not less than 120 days after the deadline date for bid submission specified in Clause 20.

- 15.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified period. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of his security for a period of the extension, and in compliance with Clause 16 in all respects.

**#16.** *Bid Security*

- 16.1. The Bidder shall furnish, as part of his Bid, a Bid security in the amount as shown in column 4 of the table of IFB for this particular work. This Bid security shall be in favor of Employer as named in Appendix and may be in one of the following forms;

- a. Bank Guarantee from any scheduled Indian bank, in the format given in Volume III. **(Bank Guarantee is applicable only for Bid Estimated Amount of 01 Crore and above) and Bank** Guarantee of Schedule and Private Banks shall be considered as per GoG Finance Department's Circular No. FD/MSM/e- file/4/2023/4020/D.M.O. Date 11/03/2024 or as per their latest amendment.
- b. Fixed Deposit Receipt issued by any Scheduled Indian Bank or a foreign Bank approved by the Reserve Bank of India.

**OR**

# A Valid Bid Security / EMD Exemption Certificate issued by (1) Road & Building Department or (2) Narmada Water Resources, Water Supply and Kalpsar Department of Govt of Gujarat. **Exemption Certificate is applicable only when Registration Certificate of Appropriate Class and Category of Approved Contractors is required as eligible criteria of bidder.**

- 16.2. Bank guarantees (and other instruments having fixed validity) issued as surety for the bid shall be valid for 45 days beyond the validity of the bid i.e. total validity of 120+45 = 165 Days
- 16.3. Any bid not accompanied by an acceptable Bid Security and not secured as indicated in Sub-Clauses 16.1 and 16.2 above shall be rejected by the Employer as non-responsive.
- 16.4. The Bid Security of unsuccessful bidders will be returned within 28 days of the end of the bid validity period specified in Sub-Clause 15.1
- 16.5 The Bid Security of the successful bidder will be discharged when the bidder has signed the Agreement and furnished the required Performance Security.
- 16.6. The bid Security may be forfeited
- (a) If the Bidder withdraws the bid after Bid opening during the period of Bid validity.
  - (b) If the Bidder does not accept the correction of the Bid Price, if any or
  - (c) In the case of a successful Bidders, if the Bidder fails the specified time limit to
    - (i) Sign the Agreement; or
    - (ii) Furnish the requirement Performance Security.
  - (d) #If found necessary, the bidder will be intimated for negotiation, He will be intimated maximum three times within the validity period for negotiation, If contractor does not respond in time, his Bid Security (EMD) will be forfeited and his tender will be rejected. Punitive action will be taken on such contractors. (As per GoG R&B Dept's Gr. No. S/22/2017/6369/D, Dt.08/06/2018)

**17. *Alternative Proposals by Bidders.***

- 17.1. Bidders shall submit offers that fully comply with the requirements of the bidding documents, including the conditions of contract (including mobilization advance or time for completion), basic technical design as indicated in the drawing and specifications. Conditional offers or alternative offers will not be considered further in the process of tender evaluation.

**18. *Format and Signing of Bid***

- 18.1. The Bidder shall prepare documents comprising the bid as described in Clause 12 of these Instructions to bidder as the "Technical Bid "and "Financial Bid" in separate parts to be uploaded.

## **D. SUBMISSION OF BIDS**

**19. Deleted**

**20. *Deadline for Submission of the Bids***

- 20.1. Complete Bids must be received online by the Employer at the tender website specified above not later than the date indicated in appendix.
- 20.2. The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 10, in which case all right and obligation of the Employer and the bidders previously subject to the original deadline will then be subject to the new deadline.

**21. Deleted**

**22. Modification and Withdrawal of Bids**

- 22.1. Bidders may modify or withdraw their bids online before the deadline prescribed in Clause 20 or pursuant to Clause 23.
- 22.2 Deleted
- 22.3. No bid shall be modified or withdrawn after the deadline for submission of Bid.
- 22.4. Withdrawal or modification of a bid between the deadline for submission of bids and the expiration of the original period of bid validity specified in Clause 15.1 above or as extended pursuant to Clause 15.2 may result in the forfeiture of the Bid security pursuant to Clause 16.

## E. BID OPENING AND EVALUATION

### 23. Bid Opening

- 23.1 The Employer will open all the Bids received including modifications made pursuant to Clause 22, in the presence of the Bidders or their representatives who choose to attend at time, date and the place specified in Appendix in the manner specified in Clauses 20 and 23.3, In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.
- 23.2. Deleted.
- 23.3. The “Technical Bid” shall be opened. The amount, form and validity of the bid security furnished with each bid will be announced. If the bid security furnished doesnot conform to the amount and validity period as specified in the invitation for bid (ref. Column 4 and paragraph 3), and has not been furnished in the form specified in Clause 16, the technical bid will not be opened.
- 23.4. (i) Subject to confirmation of the bid security by the issuing Bank, the bids accompanied with valid bid security will be taken up for evaluation with respect to the Qualification information and other information furnished in part I of the bid pursuant to Clause 12.1.
- (ii) If required, the bidder will be asked in writing to clarify his Qualification Documents with respect to any required clarification.
- (iii) The bidders will respond in not more than 7 days of issue of the clarification letter.
- (iv) Immediately (usually within 3 or 4 days), on receipt of these clarification the Evaluation Committee will finalize the list of responsive bidders whose financial bids are eligible for consideration.
- 23.5. Deleted
- 23.6 At the time of opening of “Financial Bid”, the names of the bidders were found responsive in accordance with Clause 23.4(iv) will be announced. The bids of only these bidders will be opened. The responsive Bidders’ names, the Bid prices, the total amount of each bid, any discount and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening.
- 23.7 the time of opening of “Financial Bid”, the names of the bidders were found responsive in accordance with Clause 23.4(iv) will be announced. The bids of only these bidders will be opened. The responsive Bidders’ names, the Bid prices, the total amount of each bid, any discount, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening.
- 23.8 In case bids are invited for more than one package, the order for opening of the “Financial Bid” shall be in order of Estimated amount of Bids from highest to lowest.
- 23.9 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present in accordance with Sub-Clause 23.6.

**24**     *Process to be Confidential*

- 24.1 Information relating to the examination, clarification, evaluation, and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced. Any effort by Bidder to influence the Employer's processing of Bids or award decisions may result in the rejection of his Bid.

**25.**     *Clarification of Financial Bids*

- 25.1. To assist in the examination, evaluation, and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by e- mail, but no change in the price or substances of the Bid shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids.
- 25.2 Subject to sub-clause 25.1, no Bidder shall contact the Employer on any matter relating to his Bid opening to the contract is awarded. If the Bidder wishes to bring additional information to the notice of the Employer, it should do so in writing.
- 25.3. Any effort by the Bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decision may result in the rejection of the Bidders' bid.

**26.**     *Examinations of Bids and Determination of Responsiveness*

- 26.1 During the detail evaluation of "Technical Bid", the Employer will determine whether each Bid (a) meets the eligibility criteria defined in Clause 3 and 4; (b) has been properly signed; (c) is accompanied by the required securities and; (d) is substantially responsive to the requirements of the Bidding document. During the detailed evaluation of the "Financial Bid", the responsiveness of the bids will be further determined with respect to the remaining bid conditions, i.e., priced bill of quantities, technical specifications, and drawings.
- 26.2 A substantially responsive "Financial Bid" is one which confirms all the terms, conditions and specifications of bidding documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Bidding documents, the Employer's rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.
- 26.3 If a "Financial Bid" is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

**27.**     *Deleted*

**28. Deleted**

**29. *Evaluation and Comparison of Financial Bids***

- 29.1. The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Sub-Clause 26.2.
- 29.2. Deleted.
- 29.3. The Employer reserves the right to accept or reject any variation or deviation. Variation and deviations and other factors, which are in excess of the requirements of the Bidding documents or otherwise result in unsolicited benefits for the Employer, shall not be taken into account in Bid evaluation.
- 29.4. The estimated effect of the price adjustment conditions under Clause 47 of the Conditions of Contract, during the period of implementation of the Contract, will not be taken into account in Bid evaluation.
- 29.5. If the Bid of the successful Bidder is seriously unbalanced in relation to the Engineer's estimate of the cost of work to be performed under the contract the Employer may require the Bidder to produce detailed consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 34 be increased at the expense of the successful /bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.
- 29.6. A bid which contains several items in the bill of Quantities which are unrealistically priced low and which cannot be substantiated satisfactorily by the bidder may be rejected as non-responsive.

**30. Deleted**

## **F. AWARD OF CONTRACT**

### **31. Award Criteria**

- 31.1. Subject to Clause 32, the Employer will award the contract to the Bidder whose Bid has been determined.
- (i) to be substantially responsive to the Bidding documents and who has offered the lowest evaluated Bid Price; and
  - (ii) to be within the available bid capacity adjusted to account for his bid price which is the lowest evaluation in any of the packages opened earlier than the one consideration.

In no case, the contract shall be awarded to any bidder whose available bid capacity is less than the evaluated bid price, even if the said bid is the lowest evaluated bid. The contract will in such cases be awarded to the next lowest bidder at his evaluation bid price.

### **32. Employer's Right to Accept any Bid and to Reject any or all Bids**

- 32.1. Notwithstanding Clause 31, the Employer reserves the right to accept or reject any Bid, and to cancel the Bidding process and reject all Bids, at any time prior to the award of contract, without thereby incurring any liability to the affected bidder or Bidder or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

### **33. Notification of Award and Signing of Agreement**

- 33.1. The Bidder whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the condition of contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

- 33.2 The notification of award will constitute the formation of the contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause.

- 33.3. The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be signed by the Employer and to the successful Bidder, within 28 days following the notification of award along with the Letter of Acceptance. Within 21 days of receipt, the successful Bidder will sign the Agreement and deliver it to the Employer.

- 33.4. Upon the furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

### **34. Performance Security**

- 34.1. (A) Within 10 (Ten) days of receipt of Letter of Acceptance, the successful Bidder shall furnish to the Employer an irrevocable and unconditional guarantee from a Bank in the form set forth in Section 8 (the "Performance Security") for an amount equal to 5% (five percent) of its Contract Price. In case of bids mentioned below, the successful Bidder, along with the Performance Security,

shall also furnish to the Authority an irrevocable and unconditional guarantee from a Bank in the same form given at Section 8 towards an Additional Performance Security (The “Additional Performance Security”) for an amount calculated as under:

- (a) If the Contract Price offered by the Selected Bidder is lower than 10% but upto 20% of the Estimated Project Cost, then the Additional Performance Security shall be calculated @ 20% of the difference in the (i) Estimated Project Cost (as mentioned in Bid Document) - Minus 10% of the Estimated Project Cost and (ii) Contract Price offered by the selected Bidder.
  - (b) If the Contract Price offered by the Selected Bidder is lower than 20% of the Estimated Project Cost, then the Additional Performance Security shall be calculated @ 30% of the difference in the (i) Estimated Project Cost (as mentioned in Bid Document) - Minus 10% of the Estimated Project Cost and (ii) Contract Price offered by the selected Bidder.
  - (c) This Additional Performance Security shall be treated as part of the Performance Security.
- (B) The Performance Security shall be valid beyond 60(sixty) days of the Defects Liability Period and the Additional Performance Security shall be valid beyond 28 (twenty-eight) days of Project Completion Date.

- 34.2. If the performance security is provided by the successful Bidder in the form of a Bank Guarantee, it shall be issued either (a) at the Bidder’s option, by a Nationalized/Scheduled Indian bank or (b) by a foreign bank located in India and acceptable to the Employer. As per GoG Finance Department’s Circular No. FD/MSM/e-file/4/2023/4020/D.M.O. Date 11/03/2024 or as per their latest amendment.
- 34.3. Failure of the successful Bidder to comply with the requirement of Sub-Clause 34.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Bid Security.

### ~~35~~ ~~Advance Payment and Security~~

- ~~35.1 The Employer will provide an Advance payment on the Contract Price as stipulated in the Conditions of Contract, subject to maximum amount, as stated in the Contract Data.~~

### ~~36. Deleted~~

### **37. Corrupt or Fraudulent Practices**

- 37.1 The Employer will reject a proposal if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in completing for the contract in question and will declare the firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract with National Highways Authority of India/ State PWD and any other agencies, if it at any time determines that the firm has engaged in corrupt or fraudulent practices in completing for the contractor, or in execution.
- 37.2 Furthermore, Bidders shall be aware of the provision stated in Sub- Clause 59.2 of the Conditions of Contract.



