

**ECGC Ltd.**  
**(Formally ECGC of India Ltd.)**

Northern Regional Office: 6th Floor, Mohan Dev Building ,  
13 Tolstoy Marg, Connaught Place,  
New Delhi – 110001 . Phone No. 011 41529919,  
Website - [www.ecgc.in](http://www.ecgc.in)

**T E N D E R**

Interior Furnishing & allied Electrical Works

At

New premises of West Delhi Branch located in KLJ Tower, Netaji Subash Place  
305-306, Third Floor, Pitampura New Delhi.

**Architects:**

**bdsharma CONSULTING pvt. ltd.**

**C-1/8, Safdarjung Development Area, Adj. Aurobindo Market,  
New Delhi – 110016**

**Ph:-011 26563781, Fax: - 011 46029643**

**Email: [bdsarchitect@gmail.com](mailto:bdsarchitect@gmail.com)**

**TENDER DOCUMENTS FOR INTERIOR FURNISHING AND ALLIED WORKS**

**AT**

**West Delhi Branch Office located in K.L.J Tower (North) , 305-306,Third Floor  
Netaji Subash Place, Pitampura New Delhi**

DATE OF ISSUE : 13-12-15

PLACE OF ISSUE OF TENDER : C-1/8, Safdarjung Development Area, Near Aurobindo  
Market. New Delhi 110016

LAST DATE OF RECEIPT OF TENDER : 28-12-15 on or before 3.00 pm.

PLACE OF RECEIPT OF TENDER : Northern Regional Office , 6th floor, MohanDev  
Building, Tolstoy Marg, Connaught Place,  
New Delhi – 110001.  
Phone No. 011 41529919

OPENING OF TECHNICAL BID : 28-12-2015 at 5 : 00 pm.

OPENING OF PRICE BID : Eligible Tenderers shall be informed separately.

TIME OF COMPLETION : Five weeks.

COST OF TENDER PAPERS : Rs. 1000 Each.

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## TENDER NOTICE

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Dear Sirs,

**Sub: Interior furnishing and allied works , for New Branch Office located in K.L.J Tower, 305-306, Third Floor, Neta ji Subash Place, Pitampura New Delhi**

ECGC invites tenders, for the aforesaid work.

Tender copies can be received from, Architects , bdsharma Consulting pvt. ltd. on payment of Rs 1000/-, by cash(non refundable) during office timings, and on any working day from **14 -12-15.**

Estimated cost of project is Rs. 21 lac

The tenders may be submitted in the following manner:

### Envelope No. 1(Tender EMD):

	Favoring	Amount Rs.	DD/Banker's Cheque payable at
EMD	ECGC LTD	42,000/-	New Delhi

2. The Tenderer must also submit the Mandatory Information strictly in prescribed Proforma. Technical Pre-qualification of the tenderer will be based on the Mandatory Information and supporting documents submitted along with the tender documents, as well as Architect/Consultant scrutiny of the same and/or inspection of works carried out by the Tenderer. ECGC reserves the right to accept or reject any tender without assigning any reason whatsoever.

### Envelope No. 2 (Technical Bid):

- **Mandatory Information (strictly in the prescribed Proforma)**
- **Other supporting documents & credentials of the tenderer.**

**Must not contain any commercial information. Any Commercial disclosure in the Envelop no. 1 and/or 2 will disqualify the tenderer without any further scrutiny.**

3. The tenderer shall submit the completed tender documents duly signed in a separate envelope marked as "Commercial Bid- Envelope No. 3".

### Envelope No. 3 (Commercial Bid):

- **Commercial Bid.**

Tender Bids received in any form other than mentioned above will be disqualified.

Sealed tenders in the prescribed tender form, with the EMD, along with the Mandatory Information etc. and commercial bid (Envelope 1,2 and 3), should be addressed to DGM, ECGC, Northern Regional

Office , 6th floor, Mohan Dev Building, Tolstoy Marg, Connaught Place, New Delhi – 110001.and superscribed "Tender for **Interior Furnishing & allied work at New Branch Office located in K.L.J Tower,305-306,Third Floor, Neta ji Subash Place, Pitampura New Delhi.**

**Eligibility Criteria:-**

I] Average financial turnover during the last 3 years, ending 31st March of the previous financial year, should be at least 50% of the estimated cost. Tenderer to submit the copies of balance sheet.

II] Experience of having successfully completed similar works during last 3 years ending last day of month previous to the one in which applications are invited should be either of the following:-

A] Two similar completed works costing not less than the amount equal to 50% of the estimated cost.

Or

B] One similar completed work costing not less than the amount equal to 80% of the estimated cost.

III] Similar work means interior furnishing / renovation works of same nature /magnitude carried out for public sectors financial institutions, public sector banks, LIC, GIC, involving interior furnishing, electrification, Air conditioning , office automation.

In addition to above, the criteria regarding satisfactory performance of works, personnel establishment, detail of infrastructure , equipment etc. may be incorporated in the Technical bid.

**Tenders should be submitted to the office not later than 1500 Hrs. on 28-12-2015**

**Technical Bids** will be opened at **1700Hrs on 28-12-2015**

**Price Bids** : Eligible Tenderers shall be informed separately

Defect Liability and free maintenance period shall be twelve months from the date of virtual completion of the works.

Validity of offer shall be 90 days from the date of opening of the tender. The ECGC does not bind itself to accept the lowest or any tender and reserves to itself the right to accept or reject any or all tenders, either in whole or in part, without assigning any reason for doing so.

**TENDER FORM**

To,

**Regional Manager,  
ECGC LTD,  
Northern Regional Office,  
6th floor, Mohan Dev Building,  
13 Tolstoy Marg, Connaught Place,  
New Delhi – 110001**

Dear Sirs,

Ref: **Interior Furnishing & allied work for Branch Office located in K.L.J Tower, 305-306,Third Floor, Neta ji Subash Place, Pitampura New Delhi.**

Having examined the plans, specifications and schedule of quantities prepared by your **Architect, M/s bdsharma CONSULTING pvt. ltd.**, and satisfying ourselves as to the location of the site and working conditions, I/we hereby offer to execute the above works at the respective rates which I/we have quoted for the items in the Schedule of Quantities.

I/We herewith deposit **Rs.42,000 ( forty two Thousand only)** by Demand Draft or Banker's Cheque drawn in **favour of ECGC Ltd** as Earnest Money Deposit for the execution of the works at my/our tendered rates together with any variations should the work be awarded to me / us.

In the event of this tender being accepted, I/we agree to enter into and execute the necessary contract required by you. I/We do hereby bind myself/ourselves to forfeit the aforesaid deposit of **Rs.42,000 ( Rupees forty two Thousand only)** in the event of our refusal or delay in signing the Contract Agreement. I/we further agree to execute and complete the work within the time frame stipulated in the tender documents. I/we agree not to employ Sub-Contractors without the prior approval of the ECGC.

I/we agree to pay Sales Tax, Works Contract Tax, Excise Tax, Octroi, VAT, Duties, all Royalties and all other applicable taxes prevailing and be levied from time to time on such items for which the same are leviable and the rates quoted by me/us are inclusive of the same.

I/we understand that you are not bound to accept the lowest tender or bound to assign any reasons for rejecting our tender. I/we further understand that ECGC may award Contracts for Interior to more than one Contractors and that I/we shall make no claims whatsoever if ECGC accept only a part of my/our tender. We unconditionally agree ECGC's preconditions a stipulated in the tender documents.

I/We agree that in case of my/our failure to execute work in accordance with the specifications and instructions received from the Owner or the Architect/Consultants appointed by the ECGC, during the course of the work, ECGC reserves the right to terminate my contract and forfeit the Earnest money deposit paid by me in additions to recovery of all the dues to the ECGC from the payment receivable by me. Further I may also be barred from tendering in future for the ECGC and its subsidiaries.

I/we enclose demand draft/banker's Cheque for **Rs.42,000 towards Earnest Money** deposit (non-refundable) in envelope No. 1.

I/we agree to keep our tender open for 30 days from the date of opening of envelope No. 2 i.e. (Technical bid). **Any Commercial disclosure in the Envelope no. 1 and/or 2 will disqualify me/us without any further scrutiny.**

I/we enclose herewith the completed tender documents duly signed in duplicate in envelope No. 3. (Commercial Bid).

Yours truly,

[To be signed by the Authorized Representative of Tenderer holding Power of Attorney ]

Place:  
Date

### **INSTRUCTIONS TO TENDERERS:**

#### **1.0 Location:**

1.1 The site is located at **located in K.L.J Tower,305-306,Third Floor, Netaji Subash Place, Pitampura New Delhi.**

1.2 Tenderers must get acquainted with the proposed work and study drawings, designs, specifications, conditions of contract and other conditions carefully before tendering. The Tenderer shall seek clarifications on any item, if required, prior to submitting his tender. No request of any change in rates or conditions for want of information on any particular point shall be entertained after receipt of the tenders.

1.3 The Tenderer is advised to inspect the site to ascertain the nature of site, access thereto, location, facilities for procurement of materials , labour rates and execution of the work. The Tenderer shall be deemed to have full knowledge of the site and drawings whether or not he actually inspects them.

#### **2.0 Submission of Tender:**

2.1.1 Tender must be submitted in original to the Regional Manager, ECGC Ltd., Northern Regional Office , 6th floor, Mohan Dev Building, 13, Tolstoy Marg, Connaught Place, New Delhi – 110001 and as per details given hereunder. The rates shall be filled in the Schedule given in, of the tender document.

In case of any queries, the Tenderer may contact concern Architects.

2.2 The tender shall be submitted in two parts in separately sealed envelopes: The envelope containing the tender offer shall be duly super scribed with the above title.

2.4 The Tenderer is requested to quote strictly as per the terms and conditions and specifications given in the tender document and not to stipulate any deviations. However, deviations, if unavoidable, should be indicated separately indicating the specific page number and clause number against which the deviations are made. Wherever specifications of certain works are not available they shall be deemed to be done as per relevant I.S code.

2.5 Addenda to this tender document, if issued, must be signed and submitted along with the tender document.

2.6 All pages to be initialed:

All signatures in tender documents shall be dated and stamped. All pages of tender documents shall be initialed at the lower right hand corner or signed wherever required in the tender papers by the Tenderer or by a person holding power of attorney authorizing him to sign on behalf of the Tenderer before submission of tender.

2.7 Rates to be in figures and words:

The Tenderer should quote in English both in figures as well as in words the rates and amounts tendered by him in the Schedule of Rates for each item and in such a way that interpolation is not possible. The amount for each item should be worked out and entered and requisite totals given of all items both in figures and in words. The tendered amount for the work shall be entered in the tender and duly signed by the Tenderer.

2.8 Corrections and Erasures

No corrections and alterations in the entries of tender papers shall be permitted. If any they shall be signed and dated in full by the Tenderer. Corrections with white fluid and overwriting are not permitted.

2.9 The tender shall contain the names, postal address of the residence and place of business of authorized person signing the tender and shall be signed in /his usual signature. Partnership firms shall furnish the full names of all Partners in the tender. It should be signed in the partnership name by all the partners or by duly authorized representative followed by the name and designation of the person signing. Tender by a Corporation shall be signed by an authorized representative, and a power of Attorney on their behalf shall accompany the tender. A copy of the partnership deed of the firm with names of all partners shall be furnished.

2.10 When a Tenderer signs a tender in a language other than English, the total amount tendered should, in addition, be written in the same language. The signatures should be attested by at least one witness.

2.11 Witness:

Witnesses and sureties shall be persons of status and propriety and their names, occupation and address shall be stated below their signatures.

### **3.0 Information required along with tender:**

The following details are required to be submitted along with tender:

- a) List of Sub contractors to be employed.
- b) List of equipment proposed to be deployed for work.
- c) Site Organization chart with bio-data of Resident Engineer and key personnel proposed to be deployed at site.
- d) Income Tax Clearance and Sales Tax clearance certificates.
- e) Power of Attorney in the name of persons who has signed the tender document.
- f) Programme of work.
- g) Each Tenderer shall submit with his tender a list of large works of like nature he has executed giving details as to their magnitude and cost, the proportion of work done by the contractor in it and the time within which the works were completed. The Tenderer shall also submit along with his tender a list mentioning the names of manufacturers of specialized items.

4.0 Any printing or typographical errors/omission in tender document shall be referred to the Architect/Interior Designers appointed by the ECGC and their interpretation regarding correction shall be final and binding on Contractor.

### **5.0 Transfer of Tender Documents:**

Transfer of tender documents purchased by one intending Tenderer to another is not permitted.

### **6.0 Earnest money:**

6.1 The Tenderer shall pay the amount of Earnest Money as mentioned in the Notice Inviting Tender, by Bank Demand Draft/Banker's Cheque payable to ECGC, at New Delhi. No interest on Earnest Money deposited by the Tenderer shall be allowed. The Tenderer should attach the bank draft/banker's Cheque along with the tender failing which the tender will not be considered.

6.2 The Earnest Money of the unsuccessful Tenderers will be refunded within a reasonable period of time without any interest.

6.3 The Earnest Money deposited by the successful Tenderer shall be retained as part of Security Deposit.

6.4 The Security Deposit shall be forfeited if the Contractor fails to observe any terms and conditions of the Contract.

### **7.0 Validity:**

Tenders submitted by Tenderers shall remain valid for acceptance for a period up to 90 days from the date of opening of tender. The Tenderers shall not be entitled during the period of validity, without the consent in writing of ECGC to revoke or cancel his tender or to vary the tender given or any terms thereof.

### **8.0 Addenda:**

8.1 Addenda to the tender document may be issued if required to clarify documents or to reflect modifications to the design or contract terms.



8.2 Each addendum issued by the Architect/Interior Designer will be distributed to each person or organization to whom a set of tender documents has been issued. Each recipient will submit the same along with his tender. All addenda issued by the Architect/Interior Designer shall become part of Tender Documents.

**9.0 Right to accept or reject tender:**

9.1 The acceptance of a tender will rest with the ECGC who do not bind themselves to accept lowest tender and reserve to themselves the authority to reject any or all the tenders received without assigning any reasons. They also reserve the right of accepting the whole or any part of the tender and the Tenderers shall be bound to perform the same at the rates quoted. All tenders in which any of the prescribed conditions are not fulfilled or are incomplete in any respect or there is any correction not duly signed and dated by the Tenderer are liable to be rejected. For this purpose Tenderer shall quote rates for various items which will be self sufficient to meet their whole costs for executing any / every item. No demand for variations in rates for items executed shall be entertained on the plea of the ECGC deciding to delete, alter or reduce the quantities specified in respect of the any item.

9.2 The work may be awarded to one or more agencies duly splitting the work at the entire discretion of the ECGC and the Architect/Interior Designer. The quoted rates shall hold good for such an eventuality.

**10.0 Rates:**

10.1 The ECGC is not concerned with any rise or fall in the prices of materials and labour. The rates quoted shall include all costs, allowances, taxes including sales tax on works contract or any other charges including any enhanced labour rates etc. which may become effective for any reason including those due to acts of Government/ Statutory Bodies enacted from time to time by the State and or the Central Government. Under no circumstances, shall the ECGC be held responsible for compensation or loss to the contractor due to any increase in the cost of labour or materials etc.

10.2.1 The rate quoted in the tender shall also include electric and water consumption charges for construction and erection. If power and water are available at the site, the Contractor shall have to make his own arrangements to obtain the connections from the available sources at his own expense and maintain an efficient service of electric light and power and water and shall pay for the services consumed and maintain the installations at his own cost. If no power and water are available at the site, the Contractor shall have to make his own arrangements to obtain power and water connections and maintain at his own expense an efficient service of electric light and power and shall pay for the electricity consumed.

10.3 The rate quoted in the tender by the contractor should include cost of 3 sets of 10" x 12" photographs done by a reputed professional photographer, of the completed work.

10.4 Contractor to include cost of pest control treatment of the entire site, including white ants, roaches, rodents for one year from date of virtual completion of the contract.

10.5 Contractor to coordinate and assist the Architect/Interior Designer in obtaining all statutory approvals including MMC, CFO and any other State and Central rules in force. Any expenses incurred in obtaining such approvals are deemed included in the rates quoted by the Contractors.

11 The entire interior work shall be guaranteed to be free from manufacturing defects, defective workmanship or materials and any defects that may appear within 12 months from the date of issue of completion certificate which in the opinion of the ECGC/Consultants have arisen from bad manufacturing, workmanship or materials, shall upon intimation be made good by the Contractor at his own cost within the time specified. During the said period of 12 months the Contractor shall without any extra cost, carry out all routine and special maintenance of the Interior and attend to difficulties and defects that may arise. The Tenderer / Contractors shall associate with him during the execution and free service period, the operation and maintenance staff of the ECGC.