## APPENDIX TO ITB

### Clause Reference With respect to Section –I

1. The Name of the Employer is Executive Engineer, Vadodara Electrical (R&B) Division, Vadodara. [ Cl.1.1]
2. The last five years.  
2023- 2024  
2022- 2023  
2021 - 2022  
2020 - 2021  
2019 - 2020
3. This Annual Financial Turnover Amount is Rs. [Cl.4.5.3 (a)]  
~~14,08,55,370.00 (Including GST)~~
4. Value of Work is Rs. 447147.00
5. Deleted
6. The cost of electric work is Rs. 447147.00
7. The cost of water supply / sanitary works is Rs. NIL
8. Liquid assets and / or availability of credit facilities is Rs. -- [Cl.4.5.6 ]
9. Price level of the financial year -2019-2024 [Cl. 4.5.2]
10. The pre-bid meeting will take place at ..... [Cl. 9.2.1]
11. The technical Bid will be opened at the office of the .....on dt..... at .....AM/PM
12. Address of the Employer: Executive Engineer,  
Vadodara Electrical (R&B) Division,  
Vadodara
13. Deleted
14. The bid should be submitted latest by [Cl. 20.1 & 20.2]  
As stated on online NIT
15. The bid will be opened at ..... [Cl. 23.1 ]  
As stated on online NIT
16. The Bank Draft in favor of ..... Executive Engineer,  
Vadodara Electrical (R&B) Division,  
Vadodara
17. Deleted
18. Escalation factors (for the cost of works executed and financial figure to a common base value) for works completed [Cl.4.5.2]

<u>Year</u>	<u>Financial Year</u>	<u>Multiplying factor</u>
Base year of inviting tender	2024-2025	1.00
-1	2023-2024	1.10
-2	2022-2023	1.21
-3	2021-2022	1.33
-4	2020-2021	1.46
-5	2019-2020	1.61

## #LIST OF KEY PLANT & EQUIPMENT TO BE DEPLOYED ON CONTRACT WORK

[Reference CL. 4.5.5]

The contractors shall also give a list of machineries in his possession and which they propose to use on the work.

Sr. No.	Plant or Machinery	Location	Age of Machinery (maximum 15 years)	Make	Capacity	Approximate Value	Remark
1	2(a)	2(b)	3	4	5	6	7
NIL							

## List of Key Personnel to be deployed on Contract Work

(Reference Cl. 4.5.4)

*# Employment of a qualified site Engineer by the Contractor.*

The Contractor shall employ full-time technically qualified staff during the execution of this work as under: -

1. Minimum one Diploma Electrical Engineer when the cost of work is less than Rs.15 lakhs.
2. Minimum one Diploma Electrical Engineer when the cost of work is less than Rs.50 lakhs.
3. Minimum Two Diploma Electrical Engineer when the cost of work is less than Rs.100 lakhs but more than Rs.50 lakhs.
4. Minimum One graduate Electrical Engineer and Three Diploma Electrical Engineer When the cost of work is less than Rs.150 lakhs but more than Rs.100 lakhs.
5. Minimum Two graduate Electrical Engineer and Three Diploma Electrical Engineer when the cost of work is less than Rs.300 lakhs but more than Rs.150 lakhs.
6. Minimum Two graduate Electrical Engineer and Five Diploma Electrical Engineer when the cost of work is less than Rs.700 lakhs but more than Rs.300 lakhs.
7. Minimum Three graduate Electrical Engineer and Five Diploma Electrical Engineer when the cost of work is more than Rs.700 lakhs.

The Engineer so employed for the Government work must have sufficient experience to handle the work independently. Such an Engineer shall have to stay at the site of work and he shall not be entrusted with other duty except this work.

In case the contractor or partner of the contractor firm is a Electrical Graduate Engineer, Employment of a separate Engineer will not be necessary provided that the Engineer partner himself attends the execution of the work on the site.

Within 15 days of issue of work-order the Contractor will have to furnish to the Deputy Executive Engineer-in-charge of the work the Name, Qualifications, copy of marksheet, Colour Photograph and the appointment order issued such engineers engaged for this contract work. If 15 days after issue of work order such designated Site Engineers do not resume or do not remain present on site of work, the recovery at the rate of Rs.15,000-00 per month per Engineer will be made from the bills/deposit/dues of the contractor. Such recovery shall be non-refundable.

**SECTION - 2**  
**QUALIFICATION INFORMATION**

## QUALIFICATION INFORMATION

The information to be filled in by the Bidder in the following pages will be used for the purpose of post qualification as provided for in Clause 4 of the Instruction to Bidders. This information will not be incorporated in the Contract.

### **1. For Individual Bidders**

#### **1.1 Constitution or legal status of Bidder (Attach Copy)**

Place of registration \_\_\_\_\_

Principal place of business \_\_\_\_\_

Power of attorney of signatory of Bid

(Attach)

1.2 Total value of Civil engineering constructions performed in the last five years Rs. Lakhs) 20\_\_20 Work  
20\_\_20 (in  
20\_20  
20\_\_20\_\_\_\_  
20\_\_20\_\_\_\_

1.3.1 Work performed as prime contractor, work performed in the past as a nominated sub-contractor will also be considered the sub-contract involved execution of all main items of work described in the bid documents, provided further that all other qualification criteria are satisfied (in the same name) on works of a similar nature over the last five years\*\* and in current year before the submission of the bid.

Project Name	Name of the Employer	Description of work	Contract No.	Value of contract (Rs. Crore)	Date of issue of work order	Stipulated period of completion	Actual date of completion*	Remark explaining reasons for delay & work Completed

\*Attach certificate(s) from the Engineer(s) in-charge

\*\* Immediately preceding the financial year in which bids are received.

#1.3.2 Quantities of work executed as prime contractor, work performed, in the past as a nominated sub-contractor, will also be considered provided the sub-contract involved execution of all main items of work described in the bid document, provided, further that all other qualification criteria are called (in the same name and style) in the last five years\*\* and in current year before the submission of the bid.

Year	Name of the work	Name of the Employer	Quantity of work performed (Cum/MT)				Remarks* (indicate contract Ref)
			Cement Concrete (Including RCC & PCC)	Masonry	Earth Works	Bituminous Work	
20_20							
20_20							
20_20							
20_20							
20_20							

1.4 Information on Bid Capacity (works for which bids have been submitted and works which are yet to be completed) as on the date of this bid.

(A) ~~Existing commitments and on-going works:~~

Description of works	Place & State	Contract No.	Name & Address of Employer	Value Contract (Rs. Cr)	Stipulated Period of Completion	Value of Works* remaining to be completed (Rs. Cr)	Anticipated of completion
1	2	3	4	5	6	7	8

\*Attach certificate (s) from the Engineer(s) in-charge

\*\* Immediately preceding the financial year in which bids are received.

1.5 ~~Availability of key items of Contractors Equipment for carrying out the works (Ref. Clause 4.5.5). The Bidder should list all the information requested below.~~

Item of Equipment	Requirement		Availability Proposals			Remarks (from whom to be purchased)
	NO	Capacity	Owned/ Leased to be procured	Nos./ Capacity	Age/ Conditions	

- 1.6 Qualifications and experience of key personnel required for administration and execution of the contract. Attach biographical data. Refer also to Sub Clause 9.1 of the Conditions of Contract.

Position	Name	Qualification	Year of Experience (General)	Year of experience in the proposed position
Project Manager				
Etc.				

- 1.7 Proposed sub-contract and firms involved

Sections of the works	Value of Sub-Contractor	Sub-Contractor (Name & Address)	Experience in similar work

Attach copies of certificates on possession of valid license for executing water supply/ sanitary work/ building electrification works.

- 1.8 Financial reports for the last five years: balance sheets, profit and loss statements, auditors' reports (in case of companies/corporations), etc. List them below and attach copies.
- 1.9 Evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List them below and attach copied documents.
- 1.10 Name, address, and telephone, telex, and fax numbers of the Bidders bankers who may provide references if contacted by the Employer.
- 1.11 Information on Litigation history in which the Bidder is involved.

Other Party (ies)	Employer	Cause of Dispute	Amount Involved	Remarks showing Present Status

- 1.12. Statement of compliance under the requirements of Sub Clause 3.2 of the instruction to Bidders. (Name of Consultant engaged for project preparations is \*.....)

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- 1.13 Proposed work method and schedule. The Bidder should attach descriptions, drawings and charts as necessary to comply with the requirements of the Bidding documents. (Refer ITB Clause 4.1)

- 1.14 Programme

**2. Deleted**

**3. Additional Requirements**

- 3.1 Bidders should provide any additional information required to fulfill the requirements of Clause 4 of the Instructions to the Bidders, if applicable.

- (i) Affidavit
- (ii) Undertaking

\* Fill the name of consultant



**SAMPLE FORMAT FOR EVIDENCE OF ACCESS TO OR  
AVAILABILITY OF CREDIT FACILITIES**

(CLAUSE 4.5.6 OF ITB)

**BANK CERTIFICATE**

This is to certify that M/s. \_\_\_\_\_ is a reputed company with a good financial standing.

If the contract for the work, namely \_\_\_\_\_ is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs. \_\_\_\_\_ to meet their working capital requirements for executing the above during the contract period.

\_\_\_\_\_

(Signature)

Name of Bank

Senior Bank Manager

Address of the Bank

## AFFIDAVIT

1. I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.
2. The undersigned also hereby certifies that neither our firm M/s. \_\_\_\_\_ have not abandoned any work of Government of Gujarat/Government of India/any Board or Corporation under Government of Gujarat/Government of India nor any contract awarded to us for such works have been rescinded, during last five years prior to the date of this bid.
3. The undersigned hereby authorize(s) and request (s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Department to verify this statement or regarding any (our) competence and general reputation.
4. The Undersigned understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Department/ Project implementing agency.

\_\_\_\_\_

(Signed by an Authorized Officer of the Firm)

\_\_\_\_\_

Title of Officer

\_\_\_\_\_

Name of Firm

\_\_\_\_\_

Date

**UNDERTAKING**

I, the undersigned do hereby undertake that our firm  
M/s.....would invest a minimum cash  
up to 25% of the value of the work during implementation of the contract.

\_\_\_\_\_  
(Signed by an Authorized officer of the firm)

\_\_\_\_\_  
Title of officer

\_\_\_\_\_  
Name of firm

\_\_\_\_\_  
DATE

**SECTION - 3**  
**CONDITIONS OF CONTRACT**

# Conditions of Contract

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## CONDITIONS OF CONTRACT

### 1. Definitions A. GENERAL.

- 1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meaning.

**Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid

**Compensation Events** are those defined in Clause 44 hereunder

The **Completion Date** is the date of completion of the Works as certified by the Engineer in accordance with Sub Clause 55.1

The Contract is the contract between the Employer and Contractor to execute, complete and maintain the Works **till the completion of Defects Liability Period**. It consists of the documents listed in Clause 2.3 below.

The **Contract data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Bid to carry out the Work has been accepted by the Employer.

The **Contractor's Bid** is the completed Bidding document submitted by the Contractor to the Employer and includes Technical and Financial Bids.

The **Contract Price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

**Days** are calendar days: **months** are calendar months.

The **Defects Liability Period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

**The Engineer** is the person named in the Contract Data (or any other competent person appointed and notified to the contractor to act in replacement of the Engineer) who is responsible for supervising the Contractor, administering the Contract, certifying payments due to the Contractor, issuing and valuing Variations to the Contract, awarding extensions of time, and valuing the Compensations Events.

**Equipment** is Contractor's machinery and vehicles brought temporarily to the site to construct the Works.

The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Engineer by issuing an extension of time.

**Materials** are all supplies, including consumables, used by the contractor for incorporation in the works.

**Plant** is any integral part of the work which is to have mechanical, electrical, electronic or chemical or biological functions.

The **Site** is the area defined as such in the Contract Data.

**Site Investigation Reports** are those which were included in the Bidding documents and are factual interpretive reports about the surface and subsurface conditions at the site.

**Specifications** means the Specifications of the works included in the Contract and any modification or addition made or approved by the Engineer.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

**Temporary Works** are works designed, constructed, installed, and removed by the Contractor which are needed for construction or installation of the Works.

A **Variation** is an instruction given by the Engineer, which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

## **2. Interpretation**

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter and the other way around. Heading have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Engineer will provide instructions clarifying queries about Conditions of Contract.

2.2 If sectional completion is specified in the Contract Data, references in the Conditions of Contract to the Works, the Completion date, and Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion date for the whole works)

2.3 The documents forming the Contract shall be interpreted in the following order of priority

- (1) Agreement
- (2) Letter of Acceptance, notice to proceed with works
- (3) Contractor's Bid

- (4) Contract Data
- (5) Conditions of Contract including Conditions of Contract
- (6) Specifications
- (7) Drawings
- (8) Bills of quantities and
- (9) Any other document listed in the Contract Data as forming part of the Contract.

### **3.     *Language and Law***

- 3.1 The language of the Contract and the law governing the Contract are stated in the Contract Data.

### **4.     *Engineers Decisions***

- 4.1 Except where otherwise specifically stated, the Engineer will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

### **5.     *Delegation***

- 5.1 The Engineer may delegate any of his duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

### **6.     *Communications***

- 6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

### **7.     *Sub-Contracting***

- 7.1 The Contractor may subcontract any portion of work, up to a limit specified in contract data, with the approval of the engineer but may not assign the Contract without the approval of the Employer in writing. Subcontractingshall not alter the Contractor's obligations. **Sub-contracting of supply or specific items of work is not allowed.**
- 7.2 The sub-contractor must be registered in appropriate class and category for the part of work to be subcontracted.

### **8.     *Other Contractors***

- 8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities and the Employer between the dates given in the Schedule of other Contractor. The Contractors shall as refer to in the Contract Data, also provide facilities and services for them as described in the Schedule. The employer may modify the schedule of other contractors and shall notify the contractor of any such modifications.



**9.     *Personnel***

9.1     The Contractor shall employ the key personnel named in the Schedule of Key Personnel as referred to in the Contract Data to carry out the functions stated in the Schedule or other personnel approved by the Engineer. The Engineer will approve any proposed replacement of key personnel only if their qualifications, abilities, and relevant experience are substantially equal to or better than those of the personnel listed in the Schedule.

9.2     If the engineer asks the Contractor to remove a person who is a member of the Contractor Staff or his work force stating the reasons the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

**10.    *Employer's and Contractors Risks***

10.1    The Employer carries the risk which these Contract states are Employer's risks, and the Contractor carries the risks which these Contracts states are Contractors risk.

**11.    *Employer's Risks***

11.1    The employer is responsible for the excepted risks which are (a) in so far as they directly affect the execution of the Works, the risks of war, hostilities, invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war, riot commotion or disorder (unless restricted to the Contractor's employees), and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive.

**12.    *Contractor's Risks***

12.1    All risks of loss of or damages to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

**13.    *Insurance***

13.1    The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract data for the following events which are due to the Contractor's risks:

(a) Loss of or damage to the works, Plant and materials,

(b) Loss of or damage to Equipment

(c) Loss of or damages of property (except the Works, Plant, Materials and Equipment) in connection with the Contract; and

(d) Personal injury or death.

13.2    Policies and certificates for insurance shall be delivered by the Contractor to the Engineer for the Engineer's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may affect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of an insurance shall not be made without the approval of the Engineer.

13.5 Both parties shall comply with any conditions of the insurance policies.

**14.** *Site Investigation Report*

14.1 The Contractor in preparing the Bid shall rely on any site Investigation reports referred to in the Contract Data, supplemented by any information available to the Bidder.

**15.** *Queries about the Contract data*

15.1 The engineer will clarify queries on the Contract Data

**16.** *Contractor to Construct the Works*

16.1 The Contractor shall construct and install the works in accordance with the specification and Drawings.

**17.** *The Works to be completed by the Intended Completion Date*

17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the programme submitted by the Contractor, as updated with the approval of the Engineer, and complete them by the Intended Completion date

**18.** *Approval by the Engineer*

18.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary works to the Engineer, who is to approve them if they comply with the Specifications and drawings.

18.2 The Contractor shall be responsible for design of temporary works.

18.3 The Engineer's approval shall not alter the contractor responsibility for design of the Temporary works.

18.4 The Contractor shall obtain approval of third parties to the design of the Temporary works where required.

18.5 All Drawings prepared by the Contractors for the execution of the temporary or permanent work are subject to prior approval by the Engineer before their use.

**19.** *Safety*

19.1 The Contractor shall be responsible for the safety of all activities on the Site.

**20. Discoveries**

- 20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the site is the property of the Employer. The contractor is to notify the engineer of such discoveries and carry out the Engineer's instructions for dealing with them.

**21. Possession of the Site**

- 21.1 The Employer shall give possession of all parts of the site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be a Compensation Event.
- 21.2 If within 25% of the time limit of the project, 80% of possession of the site is not handed over to the Contractor, then contractor/ Employer may fore-close the contract. Contractor/Employer has to foreclose the work within 30 days after lapse of 25%-time limit and after 30 days foreclosure option will be closed.

**22. Access to the Site**

- 22.1 The Contractor shall allow the Engineer and any person authorized by the Engineer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plants are being manufactured/ fabricated/ assembled for the works.

**23. Instructions**

- 23.1 The Contractor shall carry out all instructions of the Engineer pertaining to works which comply with the applicable laws where the site is located.
- 23.2 The Contractor shall permit the Employer to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the Employer, if so required by the Employer.

**24. Disputes**

- 24.1 If the Contractor is of the view that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to **Superintending Engineer (Electrical), Gandhinagar** within 14 days of the notification of the Engineer's decision. If the issue is not resolved, any party can refer the matter for conciliation within 15 days from the decision given by the **Superintending Engineer (Electrical), Gandhinagar**
- 24.2
- (a) For the work up to Rs.100 Cr., if any of the parties is not satisfied with the decision of the **Superintending Engineer (Electrical), Gandhinagar**, both the parties have to refer to the Chief Engineer concern for the conciliation process.
- (b) For the work more than Rs.100 Cr., if any of the parties is not satisfied with the decision of the **Superintending Engineer (Electrical), Gandhinagar**, both the parties have to refer to the #Secretary, Roads & Building Department, Government of Gujarat for the conciliation process.

If the dispute is not resolved through the conciliation process, he may refer the dispute to Gujarat Public Works Contract Dispute Arbitration Tribunal. If the Contractor fails to refer a claim / dispute to the Higher Authority within 14 days of the notification of the Engineer's decision, the Contractor shall not be entitled to any additional payment/claim if he doesn't follow the above sequence in stipulated time and he should not stop the work.

**25.**     *Procedure for Disputers*

- 25.1   The arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

**26.**     *Deleted*

## **B. TIME CONTROL**

### **27.**     *Programme*

- 27.1 Within the time stated in the Contract Data the Contractor shall submit to the Engineer for approval a Programme showing the general methods, arrangements orders, and timing for all the activities in the works along with monthly cash flow forecast.
- 27.2 An update of the Programme shall be a programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.
- 27.3 The Contractor shall submit to the Engineer, for approval an updated programme at intervals no longer than the period stated in the Contract data. If the Contractor does not submit an updated programme within this period, the Engineer may withhold the amount stated in the Contract data from the next payment after the date on which the overdue programme has been submitted.
- 27.4 The Engineer's approval of the programme shall not alter the Contractor's obligations. The Contractor may revise the programme and submit it to the Engineer again at any time. A revised programme is to show the effect of Variations and Compensations events.

### **28.**     *Extension of the Intended Completion Date*

- 28.1 The Engineer shall extend the Intended Completion Date if a compensation Event occurs or a Variation is issued which makes it impossible for completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work and which would cause the Contractor to incur additional cost.
- 28.2 The Engineer shall decide whether and by how much to extend the Intended Completion Date within 35 days of the Contractor asking the Engineer for a decision upon the effect of a compensation event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.
- 28.3 The Engineer shall within 14 days of receiving full justification from the contractor for extension of Intended Completion Date refer to the Employer his decision. The employer shall in not more than 21 days communicate to the engineer the acceptance or otherwise of the Engineer's decision. If the employer fails to give his acceptance, the Engineer shall not grant the extension and the contractor may refer the matter under Clause 24.1

### **29.**     *Deleted*

### **30.     Delays Ordered by the Engineer**

- 30.1 The Engineer may instruct the Contractor to delay the start or progress of any activity within the works.

**31.**     *Management Meetings*

- 31.1    Either the Engineer or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.
- 31.2    The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

**32.**     *Early Warning*

- 32.1    The Contractor is to warn the Engineer at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract price or delay the execution of works. The Engineer may require the contractor to provide an estimate of the expected effect of the future event or circumstance on the contract price and completion date. The estimate is to be provided by the Contractor as soon as reasonably possible.
- 32.2    The Contractor shall cooperate with the Engineer in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer.

**# 33. Identifying Defects/ Defect liability period**

33.1 : Defect liability period : The contractor shall be responsible to make good and remedy at his own expense any defect which may develop or may be noticed before the period mentioned hereunder from the certified date of completion. The Engineer in charge shall give the contractor a notice in writing about the defects and the contractor shall make good the same within 15 days of receipt of the notice. In the case of failure on the part of the contractor, the Engineer-in-charge may rectify or remove or re-execute the work at the risk & cost of the contractor. The Engineer-in-charge shall be entitled to appropriate the whole or any part of the amount of security deposit towards the expenses, if any, incurred by him in rectification, removal or re-execution. The Defects Liability period shall be as under....

- (a) For all works costing up to Rs. 50,000 (amount put to tender), the period shall be 3 Months from the certified date of completion.
  - (b) For all works costing more than Rs. 50,000 and up to Rs. 1 crore (amount put tender), the period shall be 12 (Twelve) months from the certified date of completion or one monsoon, whichever is later.
  - (c) For major projects costing more than Rs. 1 crore, the period shall be 36 Months from the certified date of completion which should include three monsoons.
  - (d) For original building works the defect liability period will be 4 years or elapse of 4 monsoon period following date of possession of building taken over by user agency following the certified date of completion, whichever is later.
- For the purpose of deciding the monsoon period, the 30th September shall be treated as the last date.

Modified vide R & B D Circular No. PAC-11-102008-2076-N dated 31/8/2009, PRCH/102013(2976) 2759-N, Dated 27/05/2013 and Circular No. TNC/10/2016/Clause 17A (Correction/(1)C Dated 12/05/2016]

**~~33.2 Free maintenance guarantee period for works of Road/Bridge construction~~**

- ~~(a) For resurfacing work of road free maintenance guarantee period one year from the date of completion.~~
- ~~(b) In case of widening of the road/strengthening of the road/bridge, the contractor shall have to give four years free maintenance guarantee from the certified date of completion. During this period the contractor shall visit the site every six months along with the concerned Section Officer / Deputy Executive Engineer and will examine the work already carried out in this contract like road work, jungle cutting, side shoulders, side gutter, road furniture, patta etc. and will prepare Km. wise inspection report duly signed by all concerned and any defect observed shall be done within 15 days by the contractor at his risk and cost as per the direction of Engineer in charge. The contractor needs to do videography of these visits and require to submit at the time of release of FMG. If B.T. the surface during the maintenance period of 4 years is worn out then agency shall have to provide renewal coating as per tender item as directed by the Engineer in charge. The amount equivalent to 5% of each running bill shall be withheld and will be released after the free maintenance guarantee period (i.e. 4 years) is over.~~

~~However, this amount shall be released against fixed deposit or bank guarantee pledged in the name of Executive Engineer after completion certificate of work is issued.~~

~~(1) The flakiness and elongation index (combined) for coarse aggregates under no circumstances shall exceed the allowable limit set forth in the relevant clause for the material in question.~~

~~(2) 2% of the amount eligible for the payment of bituminous items shall be withheld till the miscellaneous items like earthwork in embankment / cutting for side shoulders, side gutters, kilometer / indicator / guard stones, sign boards etc. are completed in all respect by the contractor. After completion of the miscellaneous items, the above said 2% withheld amount shall be released.~~

~~(Govt. of Gujarat's G.R. No.: TNC-10-2013-3(Part 3)/C, Dtd. 13/12/2013).~~

~~(3) Videography for the surface under Maintenance Guarantee is to be done as per Govt. letter No.: SSR/10/2015-16/26/C, Dtd. 26/11/15 for the work costing more than Rs. 5.00 Crore.~~

~~(4) Setting up of adequate laboratory & deployment of quality engineers.~~

~~The contractor shall have to set up the laboratory with adequate equipment. Till the setting up of adequate laboratory is completed & reported of this to the engineer (subject to due verification by engineer's representative) by contractor in writing, Rs.2,00,000/- shall be withheld. The qualified quality Engineer shall be deployed exclusively for this contract by the contractors. If quality Engineer is not deployed by contractor within one month after the date of work order, the amount equivalent to Rs.20,000 per month shall be recovered till the actual deployment of quality engineer. The amount so recovered towards the deployment of quality engineers shall not be refunded.~~

~~(5) Asphalt work will have to be cross checked as per G.R. No.: RGN/60/2006/35/C, dtd.31/05/07 before final bill is paid.~~

~~(6) Maintenance during Construction Period~~

~~During the Construction Period, the Contractor shall maintain, at his own risk and cost, the existing lane(s) of the road so that the traffic worthiness and safety thereof are at no time materially inferior as compared to their condition 10 (ten) days prior to the date of the Agreement, and shall undertake the necessary repair and maintenance works for this purpose; provided that the Contractor may, at his cost, interrupt and divert the flow of traffic if such interruption and diversion is necessary for the efficient progress of works and conforms to Good Industry Practice; provided~~



~~further that such interruption and diversion shall be undertaken by the Contractor only with the prior written approval of the Executive Engineer which approval shall not be unreasonably withheld. For the avoidance of doubt, it is agreed that the Contractor shall at all times be responsible for ensuring safe operation of the road.~~

~~33.3 The Engineer shall check the Contractor's work and notify the Contractor of any defects that are found. Such checking shall not affect the Contractor's responsibilities the Engineer may instruct the Contractor to search for a Defect and to uncover and test any work that the Engineer considers may have a Defect.~~

#### **34. Tests**

34.1 If the engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no defect the test shall be a Compensation Event.

34.2 Bidder Must Quote the rates including all charges i.e any charges occurring for testing of materials shall have to be done by the bidder. No extra Payments towards Testing Charges will be paid by the Employer.

~~34.3 Agency has to establish testing laboratory on site for the various test to be carried out in the work for this purpose agency shall construct a pukka laboratory building with all facility on site at location specified by the engineer in charge.~~

#### **35. Correction of defects**

35.1 The engineer shall give notice to the Contractor of any defects before the end of the defects Liability Period, which begins at Completion and is defined in the contract data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

35.2 Every time notice of a Defect is given, the Contractor shall correct the notified defect within the length of time specified by the Engineer's notice.

#### **36. Uncorrected Defects**

36.1 If the Contractor has not corrected a defect within the time specified in the Engineer's notice, the Engineer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

## **D. COST CONTROL**

### **37. Bill of Quantities**

- 37.1 The bill of Quantities shall contain items for the constructions, installation, testing and commissioning work to be done by the Contractor.
- 37.2 The bill of Quantities is used to calculate the Contract price. The Contractor is paid for the quantity of the work done at the rate in the Bill of Quantities for each item.

### **38. *Change in the Quantities***

- 38.1 The Engineer shall have power to make any alterations in or addition 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 instruction in this connection which may be given to him in writing signed by the Engineer and such alteration shall not invalidate the contract and any 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 same conditions in all respects on which he agreed to do the main work and at the same rate as are specified in the tender for the main work.

Except that when the quantity of any item exceeds the quantity as in the tender by more than 130%, the contractor will be paid for the quantity in excess of 130%, at the rate entered in the SOR of the year during which the excess in quantity is first executed.