12 Payments for the work to be executed under this contract shall be made as per the tender document, and no variation in the mode of payment will be acceptable.

13 The Tenderer shall guarantee that the work shall confirm to the detailed specifications.

**14 Signing of the contract:**

- a. The successful Tenderer shall be required to execute an agreement in the proforma attached with this tender document within 30 days from the date of receipt of the notice of acceptance of tender. In the event of failure on the part of the successful Tenderer to sign the agreement within

the above-stipulated period. The ECGC reserves the right to forfeit the earnest money/ security deposit and cancel the contract.

- b. Until the Agreement is formally signed, the Work Order / Letter of Acceptance of Tender issued to the successful Tenderer and accepted by him shall be operative and binding on the ECGC and the Contractor.
- 15. On acceptance of the tender , the name of the accredited representatives of the Tenderer who would be responsible for taking instructions from the ECGC shall be mentioned by the Tenderer.
- 16. If so decided, the ECGC reserves the right to appoint PMC (Project Management Consultant) or any other agency to get the quality of works checked, measurements recorded, including certification of bills etc.
- 17 The ECGC reserves the right to reproduce partly or fully the items executed on site anywhere in the country premises and no copyright claims shall be made by any contractor of any description from the ECGC.
- 18 The ECGC has the right to delete items, reduce or increase the scope of work without the contractor claiming any compensation for the reduction in the scope of work.
- 19. Notices to local bodies:

The contractor shall comply with and give all notices required under any law , rule, regulations or bye laws of parliament , state legislature or local authority relating to works . the contractor shall before commencing the execution of work issue a certificate to the ECGC / architect / consultant that he has obtained all the permission registrations and give all the notices as are required to be obtained or give in under law .

20 . I / We hereby declare that I / We have read and understood the above instructions for the guidance of the Tenderers.

Witness \_\_\_\_\_

\_\_\_\_\_

Signature of Tenderer

Address \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date : \_\_\_\_\_

Date: \_\_\_\_\_

**Mandatory information required for Prequalification of the bidder for  
Interior furnishing and allied work at ECGC Branch.**

- Important:**
1. Please type or handwrite in capital letters.
  2. Attach copies of the supporting documents as evidence.
  3. Please use additional sheets if required.

Name of the Bidder :

email address :

Telephone number office :

Telephone number office :

Fax no. :

Address 1 :

Address 2 :

City :

Pin code :

Year of Establishment :

Status of the Firm : Proprietary/Partnership/Pvt. Ltd./Pub. Ltd.

Names of the directors/Partners/proprietor :

Name and address of the Bankers – 1 :

Name and address of the Bankers – 2 :

Name and address of the Bankers – 3 :

Registration number and date with Registrar of  
Companies/Firms :

PAN Card Number :

Sales Tax Number

Service Tax Registration Number:

Average financial turnover during the last 3 years,  
ending 31st March of the previous financial year,

Request copies of the Balance sheet :

Current solvency certificate from your Banker for not  
less than Rs. Five Lacs :

Attach copy.

Field of activities :

Main Activity :

Detail Description and value of work done (Performa 1)  
:

Detail Description and value of work in hand :

(Performa 2)

List Number of Technical staff working in the  
organization :

List number of other staff working in the organization :

Have you been ever been put on a holiday list or  
banned by any Public Sector Units? If yes please  
provide details in brief:

I/We confirm that to the best of our knowledge this information is authentic and accept that any deliberate concealment  
will amount to disqualification at any stage.

**Seal and Signature of the Bidder/s.**

**Date:**

**Place:**

**Performa -1**

**List of project executed by the organization during last 3 years.**  
 (Each work not less than 50% of estimated cost)

S.N o.	Name of work /project with address	Name and full postal address of Owner	Contract amount	Stipulated time of completion	Actual time of completion	Any other information. Actual amount of the project, if increased	Enclosed clients certificate for satisfactory completion

**Note :**

1. Information has to be filled up specifically in this format .Please do not write any remark. Use additional Separate sheet if required.
2. For certificates, the issuing Authority shall not be less than an executive in charge.

**Proforma -2**

**List of important project in hand.**  
 (Each work not less than 50% of estimated cost)

S.N o.	Name of work /project with address	Name and full postal address of Owner	Contract amount	Stipulated time of completion	Present status of the project.	Any other information.

**Note :**

- 1.Information has to be filled up specifically in this format .Please do not write any remark.

## DRAFT AGREEMENT

This Agreement made at \_\_\_\_\_ day of \_\_\_\_\_ between The ECGE LTD (hereinafter 'The Employer') of the one part and

M/s \_\_\_\_\_

(whose registered office is situated at,

\_\_\_\_\_ hereinafter called 'The Contractor' of the other part).

Whereas the Employer is desirous of carrying out interior furnishing works on premises Branch Office located in **K.L.J Tower,305-306,Third Floor, Neta ji Subash Place, Pitampura New Delhi.** and has been provided drawings, specifications and schedule of quantities describing works prepared by their Architect/Interior designers M/S bdsharma CONSULTING pvt. ltd., C-1/8, S.D.A. , New Delhi 110016, Ph. No. 26563781, 26522528.

And whereas the said drawing are issued from time to time the notice inviting tender. General instructions to contractors, Agreement along with general conditions, the specifications and schedule of quantities have been signed by or on behalf of the parties hereto and whereas the contractor has agreed to execute the work shown in the said drawing and/or described in the specifications and included in the said schedule of quantities at the rates hereinafter set forth and on the terms and conditions and general conditions (both hereinafter referred to as the said conditions here to annexed.

And whereas the contractor has paid advance **Rs. 42,000/-** as the Earnest Money. Total retention money shall be 10% of the total work done and is termed until the expire of the defects liability period for the due observance and performance of the contract.

NOW IT IS AGREED AS FOLLOWS :

1. In consideration of the said sum to be paid at the time and shall upon and subject to the said conditions, execute and complete the work shown in the said drawings and described in the said specifications.
2. The Employer shall pay the contractor the said or such sums as shall become payable hereunder at the time and in the manner specified in the said conditions.
3. The terms 'Architect/Interior Designer' in the said conditions shall mean M/S bdsharma CONSULTING pvt. ltd. C-1/8, Safdarjung Development Area, New Delhi 110016.
4. Tender documents containing Special conditions of rates entered therein, shall be read and studied as forming part of this agreement.
5. The Employer through the Architect, reserve to himself the right of altering the drawings and nature of the work, of adding to or omitting any items of work or having portions of the same carried out without prejudices to this contract.
6. Time shall be considered as the essence of this agreement and the contractor hereby agrees to commence the work soon after the site is handed over to him as provided for in the said conditions and complete the entire work within **6 weeks** from the date of commencement of work
7. This Agreement and Contract shall be deemed to have been made in Delhi and any questions or disputes arising out of or is deemed to have arisen, in Delhi and only the Court in Delhi shall have jurisdiction to determine the same.

As witness our hands this \_\_\_\_\_ day of \_\_\_\_\_ is signed by the said in the presence of:

Signed by the said in the presence of:

WITNESS –1:                      Name                                      OWNER

Signature

Address

Signature

WITNESS –1:                      Name                                      Contractor

Signature

Address

Signature

**APPENDIX SHOWING IMPORTANT SCHEDULE**

S.NO.	DESCRIPTION	REMARK
1.	EARNEST MONEY DEPOSIT	RS. 42,000/- IN THE FORM OF DEMAND DRAFT DRAWN ON ECGE LTD.
2.	DATE OF COMMENCEMENT OF WORK	5 days AFTER THE ACCEPTANCE OF LETTER OF INTENT/ORDER OR THE DAY ON WHICH THE CONTRACTOR IS GIVEN THE SITE WHICH EVER IS THE LATTER.
3.	PERIOD OF COMPLETION	5 WEEKS FROM THE DATE OF COMMENCEMENT OF WORK.
4.	LIQUIDATED DAMAGES	1 % of the contract amount per week subject to max. of 10 % of the contract sum. FOR ANY DELAY BEYOND STIPULATED TIME PERIOD 6 WEEKS .
5.	PERIOD AND VALUE OF RUNNING ON ACCOUNT BILL	THE MINIMUM AMOUNT OF RUNNING BILL SHALL BE RS. 5 LACS OR SEVEN DAYS GAP.
6.	INITIAL SECURITY DEPOSIT	2% OF THE ACCEPTED VALUE OF THE TENDER INCLUDING OF THE EARNEST MONEY
7.	REFUND OF RETENTION MONEY	50% OF RETENTION MONEY TO BE RELEASED ALONG CERTIFICATE OF FINAL COMPLETION AND 50% AFTER COMPLETION OF DEFECT LIABILITY PERIOD.
8.	TOTAL SECURITY DEPOSIT	10 % OF THE CONTRACT VALUE.
9.	INCOME TAX DEDUCTION	AT PREVAILING RATE FROM EACH BILL
10.	DEFECTS LIABILITY PERIOD	12 MONTHS AFTER COMPLETION OF WORKS.
11.	PERIOD OF FINAL MEASUREMENT	4 WEEKS AFTER VIRTUAL COMPLETION OF WORKS
12.	RETENTION MONEY	10%



## **GENERAL CONDITIONS OF CONTRACT.**

Except where provided for in the description of the individual items in the schedule of quantities and in the specifications and conditions laid down hereinafter and in the Drawings, the work shall be carried out as per standard specifications and under the direction of Employer/ Architects.

### **1. INTERPRETATION:**

In constructing these conditions, specifications, the schedule of quantities, tender and agreement, the following words shall have the meaning herein assigned to them except when the subject or context otherwise requires.

Employer: The term Employer shall denote ECGE OF INDIA LTD and any of its employee's representative authorized on their behalf.

Architects: The terms Architects shall mean **M/S bdsharma CONSULTING pvt. ltd., C-1/8, Basement , Safdarjung Development Area , New Delhi 110016**. Or in the event of his/their ceasing to be the Architects for the purpose of this contract such other person/s as the Employer shall nominate for the purpose.

Contractor: The term Contractor shall mean ----- (Name and address of the Contractor), and his/their heirs, legal representatives, assigns and successors.

Site: The site shall mean the Site where the works are to be executed .

Drawings: The work is to be carried out in accordance with drawings, specifications, the schedule of quantities and any further drawings which may be supplied or any other instruction, which may be given by the Employer during the execution of the work.

All drawings relating to work given to the contractor together with a copy of schedule of quantities are to be kept at site and the Employer/Architects shall be given access to such drawings or schedule of quantities whenever necessary.

In case any detailed Drawings are necessary, contractor shall prepare such detailed drawings and/or dimensional sketches therefore and have it confirmed by the Employer/Architects prior to taking up such work.

The contractor shall ask in writing for clarifications on matters occurring anywhere in drawings, specifications and schedule of quantities or to additional instructions at least 10 days ahead from the time when it required for implementation so that the Employer may be able to give decision thereon.

"The Works" shall mean the work or works to be executed or done under this contract.

"Act of Insolvency" shall mean any act as such as defined by the Presidency Towns Insolvency Act or in Providential insolvency act or any amending statutes.

"The Schedule of Quantities" shall mean the schedule of quantities as specified and forming part of this contract.

"Priced Schedule of Quantities" shall mean the schedule of quantities duly priced with the accepted quoted rates of the contractor.

### **2. SCOPE:**

The work consists of Interior Furnishing Works at ECGE OF INDIA LTD, New Branch Office located in K.L.J. TOWER, 305-306, Third Floor K.L.J. Tower Neta Ji Subash Place Pitampura Delhi) ECGE OF INDIA LTD, (Delhi) in accordance with the drawings and schedule of quantities. It includes furnishing all materials, labour, tools and equipment and management necessary for and incidental to the construction and completion of the work. All work during its progress and upon completion shall conform to the lines, elevations and grades as show on the drawings furnished by the Employer/Architects. Should any detail essential for efficient completion of the work be omitted from the drawings and specifications, it shall be the responsibility of the contractor to inform the Employer/Architects and to furnish and install such detail with Employer's/Architect's concurrence, so that upon completion of the proposed work, the same will be acceptable and ready for use.

Employer/Architects may in their absolute discretion issue further drawings and/or written instructions, details, directions and explanations, which are, hereafter collectively referred to as "The Employer's/Architect Instructions" in regard to:

The verification or modification of the design quality or quantity of works or the addition or omission or substitution of any work.

Any discrepancy in the drawings or between the schedule of quantities and/or drawings and/or specifications.

The removal from the site of any defective material brought thereon by the contractor and the substitution of any other material thereof.

The demolition removal and/or re-execution of any work executed by the contractor/s.

The dismissal from the work of any persons employed thereupon the opening up for inspection of any work covered up.

The rectification and making good of any defects under clauses hereinafter mentioned and those arising during the maintenance period (retention period).

The contractor shall forthwith comply with and duly execute any work comprised in such Employer's/Architects instructions, provided always that verbal instructions, directions and explanations given to the contractor's or he representative upon the works by the Employer / Architects shall if involving a variation be confirmed in writing to the contractor's within seven days. No works for which rates are not specifically mentioned in the priced schedule of quantities shall be taken up without written permission of the Employer's/Architects. Rates of items not mentioned in the priced schedule of quantities shall be fixed by the Employer in consultation with the Architects as provided in Clause variation.

Regarding all factory made products for which ISI marked products are available, only products bearing ISI marking shall be used in the work.

**It would be the sole responsibility of the contractor to ensure proper disposal of debris/ waste materials from the renovation site without causing any inconvenience to any other person/entity by obtaining necessary permits /clearances from the building authorities of the deemed premises , statutory bodies, wherever applicable, in order to ensure unhindered completion of the work within time. .**

### **3. TENDERS.**

The entire set of tender paper issued to the tendered should be submitted fully priced and also signed on the last page together with initials on every page, initial/signature will indicate the acceptance of the tender papers by the tenderer.

The schedule of quantities shall be filled in as follows.

Amount column to be filled in for each item and the amount for each sub head as detailed in the "Schedule of Quantities".

All corrections are to be initialed.

The "Rate Column" for alternative items shall be filled up.

The "Amount" column for alternative items of which the quantities are not mentioned shall not be filled up.

In case of any errors/omissions in the quoted rates, the rates given the tender marked "Original" shall be taken as correct rates.

No modifications, writing or corrections can be made in the tender papers by tenderer, but may at this option offer his comments or modifications in a separate sheet of paper attached to the original tender papers.

The Employer reserves the right to reject the lowest or any tender and also to discharge any or all of the tenders for each section or to split up and distribute any item of work to any specialist firm or firms, without assigning any reason.

The tenderer should note that the tender is strictly on the item rate basis and their attention is drawn to the fact that the rates for each and every item should be correct, workable and self-supporting. If called upon by the Employer/Architects detailed analysis of any or all the rates shall be submitted. The Employer/Architects shall not be bound to recognize the contractor's analysis.

The works will be paid for as "measured work" on the actual work done and not as lump-sum contract.

All items of work described in the schedule of quantities are to be deemed and paid as complete works in all respects and details including preparatory and finishing works involved directly related to and reasonably detectable from the drawings, specifications and schedule of quantities and no further extra charges will be allowed in this connection. In the

case of lump-sum charges in the tender in respect of any items of work will be made for the actual work done on the basis of lump-sum charges as will be assessed to be payable by the Employer.

The Employer has power to add to omit from any work as shown in the drawings or described in specifications or included in schedule of quantities and intimate the same in writing but no addition, omission or variation shall be made by the contractor without authorization from the Employer. No variation shall vitiate the contract.

#### **4. AGREEMENT.**

The successful contractor may be required to sign agreement as may be drawn up to suit local Conditions and shall pay for all stamps and legal expenses, incidental thereto.

#### **5. GOVERNMENT AND LOCAL RULES:**

The contractor shall confirm to the provisions of all local Bye-Laws and Acts relating to work and to the Regulations etc. of the Govt. and the local authorities and of any company with whose system the structure is proposed to be connected. The contractor shall give all notices required by said Act, Rules, Regulations and Bye-Laws etc. and pay all fees payable to such authority/authorities for execution of work involved. The cost of any shall be deemed to have been included in his quoted rates, taking in to account all liabilities for licenses, fees for footpath encroachment and restorations etc. and shall identify the Employer against such liabilities and shall defend all actions arising from such claims or liabilities.

#### **6. QUANTITY OF WORK TO BE EXECUTED.**

The quantities shown in the schedule of quantities are intended to cover the entire new structure indicated in the drawings but the Employer reserves the right to execute only a part or the whole or any excess thereof without assigning any reason thereof.

#### **7. EARNEST MONEY AND SECURITY DEPOSIT.**

The tenderer will have to deposit an amount of Rs.20,000/- in the form of Bank Draft drawn in favor of ECGE OF INDIA LTD. at the time of submission of tender as an Earnest Money. The Employer is not liable to pay any interest on the Earnest Money. The Earnest Money of the unsuccessful tenderers will be refunded without any interest soon after the decision to award the work is taken or after the expiry of the validity period of the tender.