### **39. *Variations***

- 39.1 All Variations shall be included in updated programmes produced by the Contractor.

### **40. *Payments for Variations***

- 40.1 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 as under.
- (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 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 of the Division does not contain all the items, the percentage increase or decrease of the tender shall be calculated considering such items which were included in the "Scheduled 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.

- (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.
- 40.2 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 alternation 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 alterations bears to the cost of the original work and the certificate of the Engineer-in-charge as to such proportion shall be final and conclusive.

#### **41.** *Cash Flow Forecasts*

- 41.1 When the programme is updated, the contractor is to provide the engineer with an updated cash flow forecast.

**42.** *Payment certificates.*

- 42.1 The Contractor shall submit to the Engineer monthly statements of the estimated value of the work completed less the cumulative amount certified previously.
- 42.2 The Engineer shall check the Contractor's monthly statement within 14 days and certify the amount to be paid to the Contractor after taking in to account any credit or debit for the month in question in respect of materials for the works in the relevant amounts and under conditions set forth in sub-clause 32.3 of the Contract Data (secured Advance).
- 42.3 The value of work executed shall be determined by the Engineer.
- 42.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.
- 42.5 The value of work executed shall include the valuation of variations and compensation events.
- 42.6 The Engineer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information

**43.** *Payments*

- 43.1 Payments shall be adjusted for deductions for advance payments, retention, other recoveries in terms of the contract and taxes at source, as applicable under the law. The Employer shall pay the Contractor the amounts certified by the Engineer within 28 days of the date of each certificate.
- 43.2 Payment of GST (prevailing rates) on the amount payable under the contract to the Contractor will be made by the Employer. Hence, it is the responsibility of the contractor to pay the GST to the concerned Authority.
- 43.3 Items of the works for which no rate or price has been entered in will not be paid by the Employer and shall be deemed covered by other rates and prices in the Contract.

**44.** *Compensation events*

- 44.1 The following are compensation Events unless they are caused by the Contractor:
  - (a) The Employer does not give access to a part of the Site by the site Possession date stated in Contract data to the Contractor
- 44.2 In case of compensation event occurs and it prevents the work being completed beyond the Intended Completion Date then Authority will approve EOT with eligible contractual price escalation.

#### **45. Tax**

- 45.1 The rates quoted by the Contractor must be inclusive of all taxes prevailing on due date of bid submission **excluding GST**. However, any subsequent changes in the tax structure by Government after due date of bid submission will be compensated (+/-) on availability or submission of actual documentation. Contractor will have to intimate Engineer regarding changes occurred in the tax structure after bid submission. If the contractor fails to provide such information and if any financial obligation may arise due to change in tax structure, same will be recovered from the contractor.
- 45.2 GST will be paid separately on the bills. Hence, It is the responsibility of the contractor to pay the GST to the concerned Authority.

#### **46. Currencies.**

- 46.1 All payment shall be made in Indian Rupees.

#### **~~47. Price Adjustment~~**

- ~~47.1 Contract price shall be adjusted for increase or decrease in rates and price of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given in the contract data:~~
- ~~(a) The price adjustment shall apply for the work done from the start date given in the contract data up to end of the initial intended completion date or extensions granted by the Engineer and shall not apply to the work carried out beyond the stipulated time for reasons attributable to the contractor.~~
- ~~(b) The price adjustment shall be determined during each month from the formula given in the contract data.~~
- ~~(c) Following expressions and meanings during to the work done during each month~~
- ~~R = Total value of work done during the month. It would include the amount of secured advance granted, if any, during the month less the amount of secured advance recovered, if any during the month. It will exclude value for works executed under variations for which price adjustment will be worked separately based on the terms mutually agreed.~~
- ~~47.2 To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clause in the contract, the unit rates and prices included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.~~

#### **48. Retention**

- 48.1 The Employer shall retain from each payment due to Contractor the proportion stated in the Contract Data until Completion of the whole of the Works.

- 48.2 On Completion of the whole of the Works half the total amount retained is repaid to the Contractor and half when the Defects Liability Period has passed and the Engineer has certified that all Defects notified by the Engineer to the Contractor before the end of this period have been corrected.
- 48.3 On completion of the whole works, the contractor may substitute retention money with an "on demand" Bank guarantee.

In case, Contractor requests for refund of the Retention Money deducted by the Employer under the provision of this clause, Employer shall consider the said request of the Contractor provided that the refund hereunder shall be made in tranches of not less than 1% (One Percent) of the Contract Price and Contractor furnishes an irrevocable and unconditional Bank guarantee for an equal amount substantially in the format of Bank Guarantee for Performance Guarantee enclosed with SBD and valid up to 60 day beyond the scheduled / extended Defects Liability Period. On completion of the whole works, the contractor has however an option to submit a fresh irrevocable and unconditional Bank Guarantee for an amount equal to 5% of the total value of work executed substantially in the format of Bank Guarantee for Performance Guarantee enclosed with SBD and valid up to 60 days beyond the Defect Liability Period and yet refund the Retention Money Bank Guarantee submitted for refund of Retention Money.

#### **49.** *Liquidated Damages*

- 49.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date (for the whole works or the milestone as stated in the contract data). The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payment due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.
- 49.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall not be entitled for any interest on the over payment calculated from the date of payment to the date of repayment.
- 49.3 If the contractor fails to comply with the time for completion as stipulated in the tender, then the contractor shall pay to the employer the relevant sum stated in the Contract Data as Liquidated damages for such default and not as penalty for everyday or part of day which shall elapse between relevant time for completion and the date stated in the taking over certificate of the whole of the works on the relevant section, subject to the limit stated in the contract data.

The employer may, without prejudice to any other method of recovery deduct the amount of such damages from any monies due or to become due to the contractor. The payment or deduction of such damages shall not relieve

the contractor from his obligation to complete the works on from any other of his obligations and liabilities under the contract.

- 49.4 If, before the Time for Completion of the whole of the Works or, if applicable any Section, a Taking Over Certificate has been issued for any part of the Works or of a Section, the liquidated damages for delay in completion of the remainder of the Works or of that Section shall, for any period of delay after the date stated in such Taking-Over-Certificate, and in the absence of alternative provisions in the Contract, be reduced in the proportion which the value of the part so certified bears to the value of the whole of the Works or Section, as applicable. The provisions of this Sub-clause shall only apply to the rate of liquidated damages and shall not affect the limit thereof.

~~50~~ — *Bonus*

- ~~50.1 If the contractor achieves completion of the whole of the works prior to the intended Completion Date prescribed in Contract Data the Employer shall pay to the contractor a sum stated in Contract Data as bonus for every completed month but subjected to maximum amount as stated in Contract Data; which shall elapse between the date of completion of all items of works as stipulated in the contract, including variations ordered by the Engineer and the time prescribed in Clause 17.~~

- ~~50.2 Bonus shall be paid only to works amounting to above INR 5 crore with time limit of the works is equal or more than 6 months. The bonus would be paid as under~~

<del>% of Time Saved</del>	<del>% of Initial Contract Price entitled for Bonus</del>
<del>50 %</del>	<del>5%</del>
<del>40 %</del>	<del>4%</del>
<del>30 %</del>	<del>3%</del>
<del>20 %</del>	<del>2%</del>
<del>10 %</del>	<del>1%</del>
<del>Less than 10%</del>	<del>0%</del>

~~51.~~ — *Advance Payment.*

- ~~51.1 The Employer shall make advance payment (not to be paid less than two installments except in special circumstances for which the reason to be Recorded in writing) to the Contractor of the amounts stated in the Contract Date by the date stated in the Contract Date, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to be at least 110% of the advance payment. The guarantee shall remain effective until the~~

~~advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. The Mobilization advance would be deemed as interest bearing advance at an interest rate of 10 % to be compounded, quarterly.~~

~~51.2 The Contractor is to use the advance payment only to pay for Equipment, plant and Mobilization expenses required specifically for execution of the Works. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the engineer.~~

~~51.3 The advance payment shall be repaid by deduction proportionate amount from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, variations, price adjustments, Compensation Events, or Liquidated damages.~~

51.4 Deleted

## **52. Securities**

52.1 The performance Security (including additional security for unbalanced bids) shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank or surety acceptable to the Employer, and denominated in Indian Rupees. The performance Security shall be valid until a date 60 days from the date of expiry of Defects Liability Period and the additional security for unbalanced bids shall be valid until a date 28 days from the date of issue of the certificate of completion.

## **53. Deleted**

## **54. Cost of Repairs.**

54.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start date and the end of Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damages arises from the Contractor's acts or omissions.



**55. Completion**

- 55.1 The Contractor shall request the Engineer to issue a Certificate of Completion of the works and the Engineer will do so upon deciding that the work is completed.

**56. *Taking Over***

- 56.1 The Employer shall take over the Site and the Works within seven days of the Engineer issuing a certificate of Completion.

**57. *Final Account***

- 57.1 The Contractor shall supply to the Engineer a detailed final account of the total amount that the Contractor considers payable as full and final settlement of all claims under the Contract for items before the end of the Defects Liability Period. The Engineer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Engineer shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Engineer shall decide on the amount payable to the Contractor and issue a payment certificate, within 56 days of receiving the Contractor's revised account.
- 57.2 If reversal in characteristic of tender (L1 becoming L2) on account of excesses and savings in final account is observed, the Engineer/Employer shall be at liberty to restrict the final payment of BOQ items to the lowest amount evaluated of the bids considering the final quantities and the rates quoted including the rebates if any. Payment of variation items shall however be made at the rates approved by the Employer, within 90 days from the physical completion of work.

**58. *Operating and Maintenance Manuals***

- 58.1 If "as built" drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract data.
- 58.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the Contract data, or they do not receive the Engineer's approval, the Engineer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

**59. *Termination***

- 59.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

59.2 Fundamental breaches of Contract include, but shall not be limited to the following:

1. The contractor stops work for 28 days when no stoppage of work is shown on the current programme and the stoppage has not been authorized by the Engineer
2. The Engineer instructs the Contractor to delay the progress of the Works and the instructions is not withdrawn within 28 days;
3. The Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstructions or amalgamation
4. A payment certified by the Engineer is not paid by the Employer to the Contractor within 56 days of the date of the Engineer's certificate
5. The Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;
6. The Contractor does not maintain a security which is required;
7. The Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and
8. If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

For the purpose of this paragraph: "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the borrower, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition.

59.3 When either party to the Contract gives notice of a breach of contract to the Engineer for a cause other than those listed under Sub Clause 59.2 above, the Engineer shall decide whether the breach is fundamental or not.

59.4 Notwithstanding the above, the employer may terminate the Contract for convenience.

**60.** *Payment upon Termination*

60.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a Certificate for the value of the work done less advance payments received up to the date of the issue of the certificate, less

other recoveries due in terms of the contract, less taxes due to deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

- 60.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Engineer shall issue a certificate for the value of the work done, the cost of balance material brought by the contractor and available at site, the reasonable cost of removal of equipment, repatriation of the Contractor's personnel employed solely on the works, and the Contractor's cost of protecting and securing the Works and less advance payment received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to deducted at source as per applicable law.

**61.** *Property*

- 61.1 All materials on the Site, Plant Equipments, Temporary Works and Works are deemed to be property of the Employer, if the Contract is terminated because of a Contractor's default.

**62.** *Release from Performance*

- 62.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor the Engineer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

**63. LABOUR**

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment of housing, feeding and transport.

The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the site and such other information as the Engineer may require.

**64. COMPLIANCE WITH LABOUR REGULATIONS**

During continuance of the contract, the Contractor and his sub-contractor shall abide at all times by all existing labour enactments and rules made thereunder, regulations, notification and bye laws of the State or central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notifications that may be issued under any labour law in future either by the State or the Central Government or the local authority. Salient features of some of the major labour laws that are applicable to the construction industry are given below. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, the Engineer/employer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Employer/Engineer shall also have the right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point to time.

## SALIENT FEATURES OF SOME MAJOR LABOUR AND OTHER LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTIONS WORK

- A) **Workmen Compensation Act 1923** :- The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- B) **Payment of Gratuity Act. 1972** :- Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more on death, the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.
- C) **Employees P.F. and Miscellaneous Provision Act 1952:-** The Act Provides for monthly contributions by the employer plus workers @ 10% or 8.33% The benefits payable under the Act are :
1. Pension or family pension on retirement or death, as the case may be.
  2. Deposit linked insurance on the death in harness of the worker.
  3. Payment of P.F. accumulation on retirement/death etc.
- D) **Maternity Benefit Act 1951** :- The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.
- E) **Contract Labour (Regulation & Abolition) Act 1970** : The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The principal Employer is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer, if they employ 20 or more contract labour.
- F) **Minimum Wages Act 1948** :- The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act, if the employment is a scheduled employment. Construction of Building, Roads, Runways are scheduled employment.
- G) **Payments of wages Act 1936:-** It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
- H) **Equal remunerations Act 1979** :- The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against female employees in the matter of transfer, training and promotions etc.
- I) **Payments of Bonus Act 1965** :- The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20 % of wages to employees drawing Rs. 3500/- per month or less. The bonus to be paid to employees getting Rs, 2500/- per month or above Rs. 3500/- per month shall be worked out by taking wages as Rs. 2500/- per month only. The Act does not

apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act.