The successful tenderer to whom the contract is awarded will have to deposit as initial security deposit a further sum to make up 2% of the of the accepted tender including the Earnest Money. The initial Security Deposit is to be deducted from first running bill.

Apart from the initial security deposit made as above, retention money shall be deducted from progressive running bills @ 8% of the gross value of each running bill until the total security deposit i.e. the initial Security Deposit plus the retention money equals to 10% of the estimate cost of work. 50 % of Retention amount shall be refunded after virtual completion of project and balance amount will be refunded to the contractor after the end of defect liability period, provided he has satisfactorily carried out all the work and attended to an defects in accordance with the conditions of the contract. No interest is allowed on retention money.

#### **8. TIME OF COMPLETION EXTENSION OF TIME PROGRESS CHART.**

a. Time of completion: The entire work is to be completed in all respects within the stipulated period. The work shall deemed to be commenced within **7 (seven)** days from the date of acceptance or date of handing over of site, whichever is earlier. Time is the essence of the contract and shall be strictly observed by the contractor.

The work shall not be considered as complete until the Employer/Architects have certified in writing that this has been completed and the Defects Liability period shall commence from the date of such certificate.

b. Extension of Time: If in the opinion of the Employer/Architects the works be delayed (a) By reason of any exceptionally inclement weather, or (b) By reason of instructions from the Employer in consequence of proceedings taken or threatened by or dispute with adjoining or neighboring owners or (c) by the works or delay of other contractors or tradesmen engaged or nominated by the Employer and not referred to in the specification or (d) by reason of authorized extra and additions or (e) by reason of any combination of workmen or strikes or lock-out affecting any of the building trades or from other causes

which the Employer may consider are beyond the control of the contractor, the Employer at the completion of the time allowed for the contract, shall make fair reasonable extension in respect therefore. In the event of the Employer failing to give possession of the site upon the day specified above the time of completion shall be extended suitably.

In case of such strikes or lock-outs as am referred to above, the contractor shall immediately give the Employer, written notice thereof. Nevertheless the contractor shall use his best endeavors all that to prevent delay and shall do all that may be reasonably required to the satisfaction of the Employer, to proceed with the works, and on his doing so that it will be ground of consideration by the Employer for an extension of time as above provided. The decision of the Employer as to the period to be allowed for an extension of time for completion hereunder (which decision shall be final and binding on the contractor) shall be promulgated at the conclusion of such strike or lock-out and the Employer shall then in the event of an extension being granted, determine and declare the final completion date. The provision given herein with respect to payment of liquidated damages shall, in such case be made and constructed as if the extended date fixed by the Employer were substituted for and the damage shall be deducted accordingly.

c. Progress of work: During the period of construction the contractor shall maintain proportionate progress on the basis of a program Chart submitted by the contractor immediately before commencement of work and agreed to by the Employer/Architects. Contractor should also include planning for procurement of scarce material well in advance and reflect the same in the program Chart so that there is no delay in completion of the project.

#### **9. LIQUIDATED DAMAGES.**

Should the work be not completed to the satisfaction of the Employer/Architects within the stipulated period, the contractor shall be bound to pay to the Employer a sum calculated as given below by way of liquidated damages and not as penalty during which the work remains un commenced or unfinished after the expiry of the completion date. 0.5% of the estimated amount shown in the tender per week subject to a ceiling of 10 % of the accepted contracted sum.

#### **10. TOOLS, STORAGE OF MATERIALS, PROTECTIVE WORKS AND SITE OFFICE REQUIREMENTS.**

The contractor shall provide, fix up and maintain in an approved position proper office accommodation for the contractor's representative and staff which offices shall be open at all reasonable hours to receive instruction notices or communications and clear away on completion of the works and make good all work disturbed.

All drawings maintained on the site are to be carefully mounted on boards of appropriate size and covered with a coat of approved varnish. The contractor shall provide at his own cost an artificial light required for the work and to enable other contractors and sub contractors to complete the work within the specified time.

The contractor shall arrange for temporary latrines for the use of workers and field staff and keep the same in a clean and sanitary condition to the satisfaction of the Public Health Authorities and shall cause such latrines and soil to be cleared away whenever necessary and shall make good all the works disturbed by these conveniences.

Every precaution shall be taken by the contractor to prevent the breeding of mosquitoes on the works during the construction, and an receptacles, cisterns, water tank etc. used for the storage of water must be suitably protected against breeding of mosquitoes. The contractor shall identify the Employer against any breach of rules in respect of anti-malarial measures.

The contractor shall not fix or place any placards or advertisement of any description or permit the same to be fixed or placed in or upon any boarding, gantry, budding structure other than those approved by the Employer.

Protective Measures: The contractor from the time of being placed in possession of the site must make suitable arrangements for watching lighting and protecting the work, the site and surrounding property by day, by night, on Sunday and other holidays.

Contractor shall indemnify the Employer against any possible damage to the building, roads, or members of the public in course of execution of the work.

The contractor shall provide necessary temporary enclosures, gates, entrances, etc. for the protection of the work and materials and for altering and adopting the same as may be required and removing on completion of the works and making good an works disturbed.

Storage of Materials: The contractor shall provide and maintain proper sheds for the proper storage and adequate protection of the materials etc. and other works that may be executed on the site including the tools and materials of sub-contractors and remove same on completion.

Cement Godown shall be constructed for storing about six weeks requirement of cement and stored as per norms with a setback of 10 bags each and a feet opening an around with 2 feet passage of each stack. Structure shall be waterproof from all the sides and top. Cement should be stored one feet above the ground level and have hardened raised floor.

So also reinforcement bars are to be stored above the ground level to prevent the same from getting rusted.

Tools: Theodolite levels, prismatic compass, chain, steel and metallic tapes and an other surveying instruments found necessary on the works shall be provided by the contractor for the due performance of this contract as instructed by the Site Engineer.

All measuring tapes shall be of steel and suitable scaffolding and ladders that may be required for safely taking measurement and shall be supplied by the contractor.

The masons and supervisors on the works shall carry with them always a one meter or two meter steel tape, a measuring tape of 30 meters, a spirit level a plumb bob and a square and shall check the work to see that the work is being dope according to the drawing and specifications.

The Site Engineer will use any of the measuring instruments or tools belonging to the contractors as he chooses for checking the works executed or being executed on the contract.

The contractor should cover in His rates for making provisions for all reasonable facilities for the use of His scaffolding, tools and plant etc. by subcontractor for their works.

#### **11. NOTICE AND PATENTS OF APPROPRIATE AUTHORITY AND OWNERS.**

The contractor shall confirm to the provisions of any Acts of the legislature relating to the work and to the regulations and Bye-Laws of any authorities and/or any water, lighting and other companies and/or authorities with whose systems the structures were proposed to have connection and shall before making any variations from the Employer/Architects written notices specifying the variations proposed to be made and the reasons for making them and apply for instruction shall give a decision within a reasonable time.

The contractor's shall arrange to give a notices required for by the said Acts. Regulations or Bye-Laws to be given to any authority and to pay to such authority or to any public officer a fees that may be properly chargeable in respect of the work and lodge the receipts with the Employer.

The contractor shall indemnify the Employer against an claims in respect of patent rights, royalties, damages to buildings, roads or members of public in course of execution of work and shall defend an actions arising from such claims and shall keep the Employer saved harmless and indemnified in an respects from such actions, costs and expenses.

#### **12. CLEARING SITE AND SETTING OUT WORKS.**

The contractor shall set out the works and shall be responsible for the true and perfect setting out of the work and for the correctness of the positions, levels, dimensions and alignment of all parts thereof. If at any time any error shall appear during the progress of any part of the work, the contractor shall at his own expenses rectify such error. If called upon to the satisfaction of the Employer. The contractor shall further set out the works to the alternative positions at the site until one is finally approved and the rates quoted in his tender should include for this and no extra on this account will be entertained.

#### **13. ACCESS**

Any authorized representative of the Employer shall at all reasonable times have free access to the works and/or to the workshops, factories or other places where materials are being prepared or constructed for the work and also to any place when the materials are lying or from when they are being obtained and the contractor shall give every facility to the owner or their representatives necessary for inspection and examination and test of the materials and workmanship. Except the representatives of the Employer no person shall be allowed at any time without the written permission of the Employer.

#### **14. MATERIALS, WORKMANSHIP, SAMPLES, TESTING OF MATERIALS.**

All the works specified and provided for in the specifications or which may be required to be done in order to perform and complete any part thereof shall be executed in the best and most workman like manner with materials of the best and approved quality of the respective kinds in accordance with the particulars contained in and implied by the specifications and as represented by the drawings or according to such other additional particulars and instructions as from time to time be given by the Employer/Architects during the execution of the work and to His entire satisfaction.

If required by the Employer/Architects the contractor shall have to carry out tests on materials and workmanship in approved materials testing laboratories or as prescribed by the Employer/Architects at His own cost to prove that the materials etc. under test confirm to the relevant I.S. standards or as specified in the specifications. The necessary charges for preparation of mould (in case of concrete cube) transporting, testing etc. shall have to be borne by the contractor. No extra payment on this account should in any case be entertained.

All the materials (except where otherwise described) stores and equipment required for the performance of the work under the contract must be provided through normal channel and must be the best of their kind available and the contractor's must be entirely responsible for the proper and efficient carrying out of the work. The work must be done in the best workman like manner. Employer/Architects when so directed by the Engineer/Architects and written approval from Employer/Architects must be obtained prior to placement of order.

During the inclement whether the contractor shall suspend concrete and plastering for such time as the Employer/Architects may direct and shall protect from injury all work when in course of execution. Any damage (during construction) to any part of the work for any reasons due to rain, storm or neglect of contractor shall be rectified by the contractor in an approved manner at no extra cost.

Should the work be suspended by reason of rain, strike, lock-outs or any other cause, the contractor shall take all precautions necessary for the protection of work and at his own expenses shall make good any damage arising from any of these causes.

The contractor shall cover up and protect from damage from any cause and new work and supply all temporary/doors, protection to windows and any other requisite protection for the execution of the work whether by himself or special tradesman or sub-contractor and any damage caused must be made good by the contractor at his own expenses.

#### **15. REMOVAL OF IMPROPER WORK**

The Employer shall during the progress of the work have power to order in writing from time to time the removal from the work within such reasonable time or times as may be specified in the order of any materials which in the opinion of the Employer/Architects are not in accordance with specification or instructions, the substitution or proper re-execution of any work executed with materials or workmanship not in accordance with the drawings and specifications or instructions. In case the contractor refuses to comply with the order the Employer shall have the power to employ and pay other agencies to carry out the work and an expenses consequent thereon or incidental thereto as certified by the Employer/Architects shall be borne by the contractor or may be deducted from any money due to or that may become due to the contractor from his liability in respect of unsound work or bad materials.

#### **16. SITE ENGINEER**

The terms "Site Engineer" shall mean the person appointed and paid by the Employer to superintend the work. The contractor shall afford the Site Engineer every facility and assistance for examining the works and materials and for checking and measuring work and materials. The Site Engineer shall have no power to revoke, alter, enlarge or relax any

requirements of the contractor or to sanction any day work, additions, alterations, deviations or omissions or any extra work whatever except in so far as such authority may be specially conferred by a written order of the Employer.

The Site Engineer shall have power to give notice to the contractor or to his foreman of non approval of any work or materials and such work shall be suspended or the use of such materials shall be discontinued until the decision of the Employer is obtained. The Architects from time to time will examine the work. Engineer from the Premises Department of the Employer and the Site Engineer. But such examination shall not in any way exonerate the contractor from the obligation to remedy any defects, which may be found to exist at any stage of the work or after the same is complete. Subject to the limitations of this clause the contractor shall take instructions only from the Architects/Employer.

#### **17. CONTRACTORS EMPLOYEES.**

The contractor shall employ technically qualified and competent supervisors for the work who shall be available (by turn) throughout the working hours to receive and comply with instructions of the Employer/Architects. The contractor shall engage at least one experienced Engineer as site-in-charge for execution of the work.

No laborer below the age of sixteen years and/or who is not an Indian National shall be employed on the work.

The contractor shall comply with the provisions of all labor legislation .

The contractor shall keep the Employer saved harmless and indemnified against claims if any of the workmen and an costs and expenses as may be incurred by the Employer in connection with any claim that may be made by any workmen. The contractor shall comply at his own cost with the order of requirement of any health officer of the state or any local authority or of the Employer regarding the maintenance of proper environmental sanitation of the area where the contractor's laborers are housed or accommodated for the prevention of small pox, cholera, plague, typhoid, malaria and other contagious diseases. The contractor shall provide, maintain and keep in good sanitary condition adequate sanitary accommodation and provide facilities for pure drinking water at all times for the use of men engaged on the works and shall remove and clear away the same on completion of the works. Adequate precautions shall be taken by the contractor to prevent nuisance of any kind on the works or the lands adjoining the same.

The contractor shall arrange to provide first-aid treatment to the laborers engaged on the works. He shall within 24 hours of the occurrence of any accident at or about the site or in connection with execution of the works, report such accident to the Employer and also to the competent authority where such report is required by law.

#### **18. DISMISSAL OF WORKMEN.**

The contractor shall on the request of the Employer immediately dismiss from works any person employed thereon by him, who may in the opinion of the Employer be unsuitable or incompetent or who may misconduct himself. Such discharges shall not be the basis of any claim for compensation or damages against the Employer or any of their officer or employee.

#### **19. ASSIGNMENT.**

The whole of the works included in the contract shall be executed by the contractor and the contractor shall not directly or indirectly transfer, assign or underlet the contract or any part, share or interest therein nor shall take a new partner, without written consent of the Employer and no subletting shall relieve the contractor from the full and entire responsibility of the contract or from active superintendence of the work during their progress.

#### **20. DAMAGE TO PERSONS AND PROPERTY INSURANCE ETC.**

The contractor shall be responsible for all injury to the work or workmen to persons, animals or things and for all damages to the structural and/or decorative part of property which may arise from the operations or neglect of himself or of any sub-contractor or of any of his or a subcontractor's employees, whether such injury or damage arise from carelessness, accident or any other cause whatsoever in any way connected with the carrying out of this contract. The clause shall be held to include interlay any damage to buildings whether immediately adjacent or otherwise, and any damage to roads, streets, foot paths or way as well as damages caused to the buildings and the works forming the subject of this contract by rain, wind or other inclemency of the weather. The contractor shall indemnify the Employer and hold harmless in respect of all and any

expenses arising from any such injury or damages to persons or property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts of compensation or damage consequent upon such claim.

The contractor shall reinstate all damage of every sort mentioned in this clause, so as to deliver the whole of the contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damages to the property or third parties.

#### **21. INSURANCE**

The contractor shall insure the works and keep them insured until the virtual completion of the contract against loss or damage by fire and/or earthquake, flood. The insurance must be placed with a company approved by the Employer, in the joint names of the Employer and the contractor for such amount and for any further sum being allowed to the contractor as an authorized extra.

The contractor shall deposit the policy and receipt for premiums paid with Employer along with the running bills. In default of the contractor insuring as provided above, the Employer on his behalf may so insure and may deduct the premiums paid from any money due, or which may become due to the contractor. The contractor shall as soon as the claim under the policy is settled or the work reinstated by the Insurance Company should they elect to do so proceed with due diligence with the completion of the works in the same manner as though the fire has not occurred and in all respects under conditions of the contract. The contractor in case of rebinding or reinstatement after fire shall be entitled to extension of time for completion as the Employer may deem fit.

#### **22. ACCOUNTS RECEIPTS & VOUCHERS.**

The contractor shall upon the request of the Employer furnish them with all the invoices, accounts, receipts and other vouchers that they may require in connection with the works under this contract. If the contractor shall use materials less than what he is required under the contract, the value of the difference in the quantity of the materials he was required to use and that he actually used shall be deducted from his dues. The decision of the Employer shall be final and binding on the contractor is required to use for any work under this contract.

#### **23. PAYMENTS.**

All bills shall be prepared by the contractor in the form prescribed by the Employer/Architects. Normally one interim bill shall be prepared subject to minimum value for interim certificate as stated in these documents. The bills in proper forms must be duly accompanied by detailed measurements in support of the quantities of work done and must show deductions for all previous payments, retention money etc.

The Employer/Architect shall issue a certificate after due scrutiny of the contractor's bill stating the amount due to the contractor from the Employer and the contractor shall be entitled to payment thereof within the period of honoring certificates named in these documents.

The amount stated in an interim certificate shall be the total value of work properly executed and 75% of invoiced value of material brought to site for permanent incorporation into the work up to the date of the bill less the amount to be retained by the Employer as retention money vide clause 12 of these conditions and less installments previously paid under these conditions, provided that such certificate shall only include the value of said material and goods as and from such time as they are reasonably, properly and not prematurely brought to or placed adjacent to the work and then only if adequately protected against weather or other casualties.

All the interim payments shall be regarded as payments by way of advance against the final payment only and not as payments for work actually done and completed and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be removed and taken away and reconstructed or re-erected or be considered as an admission of the due



performance of the contract or any part thereof in any respect or the accruing of any claim nor shall it conclude determine or affect in anyway the power of the Employer under these conditions or any of them as to the final settlement and adjustment of the accounts or otherwise or in any other way vary or affect the contract.

The final bill shall be submitted by the contractor within one month of the date fixed for completion of the work or of the date of certificate of completion furnished by the Site Engineer and payment shall be made within one month.

#### **FINAL PAYMENTS**

The final bill shall be accompanied by a certificate of completion from the Employer/Architects. Payments of final bill shall be made after deduction of Retention Money as specified, which sum shall be refunded after the completion of the Defects liability period after receiving the Employer's/Architects certificate that the contractor has rectified an defects to the satisfaction of the Employer/Architects. The acceptance of payments of the final bill by the contractor would indicate that he will have no further claim in respect of the work executed.

#### **24. VARIATION/DEVIATION**

The price of all such additional items/non tendered items will be worked out on the basis of rates quoted for similar items in the contract wherever existing or on engineering rate analysis based on prevalent fair price of labour, material and other components as required. The tender rates shall hold good for any increase or decrease in the tendered quantities up to variation of 25% for variation beyond  $\pm 25\%$ , the rate for the respective item may be received on mutually agreed terms.

#### **25. SUBSTITUTION**

Should the contractor desire to substitute any materials and workmanship, he/they must obtain the approval of the Employer/Architects in writing for any such substitution well in advance. Materials designated in this specification indefinitely by such terms as "Equal" or 'Other approved' etc. specific approval of the Employer/Architects has been obtained in writing.

#### **26. PREPARATION OF BUILDING WORKS FOR OCCUPATION AND USE ON COMPLETION.**

The whole of the work will be thoroughly inspected by the contractor and deficiencies and defects put right, on completion of such inspection the contractor shall inform the Employer that he has completed the works and it is ready for inspection. On completion the contractor shall clean an windows and doors including the cleaning and oiling if necessary of all hardware, inside and outside an noon staircase and every part of the building. He will leave the entire building neat and clean and ready for immediate occupation and to the satisfaction of the owner.

#### **27. DEFECTS AFTER COMPLETION**

The contractor shall make good at his own cost and to the satisfaction of the Employer all defects, shrinkage, settlements or other faults which may appear with in 12 months after completion of the work. In default the Employer may employ and pay other persons to amend and make good such damages, looses and expenses consequent thereon or incidental thereto shall be made good and borne by the contractor and such damages, loss and expenses shall be recoverable from him by the Employer or may be deducted by the Employer in lieu of such amending and making good by the contractor deduct from any money due to the contractor a sum equivalent to the cost of amending such work and in the event of the amount retained being insufficient recover that balance from the contractor from the amount retained under clause no. 12 together with any expenses the Employer may have incurred in connection therewith.

#### **28. CONCEALED WORK**

The contractor shall give due notice to the Employer/Architects whenever any work is to be buried in the earth, concrete or in the bodies of walls or otherwise becoming inaccessible later on in order that the work may be inspected and correct dimensions taken before such burial, in default whereof the same shall at the opinion of the Employer/Architects be either opened up for measurement at the contractor's expenses or no payments may be made for such materials. Should any dispute or differences arise after the execution of any work as to measurements etc. or other matters which can not be conveniently tested or checked, the notes of Employer/Architects shall be accepted as correct and binding on the contractor.

#### **29. ESCALATION**

The rate quoted shall be firm throughout the tenure of the contract (including extension of time, if any, granted) and will not be subject to any fluctuation due to increase in cost of materials, labor, sales tax, octroi, etc. unless specifically provided in these documents.

The price variation clause being adopted by the RBI may be followed, if such a situation arises on a case to case basis.

### **30. SUSPENSION**

If the contractor except on account of any legal restraint upon the Employer preventing the continuance of the work or in the opinion of the Employer shall neglect or fail to proceed with due diligence in the performance of his part of the contract or if he shall more than once make default, the Employer shall have the power to give notice in writing to the contractor requiring the work be proceeded within a reasonable manner and with reasonable dispatch, such notice purport to be a notice under this clause.

After such notice shall have been given the contractor shall not be at liberty to remove from the site of the works or from any ground contiguous thereto any plant or materials to subset from the date of such notice being given until the notice shall have been complied with. If the contractor shall fall for 7(seven) days after such notice has been given to proceed with the works as therein prescribed the Employer may proceed as provided in clause 42 (Termination of Contract by Employer).

### **31. TERMINATION OF CONTRACT BY EMPLOYER.**

If the contractor being a company going into liquidation whether voluntary or compulsory or being a firm shall be dissolved or being an individual shall be adjudicated insolvent or shall make an assignment or a composition for the benefit of the greater part in number of amount of his creditors or shall enter into a Deed or arrangement with his creditors or if the official assignee in insolvency or the receiver of the contractor in insolvency shall repudiate the contract or if a Receiver of the contractor's firm appointed by the court shall be unable within fourteen days after notice to him requiring him to do so, to show to the reasonable satisfaction of the employer that he is able to carry out and fulfill the contract and if so required by the employer to give reasonable security thereof or if the contractor shall suffer any payment under this contract to be attached by or on behalf of and of the creditors of the contractor or shall assign, charge or encumber this contract or any payments due or which may become due to the contractor, there under or shall neglect or fail to observe and perform an or any of the acts matters of things by this contract to be observed and performed by the contractor within three clear days after the notice shall have been given to the contractor in manner hereinafter mentioned requiring the contractor to observe or perform the same or shall use improper materials or workmanship in carrying on the works or shall in the opinion of the employer not exercise such due diligence and make such due progress as would enable the work to be completed within due time agreed upon, and shall fail to proceed to the satisfaction of the employer after three clear days notice requiring the contractor so to do shall have been given to the contractor as hereinafter mentioned, or shall abandon the contract then and in any of the said cases, the owner may not with standing previous waiver determine the contract by a notice in writing to the effect as hereinafter mentioned but without thereby effecting the powers of the employer of the obligations and liabilities of the contractor the whole of which shall continue in force as fully as if the contract had not been so determined and is if the works subsequently executed had been executed by or on behalf of the contractor (without thereby creating any trust in favor of the contractor) further the employer or his agent or servants may enter upon and take possession of the work and all plants, tools, scaffolding, sheds, machinery, steam and other power utensils and materials lying upon premises or the adjoining lands or roads and sell the same as Ms own property or may employ the same by mesa of his own servants and workmen in carrying on and completing the works or by employing any other contractors or other contractors or other persons or person to complete the works, and the contractor shall not in any way interrupt or do any act matter of things to prevent or hinder such other contractors or other persons or person employed from completing and finishing or using the materials and plants for the works when the works shall be completed or as soon thereafter as conveniently may be the employer shall give notice in writing to the contractor to remove Ms surplus materials and plants and should the contractor fail to do so within a period of 14 days after receipt by him the employer may sell the same by Public Auction and shall give credit to the contractor for the amount so realized. Any expenses or losses incurred by the employer in getting the works carried out by other contractors shall be adjusted against the amount payable to the contractor by way of selling his tools

and plants or due on account of the work carried out by the contractor prior to engaging other contractors or against the Security Deposit.

### **32. ARBITRATION**

All disputes or differences of any kind whatsoever which shall at any time arise between the parties hereto touching or concerning the works or the execution or maintenance thereof of this contract or the rights touching or concerning the works or the execution of maintenance thereof of this contract or the construction remaining operation or effect thereof or to the rights or liabilities of the parties or arising out of or in relation thereto whether during or after determination foreclosure or branch of the contract (other than those in respect of which the decision of any person is by the contract expressed to be final and binding) shall after written notice by either party to the contract to the other of them and to the Employer hereinafter mentioned be referred for adjudication to a sole arbitrator to be appointed as hereinafter provided.

For the purpose of appointing the sole arbitrator referred to above, the Employer will send with in thirty days of receipt of the notice to the contractor a panel of three names of persons who shall be presently unconnected with the organization for which the work is executed.

The contractor shall on receipt of the names as aforesaid select any one of the person's name to be appointed as a sole arbitrator and communicate his name to the Employer within thirty days of receipt of the names. The employer shall thereupon without any delay appoint the add person as the Sole arbitrator. If the contractor fails to communicate such selection as provided above with in the period specified, the competent authority shall make the selection and appoint the selected person as the Sole Arbitrator.

If the Employer fails to send to the contractor the panel of three names PI aforesaid within the period specified, the contractor shall send to the Employer a panel of three names of persons who shall be unconnected with either party. The Employer shall on receipt of the named as aforesaid select any one of the persons name and appoint him as the Sole Arbitrator. If the Employer fails to the select the person and appoint him as the Sole Arbitrator within 30 days of receipt of the panel and inform the contractor shall be entitled to appoint one of the persons from the panel as the Sole Arbitrator and communicate his name to the Employer.

If the Arbitrator so appointed is unable or unwilling to act or resigns Ms appointment or vacates Ms office due to any reason whatsoever another Sole Arbitrator shall be appointed as aforesaid.

The work under the contract shall, however, continue during the arbitration proceedings and no payments due or payable to the contractor shall be withheld on account of such proceedings.

The Arbitrator shall be deemed to have entered on the reference on the date he issued notice to both the parties fixing the date of the first hearing.

The Arbitrator may from time to time, with the consent of the parties enlarge the time for making and publishing the award.

The arbitrator shall give a separate award in respect of each dispute of difference referred to him. The Arbitrator shall decide each dispute in accordance with the terms of the contract and give a reasoned award. The venue of arbitration shall be such place as may be fixed by the Arbitrator in his sole discretion.

The fees, if any, of the Arbitrator shall, if required to be paid before the award is made and published be paid half and half by each of the parties. The cost of the reference and of the award including the fees, if any, of the Arbitrator who may direct to and by whom and in what manner, such code or any part thereof shall be paid and may fix or settle and amount of costs to be so paid.

The award of the Arbitrator shall be final and binding on both the parties.

Subject to aforesaid the provisions of the arbitration Act 1940 or any statutory modifications or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceeding under this clause.

The Employer and the contractor hereby also agree that arbitration under clause shall be a condition precedent to any right td action under the contract with regard to the matters hereby expressly agreed to be so referred to arbitration.

### **33. ITEM ADDITION TO THE TENDER**

The rates of the additional items/non tendered items shall be based on the rates quoted by the tenderer for similar items or based on analogous items available in the tender. Where direct applicable rates are not available, the rates for extra items, if any, shall be derived, based on the prevalent market cost for labour and material at site of work including wastage plus 15% towards tax and contractor's profit. All such works shall be carried out after approval of the architect/employer. If due to any reasons quantity of any item increases by over and above 10% , the contractor shall inform the employer/architect well in advance and take their approval before carrying out the same.

#### **34. OTHER CONTRACTORS**

The following matter shall be deemed to have been included in the quoted rates in the bill of quantities and no further payments shall be made on these counts.

The main contractor shall extend cooperation and provide space access and general safety & security for works by other contractors. He shall coordinate his activities in a manner to facilitate smooth and timely progress of work to achieve timely completion of the project. Such contractor includes, but are not limited to air conditioning.

**35.** Should any ambiguities arise during the execution of works, pertaining to the material, quality of material, workmanship, payments, speed of work, alterations in drawings etc. the decision of the architect/employer shall be final and binding.

#### **SPECIAL CONDITIONS OF CONTRACT**

1. Tenderers shall go through all documents before quoting rates and provide for necessary cost as may be included in either bill or material or specifications.
2. Tenderers shall be given prices in blank column Entries in English made in ink. Arrive also at the grand total must also fill in all "rates only columns" and sign all corrections.
3. Tender shall be invalid unless all rates are filled in. No arbitrary condition shall be submitted. Tenders shall be signed by all the legal partners of the firm.
4. Each of the tender documents shall be signed by the Tenderer.
5. The Tenderer whose tender is accepted shall be bound to enter in to the contract within eight days of intimation from ECGC.
6. Work shall be done night and day without extra charge, if necessary.
7. Tenderer shall provide for stacking of materials in such a way as to facilitate rapid checking of quantities.
8. Materials supplied by owner shall be used only in owner's work.
9. Contractors shall pay any local charges relating to execution of work.
10. Contractor shall allow for all wastages in the rates.
11. Contractor shall arrange for all temporary connections.
12. No extras shall be paid, quantity sheets and drawings both are to be considered jointly and Architect/Consultant is the final authority for the interpretation.
13. Site instruction shall be deemed for proper execution, and shall be carried out without extra charge.
14. Order book with numbered pages shall be kept on site. Contractor shall carry out all instructions properly.
15. Contractors shall insure whole work against fire, PICT and third party.

## **TECHNICAL SPECIFICATION**

### **1. GENERAL DATA**

#### **GENERAL**

The work under this tender shall be executed strictly in accordance with constructional and material requirements defined under these specifications. The contractor shall carefully acquaint himself with these specifications to determine his contractual obligations for work. The conditions of these specifications will be binding on the contractor and no deviation shall be permissible unless specifically approved by the Project Manager/Architect in writing.

#### **DRAWINGS/DIMENSIONS**

Figured dimension on drawings shall supersede measurements by scale and drawings to a large scale take precedence over these to a smaller scale. Special dimensions or directions in the specifications shall be checked on site. The dimensions where stated do not allow for wastage, laps, joints etc. The levels, measurements and other information concerning the existing site as shown on the drawings are believed to be correct, but the contractor shall verify them for himself and also examine the nature of the ground as no claim or allowance whatsoever shall be entertained here after on account of any errors or omissions in the levels or the description of the ground turning out to be different from what was expected or shown on the drawings.

#### **CO-ORDINATION OF DRAWINGS**

Before commencement of work, the contractor shall correlate all relevant structural, architectural and service drawings and satisfy himself that the information available there from is complete and unambiguous.

The contractor shall be responsible for any error/difficulty in execution/damage incurred owing to any discrepancy in the drawings which has been overlooked by him and has not been brought to the notice of the Project Manager/Architect before execution.

#### **B.I.S. CODES OF PRACTICE**

Wherever any reference is made in the specifications to any Bureau of Indian Standards (B.I.S.) or Indian Standards (I.S.) Code of practice, it shall be understood to indicate the latest version of the code of practice in usage all the time of construction. All civil and structural work shall carried out as per latest C.P.W.D. specification for material and workmanship unless specified otherwise.

#### **SETTING OUT**

The CONTRACTOR shall be responsible for the true and proper setting out of the work in relation to original points, lines and levels of reference and for the correctness of the levels, dimensions and alignment of all part of the work and for the provision of all necessary instruments, appliances and labor in connections therewith. If any time during the progress of the work any error appears or arises in the position of levels, dimensions or alignment of any part of work the contractor on being required to make good shall at his own expenses rectify such errors to the satisfaction of the Architect. The checking of any line or level by the Architect shall not in any way relieve the contractor of his responsibilities.

The contractor shall provide all required setting out pillars and one or more permanent bench marks in some place before the start of the work, from which all important center lines and levels for excavations will be set. The contractor shall provide all labor and material for setting out at his own cost.

The setting out pillars & permanent bench marks shall consist of masonry pillars with top neatly plastered and horizontal as per the approval of Architect. Bench marks shall be well connected with GTS or any other bench marks approved by Architect.

### **2. P.O.P. PUNNING**

## **GENERAL**

Plaster of Paris punning (Plaster) is generally applied on already cement plastered surface to give it a smooth and even surface.

## **PREPARATION OF SURFACE**

Projecting burrs of mortar formed during existing cement plaster shall be removed. The surface shall be scrubbed clean with wire brushes. In addition the plastered surface shall be pock marked with painted tool, at spacing of not more than 4 cm centers and depth of pocks to be approx. 3mm deep. This is to ensure a proper key for the plaster. This surface shall be cleaned of all oil and grease marks etc.

## **PLASTER OF PARIS**

The plaster of Paris shall be of semi-hydrate variety calcium sulphate. Its fineness shall be such that when sieved through a sieve of I.S. sieve designation 3.35 mm or 5 minutes, after drying the residue left on it shall be not more than 1% by weight. It shall not be too quick setting. Initial setting time shall not be less than 17 minutes.