- J) **Industrial Disputes Act 1947 :-** The Act lays down the machinery and procedure for resolutions of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- K) **Industrial employment (standing Orders) Act 1946 :-** It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the State and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get the same certified by the designated Authority.
- L) **Trade Unions Act 1926:-** The Act lays the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have given certain immunities from civil and criminal liabilities.
- M) **Child Labour (Prohibition & Regulation Act 1986 :-** The Act prohibits employment of children below 14 years of age in certain occupations and process and provides for regulation of employment of children in all other occupations and processes. Employment of Child labour is prohibited in Building and Construction Industry.
- N) **Inter – State Migrant workmen’s (Regulation of Employment & Conditions of service) Act 1979:-** The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The inter-state migrant workmen, is an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and back, etc.
- O) **The Building and Other Construction workers (Regulation of employment and Conditions of Service) Act 1996 and the Cess Act of 1996:-** All the establishments who carry on any building or other constructions work and employ 10 or more workers are covered under this Act.  
All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the government. The Employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as canteens, First Aid facilities, Ambulance, Housing accommodations for workers near the workplace etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officers appointed by the Government.

- P) **Factories Act 1948** :- The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in the manufacturing process.
- Q) **Royalty charges**-The contractor shall pay the royalty to the competent authority as per rule. The **royalty** charges paid shall be borne by the contractor and shall not be reimbursed by the Employer.
- R) **Following Pollution control Acts and amendments made thereof from time to time shall be applicable.**
1. Water (Preservation and control of Pollution) Act, 1974
  2. Air (Prevention and Control of Pollution Act 1981
  3. Environmental (Protection) Act 1986

The contractor must commit to adopting Environmental management plan for best energy use, waste management, the reduction of pollution as in EMS (Environmental Management system) ISO-14001- 2015

## 65. *ARBITRATION (GCC Clause 24)*

The procedure for arbitration will be as follows: -

- 24.1 If the Contractor is of the view that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to **#Superintending Engineer** (Higher Authority) within 14 days of the notification of the Engineer's decision. If the issue is not resolved, any party can refer the matter for conciliation within 15 days from the decision given by the #Superintending Engineer.

### 24.2

- (a) For the work up to Rs.100 Cr., if any of the parties is not satisfied with the decision of the #Superintending Engineer, both the parties have to refer to the #Chief Engineer concerned for the conciliation process.
- (b) For the work more than Rs.100 Cr., if any of the parties is not satisfied with the decision of the Superintending Engineer, both parties have to refer to the #Secretary, Roads & Building Department, Government of Gujarat for the conciliation process.

If the dispute is not resolved through the conciliation process, contractor may refer the dispute to Gujarat Public Works Contract Dispute Arbitration Tribunal. If the Contractor fails to refer a claim / dispute to the Higher Authority within 14 days of the notification of the Engineer's decision, the Contractor shall not be entitled to any additional payment/claim if he doesn't follow the above sequence in stipulated time. However, during such period, he would not stop the work in any case.

**SECTION - 4**  
**CONTRACT DATA**



Item marked "N/A" do not apply to this Contract.

Clause Reference With  
respect To section 3

1. The Employers is [CL.1.1]  
Name: Executive Engineer, Vadodara Electrical (R&B) Division, Vadodara  
Address: 4<sup>th</sup> Floor, R&B Bhavan, Nr Raopura Police Station, Vadodara  
Name of authorized Representative (will be intimated later)
2. The Engineer is .....  
Name of Authorized Representative: .....
3. The Defects Liability Period is 12 Months (1 years) from the date of completion. [CL.1.1&33]
4. The Start Date shall be **1<sup>st</sup>** days for the date of issue of the Notice to proceed with the work. [CL.1.1]
5. The Intended Completion Date for the whole of the works is [CL.1.1,17&2]  
15 days from the date of issue of work order  
after start of work with the following milestones:  
Milestone dates: [CL.2.2& 49.1]  
Physical works to be completed Period from the start date  
Milestone  
1 i.e. 25 % 45 days.  
Milestone 2 i.e. 50 % 90 days 100 % 60 days  
Milestone 3 i.e. 75% 135 days.  
Milestone 4 i.e. 100% 180 days.
6. The Site is located at Di- Vadodara. [CL.1.1]
7. The name and identification number of the Contract is: **Replacing Water Cooler at Various Block of District Court & Family Court, Diwalipura, Vadodara** [CL.1.1]
8. The works consist of Electrical Work with items as per [CL.1.1]  
B.O.Q. The works shall, inter alia, include the following, as Specified or as directed:  
**(A) Road Works**  
~~Site clearance; setting out and layout; widening of existing carriageway and strengthening including camber corrections; construction of new road/ Parallel service road; bituminous pavements remodeling/construction of junctions, intersections, bus bays, lay bays; supplying and placing of drainage Channels, flumes, guard posts and guard other related items; construction/extension of cross drainage works, bridge, approaches and other related stones; protective works for roads/bridge; all aspects of quality assurance of various components of the works; rectification of The defects in the completed works during the Defects Liability Period; submission of "As built" drawings and any other related documents; and other item of work as may be required to be carried out for completing the work in accordance with the drawings and the provisions of the contract and to ensure safety.~~

## **(B) Bridge Works**

~~Site clearance; setting out, provision of foundations, piers abutments and bearing; prestressed/reinforced cement concrete superstructure; wearing coat, hand railings, expansion joints, approach slabs, drainages spouts/ dwntake pipes, arrangements for fixing light posts, water mains, utilities etc; provision of suitably designed protective works; providing wing/return walls; provision of road markings, road signs etc.; all aspects of quality assurance; clearing the site and handing over the works on completion; rectification of the defects during the Defects Liability Period and submission of "As-built" drawings and other related documents; and other items of work as may be required to be carried out for completing the works in accordance with the drawings and the provisions of the contract and to Insure safety~~

[CL.1.1]

## **(C) Other Items**

As Per Attached Schedule-B.

Any Other Items as required to fulfil all contractual obligations as per the Bid documents.

[CL.2.3(9)]

10. The following documents also form part of the Contract:

As per clause 2-3

11. The law which applies to the Contract is the law of Union of India

[CL.3.1]

~~12. The language of the Contract documents is English~~

~~[CL.3.1]~~

13. Limit of subcontracting 25% of the Initial Contract Price

[CL.7.1]

14. The Schedule of Other Contractors

[CL.8]

~~15. The Schedule of Key Personnel As per Annex II to Section I~~

~~[CL.9]~~

~~16. The minimum insurance cover for physical property, injury and death is Rs. 5 lakhs per occurrence with the number of occurrences limited to four. After each occurrence, the contractor will pay an additional premium necessary to make insurance valid for four occurrences always.~~

[CL.13]

17. Site Investigation report

[CL.14]

18. The Site Possession dates shall be from issue of work order

[CL.21]

~~19. The period for submission of programme for approval of the engineer shall be 21 days from the issue of Letter of Acceptance.~~

[CL. 27.1]

~~20. The period between program updates will be ..... days.~~

~~[CL.27.3]~~

~~21. The amount to be withheld for late submission of an updated programme shall be Rs.....lakhs~~

~~[CL. 27.3]~~

~~22. The following events shall also be Compensation Events~~

~~[CL. 44]~~

~~Substantially adverse ground conditions encountered during the course of execution of work not provided for in the bidding document.~~

~~(i) Removal of underground utilities detected subsequently~~

~~(ii) Significant changes in classification of soil requiring additional mobilization by the contractor, e.g. ordinary soil to rock excavation,~~

~~(iii) Removal of unsuitable material like marsh, debris dumps, etc. not caused by the contractor.~~

- (iv) — Artesian conditions
- (v) — Seepage, erosion landslide
- (vi) — River training requiring protection of permanent work
- (vii) — Presence of historical, archeological or religious structures, monuments interfering with the works
- (viii) — Restriction of access to ground imposed by civil, judicial, or military authority

23. The currency of the Contract is Indian Rupees

[CL. 46]

24. **The formula (e) for adjustment of prices are as under:**

[CL.47]

- If any of the commodities like Cement, Steel or Bitumen are not found applicable in a work, the weight component of that commodities {i.e. 'Cement' (Pc), 'Steel' (Ps) or 'Bitumen' (Pb) as indicated in SBD for the purpose of Price Adjustment} shall be clubbed with the weight component of 'Other Material' (Pm), such that the gross % weight of the components shall remain as 100%.

R = value of work as defined in Clause 47.1 of Conditions of Contract

#### **Adjustment for labour component**

- (i) — Price adjustment for increase or decrease in the cost due to labour shall be paid in accordance with the following formula:

$$V_L = 0.85 \times (P_i/100) \times R \times (L_i - L_0)/L_0$$

$V_L$  = Increase or decrease in the cost of work during the month under consideration due to changes in rates for local labour

$L_0$  = The consumer price index for industrial workers for the State on 28 days preceding the scheduled date of opening of technical Bids as published by Labour Bureau, Ministry of Labour, Government of India

$L_i$  = The consumer price index for industrial workers for the State for the month under consideration as published by the Labour Bureau, Ministry of Labour, Government of India.

$P_i$  = Percentage of labor component of the work.

#### **Adjustment for cement component.**

- (ii) — Prices adjustment for increase or decrease in the cost of cement procured by the contractor

$$V_c = 0.85 \times (P_c/100) \times R \times (C_i - C_0)/C_0$$

$V_c$  = Increase or decrease in the cost of work during the month under consideration due to changes in rates for cement.

$C_0$  = The all India wholesale price index for Ordinary Portland Cement on 28 days preceding the scheduled date of opening of technical bid as published by the **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

~~C<sub>i</sub> = The all India average wholesale price index for Ordinary Portland Cement for the month under consideration as published by **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**~~

~~P<sub>c</sub> = Percentage of cement component of the work~~

*Adjustment for steel component*

~~(iii) Price adjustment for increase or decrease in the cost of steel procured by the contractor shall be paid in accordance with the following formula~~

$$~~V_s = 0.85 \times (P_s/100) \times R \times (S_i - S_0)/S_0~~$$

~~V<sub>s</sub> = Increase or decrease in the cost of work during the month under consideration due to changes in the rates for steel~~

~~S<sub>0</sub> = The all India wholesale price index for steel (**Mild Steel Long Products Rebars**) on 28 days preceding the date of opening of Bids as published by the **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**~~

~~S<sub>i</sub> = The all India average wholesale price index for steel (**Mild Steel Long Products Rebars**) for the month under consideration as published by **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**~~

~~P<sub>s</sub> = Percentage of steel component of the work~~

~~Note : For the application of this clause, the index of **Mild Steel Longproducts Rebars** has been chosen to represent the steel group.~~

*Adjustments of bitumen component*

~~(iv) Price adjustment for increase in the cost of bitumen shall be paid in accordance with the following formula~~

$$~~V_b = 0.85 \times (P_b/100) \times R \times (B_i - B_0)/B_0~~$$

~~V<sub>b</sub> = Increase or decrease in the cost of work during the month under consideration due to changes in rates for bitumen.~~

~~B<sub>0</sub> = The official retail price of bitumen at the IOC depot at the nearest centre on the day 28 days prior to the scheduled date of opening of technical bid.~~

~~B<sub>i</sub> = The official retail price of bitumen of IOC depot at the nearest centre for the 15<sup>th</sup> day of the month under consideration.~~

~~P<sub>b</sub> = Percentage of bitumen component of the work~~

*Adjustment of POL (fuel and lubricant) component*

- (v) ~~Price adjustment for increase or decrease in cost of POL (fuel and lubricant) shall be paid in accordance with the following formula~~

$$V_f = 0.85 \times (P_f/100) \times R \times (F_i - F_0)/F_0$$

~~V<sub>f</sub> = Increase or decrease in the cost of work during the month under consideration due to changes in rates for fuel and lubricants.~~

~~F<sub>0</sub> = The official retail price of High Speed Diesel (HSD) at the existing consumer pumps of IOC at the nearest centre on the day 28 prior to the date of opening of Bids.~~

~~F<sub>i</sub> = The official retail price of HSD at the existing consumer pumps of IOC at the nearest centre for the 15<sup>th</sup> day of the month of the under consideration.~~

~~P<sub>f</sub> = Percentage of fuel and lubricants component of the work~~

Note: For the application of this clause, the price of High-Speed diesel Oil has been chosen to represent the fuel and lubricants group.

*Adjustment for Construction Machinery*

- (vi) ~~Price adjustment for increase or decrease in the cost of plant and Machinery spare procured by the Contractor shall be paid in accordance with the following formula~~

$$V_p = 0.85 \times (P_p/100) \times R \times (P_i - P_0)/P_0$$

~~V<sub>p</sub> = Increase or decrease in the cost of work during the month under consideration due to changes in rates for plant and machinery spares~~

~~P<sub>0</sub> = The all India wholesale price index for **manufacturer of machinery for mining, quarrying and Construction** for the month under consideration as published **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**~~

~~P<sub>i</sub> = The all India average wholesale price index for **manufacturer of machinery for mining, quarrying and Construction** for the month under consideration as published **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**~~

~~P<sub>p</sub> = Percentage of plant and machinery spares component of the work.~~

Note: For the application of this clause, index of Heavy Machinery and parts has been chosen to represent the Plant and Machinery Spares group

- (vii) ~~Price adjustment for increase or decrease in cost of local materials other than cement, steel, bitumen and POL procured by the contractor shall be paid in accordance with the following formula~~

$$V_m = 0.85 \times (P_m/100) \times R \times (M_i - M_0)/M_0$$

~~V<sub>m</sub> = Increase or decrease in the cost of work during the month under consideration due to change in rates for local materials other than cement, steel, bitumen and POL.~~

~~M<sub>0</sub> = The All India wholesale price index (all commodities) on 28 days preceding the scheduled date of opening of technical Bids, as published by the Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.~~

~~M<sub>i</sub> = The All India wholesale price index (all commodities) for the month under consideration as published by the Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.~~

~~P<sub>m</sub> = Percentage of local material components (other than cement, steel, bitumen and POL) of the work.~~

~~The following percentage will govern the price adjustment for the entire contract:~~

1. Labour	P <sub>l</sub> .....%
2. Cement	P <sub>c</sub> .....%
3. Steel	P <sub>s</sub> .....%
4. Bitumen	P <sub>b</sub> .....%
5. POL	P <sub>f</sub> .....%
6. Plant & Machinery Spares	P <sub>p</sub> .....%
7. Other Materials	P <sub>m</sub> .....%
<hr/>	
Total	100 %
<hr/>	

25. The proportion of payments retained (retention money) shall be 6% {CL. 48} from each bill subject to a maximum of 5% of final contract price.