## **APPLICATION**

The material will be mixed with water to a workable consistency. Plaster of paris shall be applied directly on the wall plasters in suitable sizes panels and finished to a smooth surfaces by steel trowels. The plaster shall be applied in such a manner that it fully fills the gaps the thickness over the plastered surface is as specified in the description of the item.

The finished surfaces shall be smooth and true to plane, slopes or curves as required

### **3. HERITAGE SURFACE TEXTURES**

**General:** Heritage surface textures are manufactured in India by M/S. Bakelite Hylam Ltd. in collaboration with M/s. UM Corporation Napan.

Heritage Granules Interiors

**Composition:** It consists of two components namely 92% silica particles coated with fade proof pigments and acrylic co-polymer bonding agent.

Thickness of coating: Normal thickness of the coating is 1.5 to 2.0 mm.

Substrates on which Heritage Surface Textures can be applied: Cement Mortar Asbestos boards/Sheets, Gypsum, plaster, marine plywood (min 4mm thk.) plaster board, medium density board or any other absorbent material.

## **PREPARATION OF SURFACE**

Ensure substrate is dry.

Remove dust/dirt and scrape of old paints (by mechanical or manual means) and all loose matter on substance.

Ensure substance to be coated is eve to get good coverage.

If surface is too smooth, sand the surface before application.

Plaster and sea all cracks in the substrate. Use plaster of Paris putty for interiors and cement for exteriors.

Procedure for making trough for application:

- a. Pour the prescribed amount of water (given in Si.No.2) into a clear plastic tub or trough. (The amount of water may be increased or decreased slightly depending on climatic conditions).
- b. Pour one pack of bonding agent into the through.
- c. Blend the bonding agent with water.

- d. Pour one pack of dry material in to the trough.
- e. Knead the material in trough with hands thoroughly.
- f. Check for lumps in the mixture. If lumps founds, mix thoroughly again.
- g. Allow the dough is ready is application.

**Method of Application:**

- a. Take the prepared dough little at a time and apply into the surface by at towel.
- b. Spread the material as thinly as possible (max. thickness 1.5mm) without any voids.
- c. Finish the coating by lightly pressing with the towel.
- d. At the end of the day, complete the job at a corner and as a straight line edge. This will ensure an even coating on continuation the next day.
- e. Ensure that the coated area is not tampered with or exposed to rain for a minimum of two days after completion of application. This is the minimum curing period required.

Days after completion of application. This is the minimum curing period required.

Pot life of prepared dough: Use up the dough within 4 hours after preparation. To extend pot life, cover the dough with wet cloth. Keep dough in shade when not in use.

**Drying time of coating:**

- a) Touch dry : Half an hour
- b) Over working time : One hour
- c) Curing time : Two days.

**4. GLAZED/CERAMIC TILE DADO**

Glazed/Ceramic tile dado where called for on drawings or schedule of finishes shall generally be of 200 x 300 mm size or as approved, white/colored glazed/ceramic tiles manufactured by Somany, Bell, Kajaria or approved by Architect. The tiles shall be uniform size and color. The rear face of the tiles shall be grooved and/or recessed to provide an adequate key for the plaster. The tiles shall be laid true and plumb over a cement screed 15mm thick composed of 1 part cement and 3 parts coarse sand. Before laying the tiles, the plaster shall be allowed to harden and then roughened with wire brushes. The back of the tiles shall be buttered with a coat of gray cement slurry and set in the bedding mortar. The tiles shall be firmly set in the mortar bedding and tamped and corrected to proper plane and lines. The joints shall be tight, regular, uniform and shall be as fine as possible and finished neat in pigmented horizontal to form required pattern.

After laying, the tiles shall be thoroughly washed and clean to the satisfaction of the Architect.

**b. CERAMIC TILES FLOORING**

Ceramic tile paving in terrace and other areas where called for shall be or non-slip ceramic tiles as Approved by Architect. The tiles shall be of approved color, size and shape and shall be laid to the pattern approved by the Architect. The tiles shall be of uniform color, true to size and shape and free from tracks, twists, uneven edges, cracking and other defects. The tiles shall be generally of size 300 x 300 mm unless otherwise called for.

The tiles shall be laid over a bed of 20mm thick cement mortar 1:3 (1 cement : 3 coarse sand) and leveled to at true surface. The surface of the bedding mortar shall be left rough to provide bond for the tiles. A floating coat of thick cement slurry shall be laid over the screed to proper levels and the tiles set over the same firmly to correct line and levels.

**5. WALL FINISHES**

**EXTENT AND INTENT**

The contractor shall finish all materials, labor, scaffolding, tools, plant and incidentals necessary and required for the completion of all plaster and wall finishes. The contractor shall be responsible to take proper precautions to protect already installed work from damage. Particular care shall be taken to protect windows. Tape shall be used where necessary.

Particular care shall be taken to protect windows. Tape shall be used where necessary.

#### **GENERAL**

Plaster as herein specified shall be applied to all internal surfaces where called for. Glazed tile dado, terrazzo dado and other wall finishes are to be provided where indicated on drawings and typical details shall be considered to apply to appropriate adjoining areas where shown on same drawings or not as whether indicated or not. All plaster work and other wall finishes shall be executed by skilled workmen in a workman like manner and shall be of the best workmanship and in strict accordance with the dimensions on drawings.

#### **PLASTER WORK**

The primary requirements of the plaster work, shall be to provide an absolute water tight enclosures, dense, smooth, and hard and divided of cracks on the interior and exterior. The contractor shall do all that is necessary to ensure this result. All plastering shall be finished to true plane without imperfections and square with adjoining work and shall from proper foundations for finishing materials such as paints etc.

Masonry and concrete surfaces to which plaster is to be applied shall be clean, free from efflorescence, damp and sufficiently rough and keyed. Hacking of concrete shall be 100% to ensure proper bond.

Whether directed all joints between concrete frames and masonry in-filling shall be expressed by a groove cut in the plaster. Said groove shall be 1cm lower the joint beneath.

Where groves are not called for the joints between concrete members and masonry, in-filling shall be covered by a layer of 24 gauge, 12mm size galvanized chicken wire mesh strips 400mm wide or as shown, installed before plastering.

#### **CHASING**

All chasing, installation of conduits, boxes etc. to be completed before any plastering or other wall finish is commenced on a surface. Chasing or cutting of plaster or other finish will not be permitted. Broken corners shall be cut back not less than 150mm on both sides and patched with plaster of Paris as directed. All corners shall be rounder plaster of Paris as directed. All corners shall be rounded to a radius of 8mm or provided with suitable galvanized iron E.P.M. corner beads as directed by the Architect.

#### **SAMPLES**

Samples of each type of plaster and other wall finish shall be prepared for approval by Architect.

#### **PREPARATION OF SURFACE**

The joints in all walls, both existing and freshly built shall be raked onto a depth of 15mm, brushed clean with wire brushes dusted and thoroughly washed before starting plaster work. Concrete surfaces shall be completely hacked upto about 6mm depth for the entire surface as approved by the Architect to endure proper key for the plaster.

#### **INTERNAL PLASTER TO WALLS**

Plaster to internal faces of walls shall be 12mm/15mm/20mm thick as called for, consisting of 1 part cement and 6 part clean sand. (Fine and Coarse sand in equal proportions).

#### **MORTAR MIXING**

Mortar shall be prepared as specified under brick work. It shall be made in small quantities only as required and applied within 15 minute of mixing.

#### **APPLICATION**



Plaster application shall be commenced only after the preparatory work is approved by the Architect. Correct thickness of plaster shall be obtained by laying plaster screed (Gauges) at intervals of 1.50 meters.

Mortar shall be firmly applied, well pressed into the joints, rubbed and finished as approved by the Architect to give smooth and even surface.

#### **CHICKEN MESH ON WALLS**

A layer of galvanized chicken mesh (24 gauge, 12mm size) shall be provided at all junctions of members and masonry walls besides other locations as called for, properly stretched and nailed, ensuring equal thickness of plaster on both side of the mesh. Chicken mesh shall be provided over the entire surface of hollow blocks wherever plaster over hollow block wall is called for.

Metal corner beads to be provided where called for on drawings and/or as instructed.

#### **CURING**

Finished plaster shall be kept wet for 10 days after completion. In hot weather, all walls shall be screened with matting kept wet or any other approved means.

#### **CEILING PLASTER**

Plaster to ceiling, soffits of stair flight slabs and similar locations where called for shall be 6mm thick and consist of 1 cement and 4 parts clean fine sand.

#### **PREPARATION OF SURFACE**

The surface to be plastered shall be prepared by a close hacking with pointed chisel as directed, to provide necessary bonding for the plaster. The surface shall be brushed, swept clean and thoroughly wetted before plastering.

#### **APPLICATION**

Mortar shall be applied firmly, pressed to the surface, rubbed and finished to a smooth and even surface.

#### **CURING**

Finished plaster shall be kept wet for 10 days after completion.

#### **GROOVES**

Where called for V Grooves of size as approved shall be formed in the dado and finished neat as directed. The grooves shall be straight, uniform width and depth and neatly formed.

### **6.0 METAL WORK**

#### **ALUMINUM DOORS, WINDOWS AND GLAZING**

##### **SHOP DRAWINGS**

Contractor shall submit to the Architect for his approval shop drawings within 10 days of confirming opening sizes.

The drawing should be to full scale as possible, showing all items of work, including:-

Metal thickness

Arrangement of components

Jointing

Details of site connections

Fastening

Flashing

Metal finishes

Glazing

Weather stripping

Sub framing

Hardware (including preparation)

Sealant

Other pertinent information.

**INSPECTION:** All material brought to site by the contractor for used in the work shall be subjected to inspection and approval by the Architect and shall be required to get necessary tests carried out on material and work from approved laboratory/test house, the cost of which shall be borne by the Contractor.

**ALUMINUM SECTIONS:** Aluminum sections used for work shall be as per Architects approved drawing and suitable for use to meet architectural on technical, structural, functional and visual considerations. The aluminum extruded section shall be confirm to IS designation HE 9WP/HV 9WP alloy, with chemical composition and technical properties as per IS 733 and IS 1285.

**FABRICATION:** All frames shall be square and flat and the frames being fabricated to a true right angle, and shall confirm to IS 1948. These shall be fabricated as per approved shop drawing. Both fixed and operable frames shall be fabricated out of a section which has been machine cut to length and mechanically jointed with hardened nickel, zinc plate steel screws and joining accessories such as cleat, fixture, machine bolt made of such material as not to cause bernaltic action. For matching with colored anodized aluminum section all visible screws shall be colored black by chemical process. Threads of machine screws used shall confirm to requirements of IS 4218. It shall withstand 150 Kg/sqm wind pressure without deformation. Required sash bars as per approved drawing shall have watertight EPDM gasket to that water does not penetrate through it even through water penetrates exterior gasket and are properly welded/braced/screwed to the main members.

**ANODIZING:** All aluminum section shall be anodized as per IS 7088 and electro-colored to matt bronze finish as per IS 1868 grading as specified in item schedule. Anodizing to confirm specified grade with minimum average thickness of 25 microns meter when measured as per IS 6012. The anodized coating shall be properly sealed by steam or in boiling water cold sealing process as per IS 1868/IS 6057. Polyethylene tape protection shall be applied on the anodized section before they are brought to site. All care shall be taken to ensure surface protection during transportation, storage at site and installation. The tape protection shall be removed on installation.

**GLAZING:** Glazing shall comprise of reflecting bronze or approved shade tinted or heat reflective float glass 6mm thick on out side and 8mm thick toughened float glass on in side, all glass panels shall be retained within aluminum framing by used of exterior grade Ethyl Propylene Di Methaline (EPDM) gasket. No water leakage or penetration shall occur when subjected to continuos steady water shower as per BS 4315 and DIN 18055 withstanding water spray at the rate of 5 gallon per hour sft. of fixed glass area and static pressure of 20% design wind load or 15 PSI which ever is greater. The complete installation shall be free from vibration, wind whistle and noise due to thermal and structural movement and wind pressure. For doors glazing shall be of 12mm thick float glass clear/tinted as specified.

**PRECAUTIONS:** Contractor shall ensure that aluminum curtain walls are not deformed/damaged during subsequent construction. all fittings, hinges and frame works etc. shall be protected within alkathene sheets, so that these may not be damaged during execution of work.

**FITTINGS:**

The contractor shall fix aluminum doors, windows etc. in prepared opening. Aluminum door frames, wherever possible, shall be fixed in place before erecting partitions. Where this is not possible, prepared opening shall be left for hold fasts. Breaking of partitions or walls for inserting hold fasts will not be permitted. Where the frames are to be fixed to column/wall faces they shall be fixed with rawl bolts/expansions bolts of approved make in approved manner. Special concrete blocks with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate 10 mm

size) with 3mm thick M.S. plate 100 x 100mm shall be cast set at suitable places into the jambs of openings. Door and windows frames shall be welded to the blocks with spaces in approved manner.

The contractor shall be responsible for assembling composites, bedding and pointing with mastic inside and outside at the mullions and transoms, fixing lugs to the frames, placing the doors/windows in their respective opening and bedding with mastic. The contractor shall be responsible for all builders work including cutting out and making good, forming fixing holes for inserting loose lugs, bolts and clips and for stacking of window, doors adjacent to the opening for necessary hoisting. The contractor shall be responsible for the doors and windows being set straight, plumb and level and for their satisfactory operation after the fixing is complete.

#### **MANUFACTURER'S ATTENDANCE**

The manufacturer immediately prior to the commencement of glazing, shall adjust and set all windows and doors and accept responsibility for satisfactory working of the opening frames. The contractor shall give three days clear notice to the manufacturer that glazing will commence.

#### **MASTIC CEMENT**

The gaps between frames and supports and also any gaps in the door and window section shall be raked out as directed and filled with mastic cement of approved color and make to ensure complete water tightness. The mastic cement shall be of such color and composition that it would not stain the masonry/concrete work shall not set hard or dry out under any conditions of weather. The sample of plastic cement to be used for this purpose shall be got approved from the Architect before its actual use.

### **7. CARPENTRY AND JOINERY**

#### **EXTENT & INTENT**

It is the intent of this specification to include all carpentry and joinery work in connection with doors, windows, glazing, partitions, ceilings, paneling, cabinets and other items of wood work called for in the drawings.

#### **GENERAL**

The carpentry and joinery work shall include the finishing of all labor, materials, equipment, incidentals and appliances required to complete the work including the supervision and installation of fastening devices and hardware in accordance with the drawings and the attached hardware schedule.

#### **7.1 TIMBER**

**General:** Specified variety of timber shall be used in the work. The timber shall be sawn in the direction of grains. The sawing shall be truly straight and square.

Timber generally is to be the best of kind, well and properly seasoned, of nature growth, free from worm holes, large loose or dead knots or other defeats and sawn i.e., squarely and will not suffer warping, splitting or other defects through improper handling.

The hardwood is to be well seasoned, Hollock or other approved similar locally obtainable hardwood weighing is to be well seasoned Hollock 610kg/cum (12% moisture content with a maximum moisture content of 20%).

Teak wood would be of best quality from Dandeli, Balarshsh, free from soft heart, worm holes and weighing 640kgs/cum (Avg. wt. With a moisture content of 12% ).

The moisture contents in wood shall be as per the CPWD Specification 1977. The testing of wood shall be carried out as per CPWD Specification 1977.

All rubber wood shall be free from worm holes, soft sap or knots. The wood shall be well seasoned as per IS:287:1973 with a moisture content of 10%, called BOROTIK, manufactured by Borox Morarji Ltd.

Kail wood shall be of good quality, well seasoned free from defects such as dead knots, cracks, sapwood etc. No individual hard and sound knot shall exceed 6Sq.cm. In size and the aggregate area shall be more than 1% of the pieces. These shall not be less than 2 growth rings per cm. Width in cross-section.

#### **8. BLOCK BOARD**

The Block board to be used shall be grade, i.e., exterior grade of commercial type (X-com) which shall have both faces of commercial plywood veneer. The Block board shall be solid core, phenol formaldehyde resin bonded of approved make. The core shall be made of strips of wood each not exceeding 25 mm in width joined together. Sandwiched and glued between two or more outer veneers with the direction of the grains of the core block running at right angle to that of adjacent veneers.

The Block board to be used in the said work shall be grade I, Exterior grade of commercial type (X-com) which shall be both faces of commercial plywood veneers.

#### **9. PARTICLE BOARD**

Particle board manufactured from particles of T.W./ Hardwood, for example flakes, granules, shavings, servers, splinters in agglomerated formed and pressed together by use of an organic binder together with one or of the agents such as heat, pressure, moisture, a catalyst etc. Particle board used for partitioning of paneling shall be of FPTH (flat pressed three layered board type). It shall be bounded with BWR (Boiling Water Proof) type synthetic resin adhesive. The shrinkage in thickness and length of the particle board shall not exceed 5%.