26. Amount of Liquidated damages for in completion of works
- For Whole of work {CL.49} delay (1/2000)<sup>th</sup> of the Initial contract price, rounded off to the nearest Thousand, per day. For sectional Completion (wherever specified In item 6 of Contract data) (1/2000)<sup>th</sup> of initial contract price for #5 km Section, rounded off to the nearest thousand per day.

27. Maximum limit of liquidated damages 10 percent of the Initial {CL. 49}  
For delay in completion work Contract Price rounded off to  
the nearest thousand

~~28. Amount of Bonus for early completion~~ ~~Amount of bonus for early~~  
~~completion of work shall be given~~  
~~as per CL.50 of Section 3~~

~~29. Maximum limit of bonus for early~~ ~~5 percent of the Contract {CL. 50}~~  
~~Completion of work~~ ~~Price~~

~~30. The amount of the advance payment are: {CL. 51 & 52}~~

<del>#Nature of Advances</del>	<del>Amount (Rs.)</del>	<del>Conditions toBe</del> <del>fulfilled</del>
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<del>i Mobilization</del>	<del>10% of the contract</del>	<del>On submission of unconditional</del>
<del>Price</del>	<del>Bank Guarantee. (to be drawn</del>	<del>before the end of 20% of the</del>
	<del>contract period). The contractor</del>	<del>may furnish four bank guarantees</del>
	<del>of 2.5 % of each valid for the full</del>	<del>period.</del>

<del>ii Equipment</del>	<del>90% for new and 50% of</del>	<del>After equipment is brought to site</del>
	<del>depreciated value for old</del>	<del>(provided the Engineer is</del>
	<del>equipment. Total amount</del>	<del>satisfied That the equipment is</del>
	<del>will be subject to a</del>	<del>required for performance of the</del>
	<del>maximum of 5% of the</del>	<del>contract) and on submission of</del>
	<del>Contract Price</del>	<del>unconditional Bank Guarantee for</del>
		<del>amount of advance</del>

~~iii Secured Deleted~~

~~Advance for~~  
~~Non-persish~~  
~~able material~~  
~~Brought to site~~

~~(The advance payment will be paid to the Contractor no later than 28 days after~~  
~~fulfillment of the above conditions).~~

~~31. Repayment of advance payment for mobilization and equipment {CL. 51.3}~~

~~The advance loan shall be repaid with percentage deduction from the interim~~  
~~payments certified by the Engineer under the Contract. Deduction shall~~  
~~commence in the next Interim Payment Certificate following that in which the~~

~~total of all such payments to the Contractor has reached not less than 20 percent of the Contract Price or 6 (six) months from the date of payment of first installment of advance, whichever period concludes earlier, and shall be made at the rate of 20 percent **(collectively for both Mobilization Advance and Equipment Advance)** of the amounts of all Interim Payment Certificate until such time as the loan has been repaid, always provided that the loan shall be completely repaid prior to the expiry of the original time for completion pursuant to Clause 17 and 28.~~

32. Deleted

33. The securities shall be for the following minimum amounts equivalent {CL. 52}As a percentage of the Contract Price:

Performance Security for 5 percent of contract price plus Rs. .... (to be decided after evaluation of the bid) as additional security in terms of ITB Clause 29.5

The standard form of Performance security acceptable to the Employer shall be an unconditional Bank Guarantee of the type as presented in Section 8 of the Bidding Documents.

34. The Schedule of Operating and maintenance Manuals..... {CL. 58}

35. The date by which “as– built” drawings (in scale as directed) in 2 sets {CL. 58} are required within 28 days of the issue of certificate of completion of the whole or section of the work, as the case may be.

36. The amount to be withheld for failing to supply “as built” drawings will be as per the Clause -58

37. The following events shall also be fundamentals breach of contract: {CL.59.2} “The Contractor has contravened Sub- clause 7.1 and Clause 9 of GCC”

38. The percentage to apply the value of the work not completed representing {Cl 60}the Employer’s additional cost for completing the Works shall be 20 per cent.



**SECTION - 5**

**TECHNICAL SPECIFICATION**

## SPECIFICATIONS FOR ELECTRICAL WORKS IN GOVERNMENT

BUILDING SUBJECT TO THE GENERAL CONDITIONS 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-56008-1970 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 description:***

(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 Executive Engineer Electrical Division.

(ii) Within one month of the taking over the installation, the Contractor shall supply to the Executive 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 Executive Engineer, Elect. 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 relevant 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 through 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 of any lump shall not exceed three percent of the voltage of the consumer's with all the consuming devices in use.

- 7.1 It 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 outlets : Points and exhaust fans**

- 8.1 Incandescent lamps installed in residential and non-residential buildings shall be rated at 60 watts & 100 watts respectively.
- 8.2 Table fans and ceiling fans shall be rated at 60 watts, 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 watts and 1000 watts respectively for the purpose of load assessment unless value of the load are known 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 Electrode 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 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 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 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 disconnected 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 throughout & 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 along with 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 direct 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 Executive Engineer Divisions all joints in conductor shall be made by 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 conductor shall be looped at the switch box whereas 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 Switchgear, 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 shall 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 pannel 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 inadvertantly personal contact with live parts is unlikely during the mainpulation of switchagears, 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. form any edge of the pannel.
- 11.10** The various live parts, unless they are effectively screened by substantial barrierrs of non-hydrosopic, no-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 pannel 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 whenever accessible.
- 11.15** All switch board 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 throughout 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,1966 (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 earthel neutral conductor of a multi-wire system or a conductor which is to be connected thereto, an indication of a permanet nature shall be provided to identify the earther neutral conductor. In this connectio Rule 32 (1) of Indian Electricity Rules, 1956 (See Appendis 'S') 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 ofr examination of the wiring at the back. The joints shalll be welded. A teak wood board, thoroughly protected both inside and outside with good insulating conforming to IS-347-1952 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 beard and the cover, the teak wooe board and the cover, the distance being inccressed 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, pulgs of wooden Gutties and shall be provided with a locking arrangement and and earthing stud. All wires passing through the metal board shall be bunched. Alternatively, hinged type metal boards shall be made of sheet munted on channel or angle iron freme.

**Note :** *Subh 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 of 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 meter 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.

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

- 13.3 Teakwood Boards :** for small installitons 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 imprenated with varnish of approved quality with all joints dovertailed.
- 13.4** In large size medium voltage installations, before proceeding with 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 overal 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 hinged pannel of teak wood or other suitable materials such as balelite, or with unbreakable glass doors in teak wood frame with loocking arrangement, the other surface of the door 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 :**
- (a) Equipment which is on the front of switch board shall be so arranged that inadevententy personal contact with live parts is unlikely during the manipulation of switches, changing of fuses or like operation.
  - (b) No apparatus shall project beyond any edge of pannel. 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 pannel.
  - (c) The various live parts, unless they are effectively screened by substantial barriers of non-hydroscopic, non-inflammable isulating material, shall be so spaced that an arc cannot maintain between such parts and earth.
  - (d) 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.
  - (e) In evety 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.
  - (f) No fuses other than fuses instrument circuit shall be fixed on the back of or behind a switch board pannel or flame.
- 13.7 Marking of Apparatus :**

- (a) 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 of 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.

- (b) Where a board has more than one switch, each such switch shall be marked to indicate which section of the installation it controls.
- (c) 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-circuit.

**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 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 percent increase in load due to any future modification. Power sub-circuits shall be designed according to the 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-circuit.

**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 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 connection 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 be 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 clearance of at least 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 run 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 60°.

### **14.0 Capacity of Circuits :**

- 14.1** Lights and fans may be connected on a common circuit 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 circuit 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 isolator 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 either 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 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 bolt 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 approved hardwood not less than 5 cm long 2.5 c. square on the inner end and 2 cm. square on the outer end. They shall



be cemented into walls to within 7.5 mm of the surface, the remaining being finished according to the nature of the surface 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 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, meatilic 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-pahase switch or fuse shall be inserted in the middle wire, earth or earthed neutral conductor of the circuit, Single-pole swiches (other than for multiple control) carrying not more than 15 apmperes may be of tumbler type which shall be 'ON' when the handle known is down.

**18.0 Fittings :**

Where conductors are required t be threaded through tubes or chanel 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 wierd 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 suffcient 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 ventiated.

**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 :

<b>Nominal cross sectional Araea cord. mm<sup>2</sup></b>	<b>No. &amp; Dia in mm of wires.</b>	<b>Max Permissible wight Kg.</b>
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

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

**8.3 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, the sub-circuit loads shall be terminated in a ceiling zone or connector from which they shall be carried into the fitting.

**9.0 Lamp Holders :**

Lamp holders for use on brackets and the like shall be in accordance with "IS : 1258-1967, specification ofr Boyonet lampholder and all those for use flexible panants shall be provided with cord grips. All lampholders shall be provided with shade carriers. Where centre contac edison screw lampholders are used, the outer or screw contacts shall be connected to the middle wire, the netural, and the earthed conductor of the circuit.

**20. Outdoor Lamps :**

Extrnal 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 shallbe inserted in the fittings. Flexible cord and cord grip lampholders shall not be used where exposed to weather. In verandahs and similer exposed situations where pendants are used, they shall be of fixed road type.

#### **21.0 Lamps :**

All incandescent lamps, unless otherwise required and sutially protected, shall be hung at a height fo not less than 2.5 m abovethe floor level, They shall be in accordance with IS : 418 : 1957 specification for Tongster 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 ceilling 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 supension rods. There shall be no joint in the supension rod, but if joints be unavoidable then such joints shall be screwed to sepecial 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 amy be welded.

(b) Fans clamps shall be of suitable design accroding 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 roots shall be buried with the casting end 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 togeher. Fan clamps for steel jjoint 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 nominal cross-sectional area not less than 1.0 mm<sup>2</sup> with copper and 1.5 mm<sup>2</sup> with aluminium and shall be protectd from abrasion.

(e) Unless otherwiise specified, the clear distance between the ceiling fand and the floor shall not beless 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 holes 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 acessories :**

**23.1** In other than conduit wiring, all ceiling crosses, brackets, pendants and accessories attached to walls or ceilings shall be mounted on substanitial 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 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 accessories only (IS L 2667-1964).

**Specification for Fittings for Rigid Steel Conduits for Electrical Wiring) :** In long distance straight runs of conduit, inspection type couplers at reasonable intervals shall be provided or running threads with couplers and jam-nuts (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 of full threaded portion of couplers or accessories. Cut ends of conduit pipes shall have no sharp edges nor any of burrs 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	No. and	16	:	20	:	25	:	32	:	40	:	50	:	63	:
Cross-section- ional area.	Dia. in mm of wires	:	:	:	:	(No. of cables, 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	1/2.24 3 (3/1.06*) (7/0.85)	2	4	3	7	6	12	10	-	-	-	-	-	-	
6	1/2.80 2 (7/1.06*)	-	3	2	6	5	10	8							
10	1/3.55+ 7/1.40*	-	-	2	5	4	8	7	-	-	-	-	-	-	-
16	7/1.70 -	-	-	-	2	-	4	3	7	6	-	-	-	-	
25	7/2.24 -	-	-	-	-	-	3	2	5	4	7	6	9	7	
35	7/2.50 -	-	-	-	-	-	2	-	4	3	7	5	8	6	
50	7/3.00+ 19/1.80	-	-	-	-	-	-	-	-	2	-	5	4	6	5
		-	-	-	-	-	-	-	-	2	-	5	4	6	5

**For Cu. Conductors only. + For Al. conductor only.**

**NOTE 1** The cable shows the maximum capacity of conditions 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

*form 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 sweating 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 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 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 of 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 Conductor** - All conductor used in conduits wiring shall preferably be stranded. No single-core cable or nominal Cross-sectional area greater than 130 mm<sup>2</sup> 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 after erection shall be tested for mechanical and electrical continuity throughout and permanently connected to earth conforming to the requirements specified under 7 by means of special approved type earthing clamp efficiently fastened to conduit 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 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 or 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 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-The conduit may be either threaded type or plain type as specified in IS : 2509-6913\* 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. &	16	20	25	32	40	50
Cross Sectional	Diameter						
Area	in mm. of						
	wires						
mm <sup>2</sup>							
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	1/2.24	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	7/300+	-	-	-	-	2	3
	19/1.80						

\* For copper conductors only.

+ For aluminium conductors only.

- 25.3.3 Conduit joints** - Conduit joints shall be jointed 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 of hot surfaces should be avoided. Caution should be exercised in the use of the conduit in locations where the ambient temperature is 500 °C or above. Use of such conduits in place where ambient temperature is 600 °C or above is prohibited.