#### **10. PLYWOOD**

Plywood to be used shall be grade BWR, i.e., it shall have bounded with BWR (Boiling Water Proof) type synthetic resin adhesive shall be equal or superior quality that is laid down in IS: 303-1960.

The veneers for all grades shall be either rotary cut or sliced. The Veneers shall be sufficiently smooth to permit even spread of glue. The thickness of all veneers shall be uniform, within a tolerance 5%, corresponding veneers on either side of center one shall be of the same thickness and species. The requirement of thickness of the face and core veneers shall be as follows:

In 3 ply board up to 5 mm thick, the combined thickness of the face veneers shall not exceed twice the thickness of the center ply.

In a multiply boards, the thickness of any veneers shall not more than thrice the thickness of any other veneers.

The sum of the thickness of the veneers in one direction shall approx. To the sum of the thickness of the veneers at right angles to them and shall not be greater than 1-5 times this sum except for 3-ply as specified in (a).

#### **11. FLUSH DOORS**

All flush doors shall be solid core type with well-seasoned block board core. The entire bonding shall be in highly water resistant type liquid phenol Formaldehyde Synthetic Resin Adhesives of the hot pressed type. Rubber wood 12 mm thick lapping all rounds had to be provide and should be included in the rates. Both the faces shall be commercial hardwood type ready for lamination or painting.

#### **12. ADHESIVES**

Adhesive shall be Phenol Formaldehyde Synthetic resin conforming to B.W.P. (Boiling Water Proof) type specified in IS:848-1974. Only synthetic resin adhesive shall be used for bonding cores members to one another, including core frame, and for lapping, glazing frame, venetian frame and other exposed parts where such binding is done.

#### **13. NAILS, SPIKES, SCREWS & BOLTS**

Nails, spikes and bolts shall be of the best quality mild steel or length and of length and weight approved by the Architect. Nails shall comply with IS:1959 -1960 or equivalent approved quality samples. Brass headed mails are to comply with B.S.1210. Wire staplers shall comply with B.S.1494 or equivalent.

#### **ROUGH CARPENTRY**

Materials unless otherwise called for, all framing and other concealed wood members shall be of first class Burma teakwood and shall be seasoned to a moisture content of not less than 10% or more than 15%. Wood of greater moisture content shall be used in any part of the structure.

#### **WORKMANSHIP**

All carpenter's work shall be done by skilled workmen using proper tools. All joints shall as far as possible, be mortised and tenoned and glued with best quality approved waterproof glue. Where mortise tenon joints are not possible, the joints shall be securely nailed with the longest nails that may be used without splitting the wood. Whenever it is necessary or an adequate joints cannot be formed by nailing, the members shall be lapped or jointed by GI straps or extra wood blocks. All joints shall be done with neatness and as approved and directed by the Architect.

#### **14. PARTITIONS AND CABINET WORK**

General: Partitions, cabinets, etc. shall be fabricated and workshop as far as practicable and then brought inside the building ready to set in place. The various members shall be worked in the best manner known to the trade, mortised and tenoned, doweled, blocked and glued together so as to avoid the use of nails as far as possible. The details shall be closely followed, moulding clearly cut and miters accurately made. Free edge of shutters, Shelves, partitions, sides etc. shall be provided with first class teakwood edging, glued and nailed in approved manner. Shelves, where shown fixed, shall be supported on aluminum or other cleats or in other manner as approved by the Architect. Adjustable shelves shall brass sockets and pins as detailed on drawings. Drawer bottoms shall be of 6 mm commercial ply, unless otherwise show. Drawer front, sides and back shall be first class teakwood. The drawers shall slide on wooden bearers as shown on drawings.

Timber skirting where called for shall be of first class Burma teakwood, cut to required sizes, Planed smooth on visible faces and fixed in position in approved manner. Cut-outs, opening, etc. shall be provided in the counters and cabinets to accommodate sinks, wash basins, cooking, ranges, pipes, etc. as shown on drawings as required at site.

#### **PRESERVATIVE TREATMENT**

All wood work in contract with masonry shall be painted with approved asphalt or anti termite & fire retardant coating (Viper or equivalent) before placing. Care shall be taken to keep exposed surfaces clear from tat etc. felt shall be used to isolated wood from masonry wherever practicable. All concealed wood etc. shall be treated fully and liberally with solignum before placing in position.

#### **PAINTING AND POLISHING**

All exposed teak faces of partitions, glazing, doors, cabinet work etc. shall be Duco painted polished to approved finish. Door shutters, internal faces of cupboards and cabinets etc. shall be enamel painted/oiled to approved finish. Drawer bottoms, sides of drawers, etc. shall be carried out as specified under "painting".

#### **PROTECTION OF WORK**

The contractor shall be responsible for the temporary doors and closing in opening necessary for the protection of the work during progress. He shall also provide and maintain any other temporary covering required for the protection of finished wood work that may damaged during the progress of the work is left unprotected.

#### **15. GLASS AND GLAZING**

##### **EXTENT AND INTENT**

The contractor shall furnish all materials, labor, tools, appliances, equipment and incidentals required to complete the installation of all glass and related items.

##### **GENERAL**

All glass shall be of the type, quality and substance specified. All glass shall be first class in every respect shall confirm to IS : 1761-1960. The glass shall be reasonably free from blisters, stains scratches and bubbles so as not disturb the visibility through the glass.

##### **GLASS SIZES**

The contractor shall cut glass sizes by field measurement or dimensionally approved shop drawings. The responsibility for correct glass sizes shall rest with the contractor. No cracked, chipped or disfigured glass shall be accepted.

#### **GLASS BREAKAGE**

The contractor shall replace all broken, damaged and disfigured glass caused in executing the work or by faulty installation, before acceptance of the building, without cost to the owner.

#### **MATERIALS**

Glass for all glazing work shall be plain sheet as called for in the drawing and schedules. Sheet Glass for Windows shall be mm/5.5 mm thick special selected quality glass as called for, manufactured by M/s. Hindustan Safety Glass works or M/s. Atual Glass Works to the best standards available.

#### **PREPARATION OF FRAMES AND GLASS**

Before installation the contractor shall ensure that:

- a. All glazing rebates are square, plumb and true in plane, clear, dry and dust free;
- b. All frame adjustments are made prior to glazing;
- c. All glass edges are clean cut to exact sizes, allowing expansion tolerance as recommended by the glass manufacturer;
- d. All sashes shall be glazed in the closed position and shall not be opened until the compound is set;
- e. All materials are used in strict accordance with the manufacture's instruction;
- f. Glass shall not be forced into place;

#### **INSTALLATION**

The glass shall be set on neoprene or EPDM glazing blocks on all side (at least two per side) as directed. Glass shall be bedded back and face glazed and so installed as to achieve a completely water tight and rattle-free installation. The obscure glass where called for shall be set with smooth surface outside.

#### **COMPLETION**

Upon the completion of the work all glass shall be thoroughly cleaned, paint or other marks removed. Any cracked, scratched, chipped or other defective false shall be removed and replaced without cost to owner. Any loose glass shall be set to the satisfaction of the Architect.

### **16. HARDWARE**

#### **EXTENT AND INTENT**

The intention of the contract is that, that the building as shown shall be completely equipped with required hardware. Any required item not noted or listed shall be finished in a grade equal to and in harmony with similar item listed.

#### **GENERAL**

All hard ware shall be of the best quality of its type and strictly in conformity with the materials and finish described in schedule of hardware. If called upon to do so, the contractor shall arrange to get hardware specially manufactured to the design, requirements and standards laid down by the Architect.

#### **SAMPLES**

Samples of each different item of hardware including screws or any particular item of hardware shall be submitted to the Architect for approval.

**QUALITY**

All hardware shall be of perfect fit, uniform in finish and free from imperfections that affect serviceability or mar the appearance.

**GUARANTEE**

The contractor shall be responsible for the proper working of all hardware, for a period of one year from the date of completion of acceptance of the building .

17. **PAINTING**

**EXTENT AND INTENT**

The contractor shall supply all materials, labor, tools, ladders, scaffolding and other equipment necessary for the completion and protection of all painting work. Painting, as herein specified shall be applied to all surfaces requiring painting throughout the interior and exterior of the building as given in the schedules of finishes or elsewhere. The painting shall be carried out by a specialized sub-contractor, approved by the Architect. Care is to be taken that all surfaces to be painted are thoroughly cleaned and dry.

**MATERIALS**

Materials used in the work shall be of manufacture approved by the Architect. Ready mixed paints, varnishes, Enamels, lacquers, stains, paste fillers, distempers and other materials must be delivered to the job site in the original containers, with the seals unbroken and labels intact. Each container shall give the manufacture's name, type of paint, colour of paint and instructions for reducing the thinning shall be done only in accordance with directions. Remove rejected materials immediately from the premises.

**COLOR**

All colours, as provide in the colour schedule shall be approved by the Architect. The contractor shall mix manufacture's colours as per Architect's requirements and shall prepare painted samples of the colours selected and submit same for approval by the Architect. No work is to proceed until the Architect has given his approval, preferably in writing of colour samples.

**COMMENCEMENT OF WORK**

Painting shall not be started until the surfaces to be painted are in a condition fit to receive painting and so certified by the Architect.

Painting work shall be taken in hand only after all other contractor's work is completed.

Building where painting work is to be commenced shall be thoroughly swept and cleaned up before commencement of painting.

other materials of colors sharp and clean, without overlapping.

**18 . ENAMEL PAINT**

Wood or Plastered Surface: Pigmented priming coat followed by one undercoat and two more finishing coat of enamel paint. Paste filler to be applied after every coat excepting the final finishing coat and sanded.

Non-Galvanized Steel Surfaces: Coat of zinc chromate's oxide primer after phosphating followed by the three or more coats of synthetic enamel paint. Paste filler to be applied after every coat excepting final finishing coat and sanded.

Galvanized Steel Surfaces: Priming coat of galvanized metal primer after washing with galvanized metal cleaner, followed by three or more coats of synthetic enamel paint. Paste filler to be applied after every coat except final finishing coat and sanded.

#### **19. PLASTIC EMULSION PAINT**

Pigmented priming coat (emulsion thinned with water) followed by three or more coats of plastic paint. Paste filler to be applied after every coat excepting the final finishing coat and sanded.

#### **OIL BOND DISTEMPER**

Pigmented primer (cement primer) coat followed by three or more finishing coats of oil bond distemper. Paste filler to be applied after every coat excepting the final finishing coat and sanded.

#### **OILING**

Three coats of linseed oil (confirming to IS:75-1950) applied with brushes. Each coat to be applied after the previous coat is thoroughly dried. Granite to be filled with approved powder and surface rubbed smooth before oiling.

#### **20. SPIRIT POLISHING**

Polish: Polishing material shall be prepared by dissolving pure shellac, varying in shade from pale orange to lemon yellow, free from direct and other materials, in methylated spirit at the rate of 0.15Kg. shellac to 1 liter of spirit. Suitable pigment to achieve the required shade of polish shall be added as directed by the Architect.

Preparation of Surface: The surface cleaned of all dirt etc. shall be rubbed down smooth with sand paper and well dusted. Knots of visible shall be covered with a preparation of red lead and glue size laid on while hot. Holes and indentations shall be given a coat of wood filler made by mixing whiting (ground chalk) in methylated spirit at the rate of 1.5 kg. of whiting to one liter of spirit. The surface shall again be rubbed down perfectly smooth with fine sand paper and wiped clean.

Application: There or more coats of polish shall be applied over the above surface, to achieve a finish as approved by the Architect. The polish shall be applied with a pad of wooden cloth covered by a fine cloth. The pad moistened with polish shall be rubbed had on the wood surface in a series of overlapping movements, applying the material uniformly over the entire area to give an even finish. Subsequent coats shall be applied in similar manner after the previous coat is allowed to dry. The finishing shall be done with fresh piece of clean fine cloth, damped with methylated spirit and applied by light rubbing. The finished surface shall have a uniform texture and high gloss.

#### **21. WAX POLISHING**

Wax polishing shall be done with ready made wax polish of approved brand and manufacturer.

Preparation of Surface: The surface to be polished shall have been finished smooth. Knots, cracks and holes on the surface shall be cleaned and filled with wood putty (fine saw dust mixed with bees wax). The filling when dry shall be rubbed down with a carpenters file and then the entire surface shall be rubbed down perfectly smooth and wiped clean. In no case shall sand papers be rubbed across the grains so that even fine marks are not seen on the surface.

Application: The polish shall be applied evenly with a clean soft pad of cotton cloth in surface is completely and fully covered. The surface is then continuously rubbed till the surface is quite dry. A second and third coat shall be applied in the same manner and rubbed continuously until the surface is dry.

The final coat shall then be applied and rubbed until the surface has assumed a uniform gloss and is dry, showing no sign of stickiness. The finished surface shall have a uniform flossy finish as approved by the Architect.



## 22. FIRE RESISTANT COATINGS ON WOOD WORK

**General:** The paints and primers to be used should be as per IS. 12777-1989 and BS:476 Part-7.

**Application:**

Primer coat: The wood surface is to be sand papered two coats of primer equivalent or Viper FR-880 (A-2) is to be applied on it with brush with a time interval of 3-4 hours.

Finishing coat: Primer coated wood is to be applied with 2 coats of sealant coating equivalent to Viper FR-944 (fear) or Viper FRS-881 with brush with a time interval of 4-6 hours.

Finishing coat as aforesaid also could be applied directly on the previously painted/polished surfaces without removing the existing paint.

Thinner: Thinning agent if required could be used equivalent to 'Viper' Setter WP-914(2:1 ratio) for primer and setter WP-914(5:1 ratio) for finishing coat paint/polish.

### SPECIAL NOTES

1. All laminate shall be 1.0mm th. on vertical surfaces & 1.5mm th. on horizontal surfaces unless otherwise specified.
2. All hardware like multipurpose locks, hinges, handles, magnetic catches etc. shall be used only after written approval of samples.
3. Rates of all furniture items including three coats of synthetic enamel paint/sprit polish etc. as specified in the BOQ.
4. Each cabinet shall be powder coated handle, Godrej, lock/spring loaded hinges brass ball catches and shutter to be fixed using hinges of approval quality.
5. Where ever not specified all exposed surfaces of partition and other wood work shall be finished with three coats of synthetic enamel paint/polish in natural shade as applicable. Nothing extra shall be paid for the same.

**SPECIFICATIONS/BRAND NAMES** of materials and finished approved by the Architect/Employer are listed below: However equivalent materials and finished of any other specialized firms may be used , In case it is established that the brands specified below are not available in the market are subject to the approval of the alternative brand by the Architect.

S. NO.	ITEM	DESCRIPTION
1.	REINFORCEMENT STEEL	Shall be TISCON 42 TATA iron & steel Co. Ltd. Or SAIL, RATHI tore steel
2.	CEMENT	Shall be ordinary Portland cement 53 grade manufactured by Larsen & Turbo Ltd. ii)Shriram Cement by M/S Shriram Industries Ltd. iii) A.C.C. Cement by Associated Cement Companies Ltd. Pozzolona cement shall not be used.
3.	POLYSULPHIDE SEALANT	Shall be PIDISEAL by M/S PIDLITE INDUSTRIES LTD.
4.	WATER PROOFING COMPOUND	CICO
5.	SHUTTERING PLYWOOD	Shall be Indian Plywood Manufacturing Co. Bombay or Swastik by Sudershan Plywood
6.	TOUGHENED GLASS	TRUTUF
7.	GLASS	Clear glass shall be MODI FLOT GLASS PVT. LTD. Or St. Gobain.
8.	WIRED GLASS	Shall be 6mm thk. Wired glass manufactured by

		Hindustan Safety Glass Works Ltd. Calcutta, Or Vallabh Glass Works Gujrat./HARYANA SHEET GLASS.
9.	WHITE CEMENT	J.K. WHITE CEMENT BIRLA WHITE CEMENT
10.	DISTEMPER, PAINT	Shall be first quality ENAMEL, PLASTIC EMULSION manufactured by PAINTS AND PRIMER BERGER PAINTS , ASIAN PAINTS SHALIMAR PAINT
11.	PUTTY	Shall be gold size Putty by SHALIMAR PAINTS LTD./ASIAN PAINTS.
12.	EXPANSION BOLTS FOR FIXING	Shall be DASH FASTENERS of appropriate size by HILTI OR M/S. DEV ASHISH TRADES OR APPROVED EQ. NEW DELHI.
13.	WINDOW HARDWARE	Approved by Architect.
14.	CERAMIC TILES	KAJARIA, NITCO ,BELL
15.	VINAYL FLOOR	ARMSTRONG/ RIKVIN.
16.	VETRIFIED TILES	NAVEEN, NITCO, KAJARIA, MARBO GRANITES.
17.	GLAZED TILES	JHONSAN /KAJARIA /BELL /SOMMANY.
18.	SPECIAL CERAMIC TILES	Saraswati Ceramics, Sarai Rohilla or other approved pottery in Delhi/Khurja (RAJA).
19	HINGES AND DRAWER SLIDE	KAFF, HETTICH,OZONE.
20.	LOCKS, HANDLES	GODREJ , DORSET or Eq. Approved by Architect.
21.	DOOR CLOSERS, FLOOR SPRING	EVERITE, DORSET or Eq. Approved by Architect.
22.	ALUM, TOWER BOLTS	ECIE, PARMAR, EVERITE or Eq. Approved By Architect.
23.	M.S. PIPES (RAILING)	JINDAL OR PRAKASH.
24.	FLUSH DOORS	NATIONAL, MYSOBOARD or SWASTIK by Sudarshan Plywood.
25	LAMINATE DECORATIVE LAMINATE	MARINO, FORMICA, GREENLAM DURIAN ,AND VENTURA
26.	PLYWOOD, BLOCK BOARD ,	SHARDA PLYWOOD IND., CENTUARY, GREENLAM
27.	STRUCTURAL STEEL	SAIL, TISCO.
28.	TEXTURE TILES FOR FALSE CEILINGS / FIBER CEMENT BOARD	EVEREST INDUSTRIES LTD.
29.	M.S. ALUMINIUM LINEAL CEILING	INTERARCH, VISTA.
30	VENETIAL BLINDS	TRAC, VISTA, MAC.
31.	GYPBOARD CEILING	INDIA GYPSUM., St. GOBAIN
32.	HEAT REFLECTIVE FILM	GARWARE OR APPROVED EQ.
33.	TILE ADHESIVE	UNITILE, ROFF CHEMICALS.
34.	G.I.PIPE AND FITTINGS	TATA, JINDAL, APPOLO

35	WOOD PRESERVATIVE	WOOD GUARD OR APPROVED EQ/ICI.
36.	ALUMINIUM SECTIONS	JINDAL, BINDAL, INDIAL.
37.	C.I./R.W.P.	RIF, IIS OR EQ.
38.	SANITARY WARE	HINDUSTAN, SOMANY ,PARRY WARE
39.	STAINLESS STEEL SINK	DIAMOND , NIRALI

Signature of the Tenderer/s  
**With the Seal of the Company**

**Date:**

### **General SPECIFICATIONS FOR ELECTRICAL WORK**

#### 1 GENERAL

- 1.1 The entire electrification work shall be carried out by licensed Electrical Contractors in accordance with these specifications without any extra cost.
- 1.2 For site supervision the contractor must depute an qualified electrical engineer. The contractor shall employ only experienced and licensed wiremen to do the electrification work.
- 1.3 The work shall conform to relevant Indian Standard Specifications the I.E. Acts and Rules and the requirements of Local Electrical Authority.
- 1.4 When the installation is complete, the same shall be tested with the 500 /1000 volts Megger in the presence of the Architect / Consultant and the results shall be entered into the test certificate as per the format available with Local Electrical Authority.
- 1.5 Contractor shall submit to the client 3 sets of test certificates for the installation.
- 1.6 The contractor shall carry out all civil works connected with the electrical job. The contractor shall repair and make good the damages caused by him to the civil structure while executing the electrification work. The foundations for the panel board and for the poles, grouting of frames in the wall, erection of D.B.-/switchboards in the wall/chasing the walls for embedding the conduits and boxes etc. are all to be carried out by the contractor including making good the damaged civil work.
- 1.7 **The Contractor has to submit shop drawings for the Electrical Distribution Boards and the conduit layout to the Architect/Consultants for their approval before starting the work. Also one set of approved sample of the materials have to be kept at site.**
- 1.8 The Architect/Consultant will issue the drawings to the Contractor for carrying out the work .
- 1.9 The Electrical Contractor ,his wiremen and supervisors shall be qualified and have a valid licence while quoting as well as during the course of work.
- 1.10 **Statutory Approval**  
The electrical contractor shall obtain the approval for the electrical works carried out by the contractor ie. electrical panels, sub station works, earthing and internal electrification as required.

#### 2.0 SCOPE OF WORK

The scope of work shall be generally as given in the schedule of items and as mentioned below :-

- A. Supply, Installation, Testing and Commissioning of the following :
  - i. All Electrical Panel & Distribution Boards
  - ii. All Mains and Sub-Main wiring/cabling between various Distribution Boards.

- iii. All Circuit and sub-circuit wiring for lights, light and power outlets, Air Conditioning and Exhaust fans in False Ceiling/wooden partition walls/floor/columns/brick or concrete walls/MS Channels.
- iv. Farthing System for the entire Electrical Installation.
- v. Conducting and wiring for Computer & Telephone System in False Ceiling/wooden partition walls/floor/columns/brick or concrete walls/M.S. Channel.
- vi. All types of lighting fixtures, Ceiling fans and Exhaust fans.
- vii. Music System.
- viii. Providing floor channels and Junction Boxes for drawing data cabling and power wiring for work stations.
- ix. Installation of sub station equipments
- x. Substation Equipment Layout etc.

X Getting the approval from the electrical inspector for the works carried by the contractor

B) Testing and commissioning of the entire Electrical Installation including Telephone system.

The contractor shall carry out and complete the work under this contract in every respect in confirming with the current rules and regulations of the local Electricity Authority, stipulations of the Indian Standard Institution, and with the directions of and to the satisfaction of the owner. The contractor shall furnish all labour, material, appliances, equipment, transportation and incidentals necessary for providing, installing, testing and commissioning of the whole electrical installation as specified herein and shown on drawings.

This also includes any materials, appliances, equipment and incidental work not specifically mentioned herein or noted on the drawings/documents as being furnished or installed but which are customary to make the installation in working order. The work shall include all incidentals and jobs connected with Electrical installation such as earthing work and cutting chases/holes and making good the same and grouting etc.

NOTES

1. All items of work under the contract shall be executed strictly in accordance with the description of the item in the Schedule of Quantities, relevant drawings and Specifications read in conjunction with the appropriate Indian Standard Specifications, Indian Electricity rules as amended up to date and Conditions of Contract.
2. The rate for each item of work included in the Schedule of Quantities shall unless expressly stated otherwise, include cost of:
  - a. All materials, fixing materials, accessories, operations, appliances, tools, plant, equipment, transport, labour and incidentals required in preparation for, in the full and entire execution and completion of the work called for in the item and as per specifications and drawings completely.
  - b. Wastage on materials and labour.
  - c. Loading, transporting, unloading, handling/double handling, hoisting to all levels, setting, fitting and fixing in position, protecting, disposal of debris and all other labour necessary in and for the full and entire execution and to fully complete the job in accordance with contract documents, good practice and recognised principles.
  - d. Liabilities, obligations and risks arising out of conditions of contract.
  - e. In the event of conflict between schedule of quantities and other documents including the specifications, the most stringent shall apply and the interpretation of the Chief Architect shall be final and binding.
3. The Contractor shall be paid for the actual quantity of work executed by him in accordance with the drawings at the contract rates.
4. All errors in totaling the amount column and in carrying forward totals shall be corrected.
5. Unless otherwise stated all measurements shall be taken in accordance with Indian Standard Electrical Installation in building Method of Measurement IS 5908 latest revisions/ additions.
6. Necessary liaison shall be done by the Contractor with the local authority for obtaining temporary and permanent electrical connection and installation of all meters etc.. The contractor shall submit and prepare all test reports and other documents to the local authorities in consultation and on behalf of the Client..

7. On the completion of the work the Contractor shall submit to the Owner layout Drawings indicating the complete Electrical Installation as installed . These Drawings shall in particular give the following information.
- i. Run and size of conduit, location of inspection/outlet boxes.
  - ii. Number and size of wires in each conduit.
  - iii. Location of switches, outlets, DBs, Telephone, Call Bell and Music outlets etc.
  - iv. Layout and particulars of mains and sub-mains and cable route etc.
  - v. Schematic diagrams for the complete Electrical System.
  - vi. Complete Earthing System with size of Earthing conductors.
  - vii. Layout and particulars of the Telephone and Computer system.
  - viii. Substation Equipments Layout.

Shop drawing for all system shall be prepared by the contractor & got approved before starting of the work.

TECHNICAL SPECIFICATIONS

1 SPECIFICATIONS FOR INTERNAL WIRING

1.1. SYSTEM OF WIRING:

The system of wiring shall consist of single/multi core PVC insulated FRLS copper conductor wires in non-metallic PVC conduits/ metallic M.S. conduits as called for in the BOQ. All conduits shall be on the surface,(supported from the Ceiling), in the False Ceiling and concealed in other areas where RCC slab is provided unless otherwise called for in the drawings. All Down conduits shall be concealed unless otherwise called for.

1.2. GENERAL

Prior to laying of conduits, the Contractor shall get approved the conduit layout indicating the route of conduit, number and size of conduits, location of junction/ inspection/pull boxes, size and location of switch boxes, point outlet boxes and other details. These conduit layouts shall be got approved by the Consultant and then only conduit layout should be started. Any modification or suggestions shall be approved by the Consultant before the laying of conduits.

1.3. MATERIALS:

M.S. conduits shall conform to Indian Standards IS : 1653 - 1964 -Specification for Rigid Steel conduits for Electrical wiring with the latest amendments.

M.S. CONDUITS:

M.S. conduits shall be solid drawn or lap welded conduits. Stove enameled inside and outside with minimum wall thickness of 1.6 mm for conduits upto 25 mm diameter and 2.0 mm wall thickness for conduits 32 mm diameter and above.

PVC conduits to be used for concealed work for all systems except Fire Alarm & Computer system where M.S. conduits shall be used. PVC conduits shall conform to Indian Standards IS : 9537(Part-3)-1983 - Specification for conduits for Electrical Installation (Part-I) General Requirements.

PVC CONDUITS:

PVC conduits shall be rigid, unplasticised, heavy gauge having 1.8 mm wall thickness upto 20 mm diameter and 2.0 mm wall thickness for all sizes above 20 mm diameter. Minimum size of conduit shall be 20 mm dia. Minimum size of conduit for Power point wiring shall be 25 mm dia. The conduits shall be delivered to the site of construction in original bundles and each length of conduit shall bear the label of the manufacturer. The number of insulated copper wires that may be drawn into the conduits of various sizes are given below and the fill shall not exceed 40% the maximum permissible number of 650/1100 volts grade single/multi core PVC insulated copper conductor wires of different sizes, that may be drawn into rigid metallic or non-metallic conduits.

SIZE OF WIRE Nominal cross- Sectional area of wires in sq. mm	SIZE OF CONDUITS (MM)				
	20	25	32	40	50 nominal dia in mm
	( Maximum number of wires )				
1.5	5	6	18	-	-
2.5	3	4	10	-	-
4.0	2	4	5	10	-
6.0	-	6	6	8	-
10.0	-	-	3	4	-
16.0	-	-	-	3	5
25.0	-	-	-	2	3

#### 1.4 PVC CONDUIT ACCESSORIES & CONNECTIONS:

The accessories used for PVC conduits shall conform to Indian Standards IS : 3419-1988-(Specification for fittings for non-metallic conduits).PVC conduits shall be joined by means of screwed or plain couplers. Where there are long runs of straight conduits, inspection boxes shall be provided at intervals as approved by the consultant. The threads of the pipe and sockets shall be free from grease and oil. It shall be thoroughly cleaned before making the screwed/plain joints. Proper jointing materials as recommended by manufacturers shall be used for jointing of PVC pipes. Use PVC couplers and connectors for PVC pipe connections and terminations in boxes. All the joints shall be fully water tight. Junction boxes and running joints shall be provided at suitable places to allow for subsequent extensions if any, without undue dismantling of conduit system. As far as possible diagonal run of conduits shall be avoided. Junction between conduit and adapter boxes, back outlet boxes, switch boxes and the like must be provided with entry spouts and smooth PVC bushes. Joints between conduit and iron clad Distribution Boards or control gear shall be effected by means of conduit couplers into each of which will be coupled smooth PVC bush from the inside of box or case. Conduit system shall be erect and straight as far as possible. All jointing methods shall be subject to the approval of the consultant.

#### BENDS IN CONDUITS:

Where necessary bends or diversions may be achieved by means of bends and or circular inspection boxes with adequate and suitable inlet and outlet screwed joints. In case of recessed system each junction box shall be provided with a cover properly secured and flush with the finished wall surface, so that the conductors inside the conduits are easily accessible. No bend shall have a radius of less than 2.5 times the outside diameter of the conduit. Conduits shall be cold bend by means of a Bending spring available with the manufacturers. In case it is not available then Heat may be used to soften the PVC conduits, by filling sand in the pipe. Use of PVC conduit in places where ambient temperature is 60 degrees or above is prohibited. PVC Solvent shall be used for joints between conduits, conduits & Junction box etc. PVC checknuts and bushes shall be used for joining conduit with outlet boxes. PVC Closures shall be provided on unused mouths of Junction boxes.

Separate conduits shall be provided for the following system.

- i) Lights, Ceiling fans, Exhaust fans & 5A Light sockets.
- ii) Power sockets & A/C outlets
- iii) Telephone System
- iv) Television, Computer & Music system
- v) Emergency System.
- vi) Public Address System
- vii) Fire Alarm System.

Separate switchboards/outlets shall be provided for the following system.

- i) Lights, Ceiling fans, Exhaust fans & 5A Light sockets.
- ii) Power sockets & A/C outlets
- iii) Telephone System
- iv) Television, Computer & Music system
- v) Emergency System.
- vi) Public Address System
- vii) Fire Alarm system .

#### 1.5 FIXING CONDUITS:

Conduits and junction boxes shall be kept in position and proper holdfasts shall be provided. Conduits shall be so arranged as to facilitate easy drawing of wires through them. Adequate junction boxes of approved shape and size shall be provided. All conduits shall be installed so as to avoid steam and hot water pipes. After the conduits, junction boxes, outlet boxes & switch boxes are installed in position their outlets shall be properly plugged so that water, mortar, insects or any other foreign matter does not enter into the conduit system. Exposed conduits shall be fixed by means of spacer bar/ saddles at intervals of not more than 600 mm in normal run and 500 mm from both sides of fitting or accessories. The saddles shall be of 3 mm x 19 mm mild steel flat, properly treated with primer and painted, securely fixed to support by means of nuts and bolts/rawl bolts and MS screws as required.

Conduits shall be laid in a neat and organised manner as directed and approved by the Consultant. Conduit runs shall be planned so as not to conflict with any other service pipe lines/ducts.

Where exposed conduits are suspended from the structure they shall be clamped firmly and rigidly to hangers of design to be approved by the Architect. Where hangers are to be anchored to reinforced

concrete appropriate inserts and necessary devices for their fixing shall be provided at the time of fixing. Making holes or openings in the concrete will generally not be allowed. In case it is unavoidable prior permission of the Consultant shall be obtained. Conduits shall be fixed in the chase by means of staples not more than 600 mm apart and the chase filled with cement mortar 1 : 4 . Cutting of horizontal chases in walls is prohibited.

1.6. PROTECTION

To minimize condensation or sweating inside the conduit pipes all outlets of conduit system shall be adequately ventilated as directed and approved by the Consultant. All screwed and socketed connections shall be adequately made fully water tight by the use of proper jointing materials i.e. Tropolin for PVC conduits & white lead for metal conduits.

1.7. SWITCH-OUTLET BOXES AND JUNCTION BOXES

All boxes shall conform to Indian Standards IS : 5133(Part-1)-1969 (Specification for boxes for enclosure of Electrical accessories) with the latest amendments. All outlet boxes for switches, sockets & other receptacles shall be fabricated from 1.6mm thick mild steel sheets duly painted with rust proof paint (zinc passivated) as called for, having smooth external & internal surfaces to true finish. Junction boxes and outlet boxes in contact with earth or installed in areas exposed to the weather shall be of 2mm thick mild steel and painted. Where called for, outlet boxes for receiving switches, telephone outlets T.V. outlets, power plugs etc. shall be fabricated to proved shape and size to suit the cover plates of approved make for different utilities. The cover plates shall be of best quality Hylam sheets or ISI grade Urea Formaldehyde Thermosetting insulating material which shall be both mechanically strong and fire retardant, as approved by the Consultant. Proper supports shall be provided in the outlet boxes to fix the cover plates of switches as required. Separate screwed earth terminal shall be provided inside the box for earthing purpose. All boxes shall have adequate number of knockout holes of required diameter for conduit entry. Where called for outlet boxes for receiving switches and fan regulators in one box, shall be fabricated to approved shape and size to accommodate fan regulators and switches to be fixed on grid plates. These boxes shall be covered with Hylam sheets or ISI grade Urea Formaldehyde Thermosetting insulating material which shall be both mechanically strong and fire retardant. All junction boxes, pull boxes and outlet boxes shall be provided with sheet cover Urea Formaldehyde Thermosetting insulating material. The box cover shall be secured to the box with adequate number of round head brass screws of approved make. Outlets exposed to the weather shall be fully weather tight, complete with rubber gasketed covers, glass where used shall be fully heat resistant for the duty. The outlet boxes shall be painted with two coats of bit mastic paint before they are fixed in position. All Outlet boxes fixed in concrete/recessed in wall shall be of a minimum depth of 55mm.