### **PVC INSULATED 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 ceiling shall be run on 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 erection, 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 joists, 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 in the ordinary way. Where wiring passes through structural steel work, the hole 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.

- 26.2.0 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 8 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 spaced 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 any circumstances be bent so as to form an abrupt right angle but must be rounded off at the corners to 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 the 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 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 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 specific 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 cut, 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, splashings, 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
<b>3.</b>	<b>Authorisation.</b>
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 cut-out therein.
33.	Earthed terminal on consumer's premises.
36.	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 of 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.
	<b>All Clauses under Chapter VIII on Overhead Lines.</b>
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.

**(1) Particulars of Works :**

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

(i) Light point

(ii) Fan point

(iii) Plug point

(a) 3 pin 5 Amp.

(b) 3 pin 15 Amp.

**(b) Others :**

Description HO/KW	Type of starting
-------------------	------------------

(a) Motor: (i)

(ii)

(iii)

**(c) Other Plants:**

**(d) if the work involves installation of overhead line/or underground 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 joint:

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. ohms
- (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

# SPECIFICATION

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 emendments.
- (3) Indian Electricity supply Act. 19948.
- (4) Regulation for Electrical Equipment in building by I.E.F. London.
- (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 1100 volts.
- (10) I.S. : 694 - 1964 Part - II - PVC insulated cable with Alluminium conduits (revised) for voltages upto 1100 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 for voltage not exceeding 1000 volts.
- (13) I.S. 1653-1964 - Rigid steel conduits for electrical wiring (revised)
- (14) I.S. : 2509-1973 - Rigied steel conduits for electrical installation. (First revision)
- (15) I.S. : 1258 - 1967 - Beyonet lampholders (First revision)
- (16) I.S. : 418-1957 - Tungston-Filament General service electric lamps (Third revision)
- (17) I.S. : 374-1966 - Fans and Regulators, ceiling type, electric (second revision)
- (18) I.S. : 2667-1964 Fittings for rigid steel conduits for electrical wiring.
- (19) I.S. : 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) **Diaelectric :** Any material which offers high resistance to the passage of the 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 I.S. : 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 of 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 opening 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 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 have their live parts covered. The covers must be of incombustible material and must be either non-conduction 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**

**Executive Engineer**

**Vadodara Electrical (R&B) Division,**

**Vadodara**

## 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, clocks, sockets, etc., including fixing of lighting fixtures and fans etc., **and miscellaneous points.**
- (b) Conduit and wiring system for **exhaust fans sockets etc.**
- (c) Panel boards, distribution boards.
- (d) Complete power and lighting
- (e) Grounding system.
- (f) Conduits system.
- (g) Street lighting system
- (h) Other miscellaneous electrical

### 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, whether 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 equipment's 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 equipment's of buildings, published by the institute of Electrical Engineers London (14th Edition 1966 and as amended upto date) hereinafter 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 equipments of buildings issued by the Bombay Regional Council of Engineer 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 of 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 Sample of materials wherever required should be approved by the 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 licensed wiremen with an experience of not less than 5 years in the type of work they are engaged. The work should be done under supervision of licensed 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-OPERATION 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 in reference 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 chases 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 SPECIFICATIONS :**

#### **2.1 Supply System :**

The wiring installation shall be suitable for 3 phase 4 wire, 400-400 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 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 a cross 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. (At.) 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 board shall accordingly be numbered.

### **2.2.5 Local Control Switches (General) :**

Local control switches for circuit carrying not less than 5-A 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, 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 embedded 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.

#### **2.2.5.B 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 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 fittings 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	1000	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 for 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 associated 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 times 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 connection 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 outlet 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 building 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 does 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 :**

### **1. SCOPE :**

i. The specifications cover the supply and installation of medium voltage power and control cables either in ground or trench depending on the conditions at site including accessories for the same. The work in general, consists of supplying, laying 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 cable lugs, concrete stabs, bricks sand, cables markers etc., as required to make the installation work including digging and back filling of the trenches as required.

### **II. SPECIFICATIONS :**

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 IS 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 provision specified therein.

iv. Only approved make of cable be used. ICC and CCI will be preferred.

v. The cables shall generally be laid as per IS Code of Practice.

### **III. GENERAL RULES FOR 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 joint 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 Contractor shall also notify the building contractor in writing, for finishing up as required, 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 cables pass through roads nallahs, etc., cables must be protected by Class 'A' Hume pipe of diameter not less than 6" (15 cm)

- vi. The cable route shall be the shortest and there 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 vertical 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 contractor 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 in multicore 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 trifurcating boxes in the case APLSTS cables. The armour should be connected to the right main earth in building with duplicate earth wires as per the relevant IS/BS specifications.

The core insulation over each conductor shall however be retained throughout 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 as aleap, and Eyre No. 7 liberally used.

The joint shall be mechanically strong and pressure tested.

## **2.6 DISTRIBUTION BOARDS AND PANELS :**

### **General Requirements :**

- 2.6.1** All distribution panels shall comply with I.E.E. Rules 60-61. A clear distance of 0.91b meter 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 meter 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 0.76 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 lugs neutral bar link. H.R.C. fuses and of approved make.

**2.6.3** Skeleton type panels shall have rigid framework adequately braced and supported. The switch and distribution boards shall be neatly arranged in the frame. The details of the framework 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 unauthorized 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 in 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 not 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 tinned sizes as indicated on applicable drawings as required.
- (d) All knockouts for branch circuits, conduit entries shall be drilled in and filed as required. For lighting panels the top and bottom cover plates shall be removable type.
- (e) Main disconnects device for all panel boards shall be of switches of disconnect type and of the size as indicated. It 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 plug for connection to the grounding system.
- (h) Temperature rise of all electrical parts shall not be more than 300° C with full load measured 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 place approved by the Engineer-in-charge.

- (l) All civil works connected with fixing such as grouting chasing and making good shall be the tenderer's responsibility.
- (m) Wires adequate capacity with proper size of lugs shall be used for interconnections.
- (n) Panel should be self-supported on angle channel iron framework. It should be preferably of bolted construction in case of transportation and flexibility. The frame 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 as to be accommodated in the existing room as per I. S. rules and I. S. codes of practice for installations of medium voltage switchgear.
- (p) Fabrication drawing showing the detailed dimensions and panels and its components indicating the frame work earthing positioning of switches, D. Bs. cable boxes, adopeter chambers etc. shall be furnished to 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 bus bar shall have continuous current rating as specified with neutral bar having half of full load rating of the phase bus bar. The sizes of the bus bars shall be so selected that the current density in bar does not exceed 150 amps. per sq.mm. for copper. The length of bus-bar chamber should be as suitable length to fix all the switches etc. as per prevailing standards. Clear spacing of two adjacent buses shall be 1.1/2" Minimum ber should be taped all along with colour coated 11 KV grade PVC tape. Te maximum internal support for each unsupported length shall exceed 600 mm.

The bus bar shall be of copper/alluminium and fabricated to the relevant standards specification. In case alluminium bus bar is used special with high conductivity alluminium 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 bar enclosing shall be made out of not less than 16 gauge M. S. sheets 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 interconnection 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 tender 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 Reptuing Capacity Catridgege Fuselinks complying with IS 2208 or BS 88 and having certified returning capacity of not less than 35 MVA at 440 volts (AC5 dully). The switch gear (panels D. Bs. etc.) shall be installed generally as per IS-Part I 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 adapter boxes. All switches mounted on the top of the busbars shall be provided with detachable type reverse entry adapter boxes. Suitably engraved lables shall be provided for eah circuit as well as for the board.

A meter with 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 figures for easy identification of circuits.

- (a) The distribution boards should be totally enclosed metal clad complying with B. S. 214. The M. S. shet steel enclosures for recessed D. Bs. shall be of not less than 14 guage.
- (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 installion.
- (d) The D. Bs. shall have proper size cut outs for conduits entry or cable entry or cable entry as required adn 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 interconnection.
- (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 isolation 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 neutral 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 arrangements as may as 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 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 cycles (in balanced load) supply.

Each selector switch shall be 3 point and of minimum 250 volts grade with silver tipped contacts suitable for metering circuits. Current transformer shall be of 5VA burden and 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. indicated in relevant drawing. Actual location and levels shall however be arrived at site in co-ordination with other services etc. and prior approval of the Engineer-on-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 as 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 mm<sup>2</sup>.
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 guage not less then 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 loacation shall be decided in the field by the Engineer-in-charge.



**SECTION - G**  
**SPECIFICATION FOR EARTHING**

**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 should 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 upon the depth of pit 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 type 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 regulations. The masonry enclosures shall be 25 cm x 25 cm (deep) with C. I. lid of 23 cm x 30 cm 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**

**Executive Engineer**

**Vadodara Electrical (R&B) Division,**

**Vadodara**

## **SECTION - 6**

### **FORM OF BID**

Description of the Works:

-----  
-----  
-----

BID

To :

Address :

1. We offer to execute the Works described above and remedy any defects therein in conformity with the conditions of Contract, specification, drawings, Bill of Quantities and Addenda for the sum (s) of

\_\_\_\_\_  
\_\_\_\_\_  
(-----)

2. We undertake, if our Bid is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Engineer's notice to commence, and to complete the whole of the Works in the Contract within the time stated in the document.
3. We agree to abide by this Bid for the period of 120 Days from the date fixed for receiving the same, and it shall remain binding upon it and may be accepted at any time before the expiration of that period.
4. Unless and until a formal Agreement is prepared and executed this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.
5. We understand that you are not bound to accept the lowest or any tender you may receive.

Dated this ----- day of ----- 20

Signature ----- in the capacity of -----

----- duly authorized to sign bids for and on behalf of -----

-----

\_\_\_\_\_

(in block capitals or typed)

Address

---

---

Witness

---

---

Address

---

---

Occupation

---

---

**SECTION - 7**  
**BILL OF QUANTITIES**

## *BILL OF QUANTITIES*

### **Preamble**

1. The bill of Quantities shall be read in conjunction with the Instructions to Bidder, Conditions of Contract, Technical Specifications and Drawings.
2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates and prices tendered in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.
3. The rates and prices tendered in the priced Bill of Quantities shall, except in so far as it is otherwise provided under the Contract, include all constructional plant, layout, supervision, materials, erection, maintenance, insurance, profit, taxes and duties, together with all general risks, liabilities and obligations set out or implied in the Contract.
4. The rates and prices shall be quoted entirely in Indian Currency.
5. A rate or prices shall be entered against each item in the Bill Quantities, whether quantities are stated or not. The cost of Items against which Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities (in case of Item rate contract).
6. The whole cost of complying with the provisions of the Contract shall be included in the items provided in the priced Bill of Quantities, and where no Items are provided the cost shall be deemed to be distributed among the rates and prices entered for the related items of Work.
7. General direction and descriptions of work and materials are not necessarily repeated or summarized in the Bill of Quantities. References to the relevant sections of the contract documentation shall be made before entering rates or prices against each item in the Bill of Quantities.
8. The method of completed work of payment shall be in accordance with the specification for Road and Bridge works. For building works specifications for building are to be followed.
9. Errors will be corrected by the Employer for any arithmetic errors pursuant to **Clause 29** of the Instructions to Bidder.
10. Rock is defined as all materials which, in the opinion of the Engineer, required blasting, or the use of metal wedges and sledgehammers, or the use of compressed air drilling for its removal, and which cannot be extracted by ripping with a tractor of at least 150 kw with a single rear mounted heavy duty ripper.

**BILL OF QUANTITIES**

**(A) Percentage Rate Tender (Up to INR 50 Cr. )**

Item No	Description of Item (with brief specification and reference to book of specifications)	Quantity	Unit	Rate In figures	Amount
<b>As per separate sheet attached</b>					

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

Estimated amount put to tender

Estimated amount put to tender

Deduct.....% below

Add.....% Above

Net

Net

In words

In words

**(B) — For Item Rate Tender (For above INR 50 Cr.):**

Item No	Description of Item (with brief specification and reference to book of specifications)	Quantity	Unit	Rate		Amount
				In figures	In Words	
As per separate sheet attached						

(A) Total Tendered Amount

(B) Rebate on above tendered amount (if any) % (in figure) .....

(in words).....

(C) Net Tendered Amount (A-B) (in figure) .....

(in words).....

#

1	The Contractor shall exhibit a board with detailed specification and details of work as directed by the Engineer-In-Charge for which no extra payment shall be made.
2	The labour cess will be deducted as per prevailing rules i.e. 1% of the work done.
3	GST and Income tax TDS will be deducted at a source while making payments of bills
4	In all R.C.C. Items in Rate Analysis Standard Cement Consumption has been taken as per Govt. G.R.: PRC 10/2017 Cement Consumption/16/C Date:11/05/2017 as stated in S.O.R. therefore in R.C.C. items where there is a change as per actual mix design the cost of difference of cement consumption have been deducted from the rate of original item at the rate of input rate mentioned in all the tender.

## **SECTION - 8**

### **SECURITIES AND OTHER FORMS**



*BID SECURITY (BANK GUARANTEE)*

WHEREAS, ----- (name of Bidder) (hereinafter called the "The Bidder") has submitted his bid Dated ----- (Date) for the construction of ----- (Name of Contractor hereinafter called "the Bid")

KNOW ALL PEOPLE by these presents that We -----  
(name of Bank) of -----(name of country) having our  
registered office at -----( hereinafter called  
"the bank") are bound unto -----(name of Employer)  
(hereinafter called "The Employer") in the sum of ----- \*  
for which payment well and truly to be made to the said Employer the Bank itself, his  
successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this ----- day of -----20

THE CONDITIONS of these obligations are:

(1) If after Bid opening the Bidder withdraws his bid during the period of Bid validity  
specified in the Form of Bid;

*Or*

(2) If the Bidder has been notified of the acceptance of his bid by the Employer  
during the period of Bid Validity:

A Fails or refuses to execute the Form of Agreement in accordance with the  
Instructions to Bidders, if required; or

B. Fails or refuse to furnish the Performance Security, in accordance with the  
Instructions to Bidders; or

C. does not accept the correction of the Bid Price pursuant to Clause 27  
(Correction of Errors)

We undertake to pay to the Employer up to the above amount upon  
receipt of his first written demand, without the employer having to substantiate  
his demand, provided that in his demand the Employer will note that the  
amount claimed by him is due to him owing to the occurrence of one or any of  
the three conditions, specifying the occurred conditions or conditions.

This Guarantee will remain in force up to and including the date ----- \*\*  
days after the deadline for submission of Bids as such the deadline is stated in the  
Instructions to Bidders or as it may be extended by the Employer, notice of which  
extension (s) to the Bank is hereby waived. Any demand in respect of this  
guarantee should reach the Bank not later than the above date

DATE -----

SIGNATURE-----

WITNESS -----

SEAL -----

---

(Signature, name and address)

\* The Bidder should insert the amount of the guarantee in words and figures  
denominated in Indian Rupees. This figure should be the same as shown in  
Clause 16.1(Bid Security) of the Instructions to Bidders.

**\*\*45 days** after the **end of the validity period** of the Bid. Date should be inserted by  
the Employer before the Bidding documents are issued.

TO,  
The Deputy Executive Engineer, Vadodara Electrical (R&B) Division, Vadodara (Name of Employer)  
4<sup>th</sup> Floor R&B Bhavan, Nr Raopura police station, Vadodara (Address of Employer)

WHEREAS ----- (name and address of contractor) (hereafter called "the Contractor") has undertaken, in pursuance of Contracts No. ----- dates ----- to execute ----- (name of Contract and brief description of Works) (hereinafter called "The Contract")

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligation in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractors such a bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you on behalf of the Contractor, up to a total of ----- (amount of guarantee)\*----- (in words), such sum being payable in types and proportions of currencies in which the Contract prices is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of ----- (amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the contractor before presenting is with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract to of the Works to be performed thereunder or of any of the Contract documents which may be made between your and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such charge, addition or modifications.

This guarantee shall be valid until 60 days from the date of expiring of the Defect Liabilities period.

Signature and Seal of the guarantor -----

Name of Bank -----

Address -----

Date -----

---

\*An amount shall be inserted by the Guarantor, representing the percentage the Contract price specified in the Contract denominated in Indian Rupees.

ADDITIONAL PERFORMANCE SECURITY

[Clause 34.1. (A)]

TO,  
The Deputy Executive Engineer, Vadodara Electrical (R&B) Division, Vadodara (Name of Employer)  
4<sup>th</sup> Floor R&B Bhavan, Nr Raopura police station, Vadodara (Address of Employer)

WHEREAS ----- (Name and address of contractor) (hereafter called "The Contractor") has undertaken, in pursuance of Contracts No. ----- dates ----- to execute ----- (Name of Contract and brief description of Works) (hereinafter called "The Contract")

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligation in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractors such a bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you on behalf of the Contractor, up to a total of ----- (amount of guarantee) ----- (in words), such sum being payable in types and proportions of currencies in which the Contract prices is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of ----- (amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the contractor before presenting is with the demand

We further agree that no change or addition to or other modification of the terms of the Contract to of the Works to be performed thereunder or of any of the Contract documents which may be made between your and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such charge, addition or modifications.

This guarantee shall be valid until **28 days** from the project completion date.

Signature and Seal of the guarantor -----

Name of Bank -----

Address -----

Date -----

*BANK GUARANTEE FOR ADVANCE PAYMENT*

TO,  
The Deputy Executive Engineer, Vadodara Electrical (R&B) Division, Vadodara (Name of Employer)  
4<sup>th</sup> Floor R&B Bhavan, Nr Raopura police station, Vadodara (Address of Employer)

----- (Name of Contractor)

Gentlemen:

In accordance with the provisions of the Conditions of Contract, sub-clause 51.1 ("Advance Payment") of the above mentioned Contract, -----  
----- (name and address of Contractor) (hereinafter called "the Contractor") shall deposit with ----- (name of Employer) a bank guarantee his proper and faithful performance under the said Clause of the Contract in an amount of ----- (amount of Guarantee)\* -  
----- in words).

We, the ----- (bank of financial institution), as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to ----- (name of Employer) on his first demand without whatsoever right of obligation on our part and without his first claim to the Contractor, in the amount not exceeding ---  
----- (amount of guarantee)\* ----- (in words)

We further agree that no change or addition to or other modifications of the terms of the Contractor or Works to be performed thereunder or of any of the Contract documents which may be made between ----- (name of Employer) and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modifications.

This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until ----- (name of employer) receives full repayment of the same amount from the contractor.

YOUR'S TRULY

Signature and Seal \_\_\_\_\_  
Name of Bank/ Financial Institution \_\_\_\_\_  
Address \_\_\_\_\_  
Date \_\_\_\_\_

\_\_\_\_\_  
\* An amount shall be inserted by that Bank or Financial Institution representing the amount of the Advance Payment, and denominated in Indian Rupees.

*Letter of Acceptance*

(Letter head paper of the Employer)

To, \_\_\_\_\_ (date)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (Name and address of the Contractor)

Dear Sirs,

This is to notify you that your Bid dated \_\_\_\_\_ for execution of the \_\_\_\_\_ (Name of the contract and identification number, as given in the Instructions to Bidders) for the Contract Price of Rupees \_\_\_\_\_ (\_\_\_\_\_) (amount in words and figures) as corrected and modified in accordance with the Instructions to Bidders\* is hereby accepted by our agency.

You are requested to furnish performance security, in the form detailed in para 34.1 of ITB for an amount equivalent to Rs. \_\_\_\_\_ within **10 days** of the receipt of this letter of acceptance up to beyond **60 days** from the date of expiry of defects Liability period i.e. up to \_\_\_\_\_ and the Additional Performance Security for an amount equivalent to Rs. \_\_\_\_\_ shall be valid beyond 28 (twenty-eight) days of Project Completion Date i.e. up to \_\_\_\_\_ and sign the contract, failing which action as stated in Para 34.3 of ITB will be taken.

Yours Faithfully

Authorized Signature  
Name and title of Signatory  
Name of Employer

---

\* Delete "Corrected and" or and modified if only one of these actions applies. Delete as corrected and modified in accordance with the Instructions to Bidders, if corrections or modifications have not been affected.

*Issue of Notice to proceed with the work*

(Letterhead of the Employer)

----- (date)

To,

\_\_\_\_\_ (Name and address of the Contractor)

\_\_\_\_\_

\_\_\_\_\_

Dear Sirs,

Pursuant to your furnishing the requisite security in ITB Clause 34.1 and  
signing of the Contract for the work of \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ at a bid Price of Rs.

\_\_\_\_\_.

You are hereby instructed to proceed with the execution of the said works in  
accordance with the contract documents.

Yours faithfully

(Signature, name and title of signatory authorized  
To sign on behalf of Employer)

*AGREEMENT FORM*

This agreement, made on the \_\_\_\_\_ day of \_\_\_\_\_ between The Deputy Executive Engineer, Vadodara Electrical (R&B) Division, Vadodara (name and address of Employer) (Hereinafter called "the Employer) and \_\_\_\_\_ (name and address of contractor) hereinafter called "the Contractor" of the other part.

Whereas the Employer is desirous that the Contractor execute

\_\_\_\_\_  
Name and identification number of contract (hereinafter called "the works") and the employer has accepted the Bid by the Contractor for the execution and completion of such works and the remedying of any defects therein, at a cost of Rs.

\_\_\_\_\_  
NOW THIS AGREEMENT WITNESSETH AS FOLLOWS

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the conditions of contract hereinafter referred to and they shall be deemed to form and be read construed as part of this Agreement.
2. In Consideration of the payment to be made by the Employer to the contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the works and remedy any defects therein in conformity in all aspects with the provisions of the contracts.
3. The employer hereby covenants to pay the Contractor in consideration of the execution and completion of the works and the remedying the defects wherein contract price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the contract.
4. The Following documents shall be deemed to form and be ready and construed as part of this Agreement viz
  - i ) letter of Acceptance
  - ii ) Notice to proceed with the works:
  - iii ) Contractor's Bid



- iv ) Conditions of contract: General and Special
- v ) Contract Data
- vi) Additional conditions
- vii ) Drawings
- viii ) Bill of Quantities and
- ix ) Any other documents listed in the Contract data as forming part of the Contract.

In witness whereof the parties there to have caused this Agreement to be executed the day and year first before written

The Common seal of \_\_\_\_\_

Was hereunto affixed in the presence of :

Signed, sealed and Delivered by the said \_\_\_\_\_

---

In the presence of

Binding signature of Employer \_\_\_\_\_

Binding Signature of Contractor \_\_\_\_\_

## UNDERTAKING

*(For Investment)*

I, the undersigned do hereby undertake that our firm M/s ..... would invest a minimum cash up to **25%** of the value of the work during implementation of the contract.

\_\_\_\_\_  
(Signed by an Authorized officer of the firm)

\_\_\_\_\_  
Title of officer

\_\_\_\_\_  
Name of firm

\_\_\_\_\_  
DATE

## UNDERTAKING

*(For Validity)*

I, the undersigned do hereby undertake that our firm M/s .....  
..... agree to abide by this bid for a period .....days  
for date fixed for receiving the same and it shall be binding on us and may be accepted at  
any time before the expiration of that period.

\_\_\_\_\_  
(Signed by an Authorized officer of the firm)

\_\_\_\_\_  
Title of officer

\_\_\_\_\_  
Name of firm

\_\_\_\_\_  
DATE

## **SECTION - 9**

### **DRAWINGS**

**SECTION - 10**

**DOCUMENTS TO BE FURNISHED BY BIDDER**

**Eligibility Criteria**

**Name of Work :- Replacing Water Cooler at Various Block of District Court & Family Court, Diwalipura, Vadodara**

**Documents to be submitted online by scan at Primary Stage:**

1. Upload scan copy of the Tender / Bid Fee
2. Upload scan copy of the Earnest Money Deposit
3. Upload scan copy of Bank Solvency of 20% of Estimated Cost of Nationalized or Scheduled Bank issued in current calendar year i.e.2024.
4. Upload Scan copy of Permanent Account Number (PAN)
5. Upload Scan copy of GST Registration Certificate
6. Scan Copy of Valid Contractor Registration in "E2" Class & Above (Electrical).
7. ~~Upload scan copy of technical compliance dully signed & stamped by bidder. (As per Annex-D)~~
8. ~~Bidder should be Original Equipment Manufacturer (OEM) of Split Air-conditioned System~~ **OR Bidder having specific authorization letter from OEM for this tender work** (Upload the copy of any of one of the following by scan:
  - A. ~~In case of Original Equipment Manufacturer:  
(Registration Certificate of Excise / ISO Certificate or other suitable documents to the satisfaction of Tender Inviting Authority)~~
  - B. ~~In case of Authorized Bidder
    - I. ~~Authorization letter as per Annexure B specifically addressed to The Executive Engineer Vadodara Electrical (R&B) Division, Vadodara for these tender (i.e. For Air Conditioned work)~~
    - II. ~~Confirmation from OEM that all required support shall be provided to Bidder for all required sales and technical support and also ensure that spares and service support for their equipment for next 6 years.~~
    - III. ~~Confirmation from OEM that bidder is associated with OEM Since Last three Years of more.~~~~
9. ~~Upload the Financial Turnover Documents (CA Certifications) Bidder having financial turnover not less Rs. 14.09 Crore during any one of last five Financial Year (C.A. Certification will be considered as per Enhancement Factor)~~
10. ~~Upload Experience documents  
Bidder should have Experience of Similar one single work (SITC of Split AC Machine) of amount not less than 40% of Estimated amount of tender within last five financial years in Government, Semi Government or Private Sector. (As per Enhancement Factor)~~

~~Note :- For Government Work/ Semi Government/ PSU Form 3A shall be attached~~

~~For Private Following Documents must be attached~~

- ~~● Self attested copy of Work Order~~
- ~~● Self attested copy of Agreement~~

- ~~Self attested copy of Bill~~
- ~~Self attested copy of TDS Certificate~~
- ~~CA certified copy of work completion certificate or 3A form~~
- ~~Self attested copy of Subletting the work (if any)~~

11. ~~Upload the Declaration letter as per Annexure A~~
12. ~~Upload scan copy of documentary evidence for the clause The Bidder must have available Bid capacity at the time of bidding of more than the Total Estimated Cost of the Work. Available Bid capacity will be calculated as per the formula given in the Annexure C.~~
13. ~~Upload Scan copy of Annexure E.~~

- Note: -**
- (1) The bidder shall submit all the documents duly scanned along with Pre – Qualification bid and shall upload Technical compliance & approved make –model compliance along with technical bid.
  - (2) The price bid of the Agencies which fulfil the above Pre-Qualifying criteria and technical compliance shall only be opened.