1.8. INSPECTION BOXES

Rust proof (Zinc passivated) inspection boxes of 1.6mm thick mild steel sheet and of required size, having smooth external and internal finish shall be provided to permit periodical inspection and to facilitate removal and replacement of wires when required. Inspection boxes shall be mounted flush with ceiling/walls finished surface and shall be provided with screwed covers of Urea Formaldehyde Thermosetting insulating material sheet cover secured to the box with brass screws. Adequate holes shall be provided for ventilation in the inspection box covers.

1.9. TELEPHONE SYSTEM

Conduits, junction boxes, draw boxes, outlet boxes and covers to boxes for telephone system shall be as described under relevant clauses elsewhere in these specifications. Conduits for telephone system shall be at least 150 mm away from the electrical conduits. The conduits for telephone wiring shall be of specified size and shall be terminated at outlets as indicated on the drawings. Telephone system conduits shall have 2 mm diameter galvanized steel pull wires installed. Necessary Junction boxes to be provided for easy drawing of the Telephone wires from each unit to the Telephone Tag Box and from the Tag Box to the open ground.

1.10. T.V. & COMPUTER SYSTEM

Conduits junction boxes, draw boxes, outlet boxes and covers to boxes for T.V. & Computer system shall be as described under relevant clauses elsewhere in these specifications. Conduits for T.V. & Computer system shall be at least 150mm away from the electrical conduits. The conduits for T.V. & Computer wiring shall be of specified size and shall be terminated at outlets as indicated on the drawings. T.V. & Computer system conduits shall have 2mm diameter galvanized steel pull wires installed. Necessary



Junction boxes to be provided for easy drawing of the Television & Computer wires from each unit to the Junction Box and from the Junction Box to the open ground.

On the completion of the work the Contractor shall submit to the Owner layout Drawings indicating the complete Electrical Installation as installed. These Drawings shall in particular give the following information.

- i. Run and size of conduit, location of inspection/outlet boxes etc.
- ii. Number and size of wires in each conduit.
- iii. Location of switches, outlets, all types of DBs, Telephone, Television, Computer, Call Bell & Public Address points, Light sockets, Power sockets, Fire Alarm points, etc. .
- iv. Layout and particulars of mains and sub-mains and cable route etc.
- v. Schematic diagrams for the complete Electrical System.
- vi. Layout of Complete Earthing System with size of Earthing conductors.
- vii. Layout and particulars of the Telephone, Public Address, Television, Computer.

#### 1.11. CONDUCTORS

PVC insulated multistoried copper conductor wires of 1100 Volts grade shall be used for three phase distribution and PVC insulated multistoried copper conductor wires of 1100 V grade shall also be used for Single phase distribution and shall conform to IS : 694 -1964 with the latest amendments and shall be ISI marked.

#### 1.12. BUNCHING OF WIRES

Wires carrying current shall be so bunched in the conduit that the outgoing and return wires are drawn into the same conduit. Wires originating from two different phases shall not be run in the same conduit.

#### 1.13. DRAWING OF CONDUCTORS

The drawing and jointing of copper conductor wires shall be executed with due regard to the following precautions, while drawing insulated wires into the conduits. Care shall be taken to avoid scratches and kinks which cause breakage of conductors. There shall be no sharp bends.

Insulation shall be shaved off for a length of 15mm at the end of wire like sharpening of a pencil and it shall not be removed by cutting it square or ringing.

PVC insulated copper conductor wire ends before connection shall be properly soldered (at least 15mm length) with special Cu solder for copper conductor or shall be properly crimped with copper lugs/sockets as the case may be. Strands of wires shall not be out for connecting to the terminals. All strands of wires shall be soldered at the end before connection. The connecting brass-screws shall have flat ends. All looped joints shall be soldered and connected through terminal block/connectors. The pressure applied to tighten terminal screws shall be just adequate, neither too much nor too less. Conductors having nominal cross sectional area exceeding 6 Sq mm shall always be provided with cable sockets.

At all bolted terminals, brass flat washer of large area and approved steel spring washers shall be used. Brass nuts and bolts shall be used for all connections.

Only certified wiremen and cable jointers shall be employed to do jointing work. All wire shall bear the manufacturer's label and the voltage grade at one meter intervals for the full length of coil, and shall be brought to site in new and original packages.

The sub-circuit wiring for points shall be carried out in looping system and no joint shall be allowed in the length of the conductors. No wire shall be drawn into any conduit, until all work of any nature, that may cause injury to wire is completed. Care shall be taken in pulling the wires so that no damage occurs to the insulation of the wire. Before the wires are drawn into the conduits the conduits shall be thoroughly cleared of moisture, dust, and dirt or any other obstruction by Drawing dry cloth through the conduits. The minimum size of PVC insulated stranded copper conductor wire for all sub circuit wiring for lights, exhaust fans, ceiling fan and 5A Light sockets points shall be 1.5 Sq mm. In case of power circuit not more than two 15 Amp power outlets shall be grouped in one circuit, wiring for the first power outlet shall be carried out with PVC insulated 6.0 sq mm copper conductor wires. Wiring for the second power outlet shall be carried with PVC insulated 4.0 sq mm copper conductor wires. All power outlets shall be connected with 4.0 sq mm PVC insulated copper conductor wires to the earth terminal of outlet. Separate circuit shall run with PVC insulated 4.0 sq mm copper conductor wires for water heaters, kitchen equipment, window Air conditioners and similar outlets at locations as shown on drawings.

The minimum size of wire from final distribution board to first tapping point in the circuit shall be 2.5 Sq mm. PVC insulated stranded copper conductor wires. Circuit shall not have more than a total of 8 points of fans, 5A Light sockets and Light points and its load shall not exceed 800 watts. Not more than two power circuits shall be drawn through the same conduit. Separate earth wire shall run for each circuit. In

case two circuits of the same phase are running in the same conduit then a common earth wire is permissible. The size of earth wire for all the light points, ceiling fans, exhaust fans, light sockets, outlet boxes etc. shall be 1.5 sq mm PVC insulated copper conductor wires.

#### 1.14. JOINTS

All joints shall be made at main switches, distribution boards, socket outlets, lighting outlets and switch boxes only. No joints shall be made inside conduits and junction boxes. Conductors shall be continuous from outlet to outlet. Joints where unavoidable, due to any specified reasons, prior permission in writing shall be obtained from the Consultant before making such connections.

#### 1.15. MAINS AND SUB-MAINS

Mains and sub-mains wires where called for shall be of the rated capacity and approved make. Every main and sub-main shall be drawn into an independent adequate size conduit. Adequate size draw boxes shall be provided at convenient locations to facilitate easy drawing of the mains and sub-mains. An independent earth wire of proper rating shall be provided. The earth wires shall run along the entire length of the mains and sub-mains. The earth wires shall be fixed to conduits by means of suitable copper clips at not more than 1000mm distance. Where mains and sub-main cables are connected to switch gears, sufficient extra length of sub-main and main cable shall be provided to facilitate easy connections and maintenance.

#### 1.16. LOAD BALANCING

Balancing of circuits in three phase installation shall be planned before the commencement of wiring, shall be got approved by the Consultant and shall be strictly adhered to.

#### 1.17. COLOUR CODE OF CONDUCTORS

Colour code shall be maintained for the entire wiring installation; red, yellow, blue for three phases and "off" circuit black for neutral and green for earth (or bare earth wire)

Telephone Multicore cables shall be of approved make and shall conform to following specifications.

- i) Type of conductor ..... Electrolytic Annealed Tinned Cu conductor. (ATC)
- ii) Diameter of Conductor ... 0.61 mm dia uniform (minimum size)
- iii) Weight of conductor .... 2.52 Kg/Km minimum. iv) Resistance of conductor at 20 degree... 60 Ohms/Km,
- v) Radial Thickness of PVC insulation...0.3mm + 0.05mm uniform
- vi) Radial Thickness of PVC sheathing ... 1.2mm uniform + 0.2mm
- vii) Overall diameter of insulated conductor.. 1.2mm uniform
- viii) High voltage Test. Able to withstand upto 500 volts D.C. up to 12 hours immersion in water.

#### 1.18. MOUNTING HEIGHT DETAILS

1.18.1 The bottom of the light/fan switch board shall be at 1.0 meter above the finished floor level unless otherwise specified.

1.18.2 All plugs and socket outlets shall be of 5/6 pin type and the appropriate pin of socket shall be connected to the earthing system.

1.18.3 In case of light and fan circuit only 5 pin 5A socket outlets shall be used. 6 pin 15A socket outlets shall be provided only on power circuits. The switch controlling the socket outlet shall be adjacent to it. 6 pin 15 A socket outlets shall be located at the levels as indicated below unless otherwise specified.

- a In Kitchen at 300 mm above kitchen platform or FFL as per the location shown on the drawings.
- b In the bathroom at 1800 mm above FFL but Mirror lights shall be above Mirror of wash basin.
- c In all other rooms at 150 mm above FFL unless otherwise specified.

1.18.4 All Bracket light fittings, unless otherwise specified shall be at a height of 2.1 meters above the floor level unless otherwise specified for some locations.

1.18.5 Unless otherwise specified, the ceiling fans shall be hung at 2.75 meters above the finished floor level.

1.18.6 Lamp holders in bath rooms are to be shrouded with insulating materials and fitted with protective shield.

1.18.7 All live conductors are to be insulated and safe guarded to avoid danger.

1.19 M.S.CONDUIT ACCESSORIES & CONNECTIONS:

The accessories used for M.S. conduits shall conform to Indian Standards IS : 3837-1966-(Specification for fittings for Rigid steel conduits with the latest amendments. M.S. conduits shall be joined by means of screwed or plain couplers. Where there are long runs of straight conduits, inspection boxes shall be provided at intervals as approved by the Consultant. The threads of the pipe and sockets shall be free from grease and oil. It shall be thoroughly cleaned before making the screwed/plain joints.

Proper jointing and Cleaning materials as recommended by manufacturers shall be used for jointing and cleaning of M.S. pipes. Use M.S. couplers and connectors for M.S.pipe connections and terminations in boxes. All the joints shall be fully water tight. Junction boxes and running joints shall be provided at suitable places to allow for subsequent extensions if any, without undue dismantling of conduit system. As far as possible diagonal run of conduits shall be avoided. Junction between conduit and adapter boxes, back outlet boxes, switch boxes and the like must be provided with entry spouts and smooth M.S. bushes and M.S. Checknuts. Joints between conduit and iron clad Distribution Boards or control gear shall be effected by means of conduit couplers into each of which will be coupled smooth M.S. bush from the inside of box or case. Conduit system shall be erect and straight as far as possible. All jointing methods shall be subject to the approval of the Consultant.

M.S. CONDUIT CONNECTIONS:

Conduit connections for MS conduits shall be screwed metal to metal and be painted with one coat of self etching zinc chromate primer and two coats of enamel paint. The threads and sockets shall be free from grease and oil. Connections between screwed conduit and sheet metal boxes shall be by means of a brass hexagon smooth bore bush, fixed inside the box. Checknuts to be provided on inside and outside of box and connected through a coupler to the conduit or as directed by the Consultant. The joints in the conduits shall be free of burrs to avoid damage to insulation of conductors while pulling them through the conduits. Connections between PVC and MS conduits shall be through a junction box. Direct connection between PVC and MS conduits is not allowed.

FAN BOX DETAILS

The Fan Box shall be 100 mm x 100 mm x 75 mm deep, M.S. box made of 2mm thick M.S. sheet, having 12 mm dia M.S. rod, bend at centre to support the fan, top screwed cover etc. as per the approval of the Architect/Consultants.

2 CABLES

2.1. GENERAL

MV Cables shall be supplied, laid tested and commissioned in accordance with drawing specifications, relevant Indian Standards specification, Indian Electricity Act and manufacturers instructions. The cable shall be delivered at site in original drums with manufacturers name clearly written on the drums.

2.2. MATERIAL

MV CABLES : MV Cables shall be PVC insulated aluminium conductor armoured and unarmoured cables conforming to IS: 1554 (part I&II)-1976 & IS : 694-1977 (PVC Insulated cables for working voltages upto and including 1100 volts (second revision) with latest amendments. MV cables shall be suitable for under ground use and laid in trenches, ducts, cable trays, under roads and paved areas. MV Cables shall be termite resistant and shall be of approved make.

2.3. JOINTS IN CABLES

The contractor shall take care to see that all the cables are apportioned to various locations in such a manner as to ensure no straight joints in the cable run. If the straight joint in cable is unavoidable due to any specified reasons, prior permission in writing shall be obtained from the Consultant before the use of such straight joints in cable.

2.4. JOINTING BOXES FOR CABLES

Cable jointing boxes shall be of appropriate size, suitable for PVC insulated cables of particular voltage ratings, and shall be manufactured by approved manufacturers.

2.5. JOINTING OF CABLES

All cable joints shall be made in suitable approved cable joint boxes. Jointing of cables in the joint boxes and the filling in of compound shall be done in accordance with the best practice in trade, in accordance with manufacturer's instructions and in an approved manner. All straight Joints shall be done in epoxy mould boxes with TROPOLIC/ M-Seal resin or approved equal. All terminal ends of conductors shall be heavily soldered upto at least 50mm length.

All cables shall be jointed colour to colour and tested for insulation resistance and continuity before jointing commences. The seals of cables must not be removed until preparations for jointing are completed. Joints shall be finished on the same day as commenced and sufficient protection from the weather shall be arranged.

2.6. FILLING OF EPOXY COMPOUND

Equal quantities of resin and hardner shall be taken and mixed thoroughly by hand until the mixture is free from white patches and has uniform colour. No water, oil or any other liquid shall be added to the mixture to make it soft as this will effect the properties of the compound. The mixture shall be used within 30-40 minutes of mixing. The surface on which epoxy compound is to be used shall be free from dust, rust, oil, grease and shall be dry. No disturbance or movement of joint shall be made till the epoxy compound has completely hardened. A smooth surface can be made by rubbing a damp cloth smoothly on the compound before it sets. The joints shall be painted after it has completely hardened.

2.7. CABLES TERMINATION

Cable termination shall be done in terminal cable box using cable glands and the cable ends sealed with sealing compound.

2.8. BONDING OF CABLES

Where a cable enters any piece of apparatus, it shall be connected to the casing by means of an approved type of armoured clamps and gland. The clamps must grip the armouring firmly to the gland or casing, so that in the event of ground movement no undue stress is passed on to the cable conductors. The glands shall be either to the lead sheath by means of 'Plumbing Joint' as on a cone of approved materials, capable of being compressed into lead sheath. The gland or cone shall be capable of effecting a good electrical bond between both the armouring and lead of the cable and the casing.

## 2.9. LAYING OF CABLES

Cables shall be laid by skilled and experienced workmen using adequate rollers to minimize stretching of the cable. The cable drums shall be placed on jacks before unwinding the cable. Great care shall be exercised in laying cable to avoid forming kinks. The drums shall be unrolled and cables run over wooden rollers in trenches at intervals not exceeding 2 meters. Cables shall be laid at depth of 750mm depth below ground level in the case of MV Cables. A cushion of sand, not less than 75mm shall be provided both above and below the cable, joint boxes and other accessories. HV and MV cables shall not be laid in the same trench and/or along side of water main. The cable shall be laid in excavated trench 80mm layer of sand shall be spread over the cable. The cable then shall be lifted and placed over the sand bed. The second layer of 80mm sand then be spread over the cable. The relative position of the cables laid in the same trench shall be preserved and the cables shall not cross each other as far as possible. At all changes in direction in horizontal and vertical planes, the cable shall be bent smooth with a radius of bend not less than 12 times the diameter of cable. Minimum 3 M long loop shall be provided at both sides of every straight joint and 5 Meters at each end of the cable. Distinguishing marks shall be made on the cable ends for identification. Insulation tapes of appropriate voltage and in red, yellow and blue colours shall be wrapped just below the sockets for phase identification. Aluminium Labels etched with the size of cable shall be provided around the two ends of each cable.

## 2.10. PROTECTION OF CABLES

The cable shall be protected by placing burnt bricks over the cables 600mm wide on the top layer of sand for the full length of underground cable. Where more than one cable is running in the same trench, the bricks shall cover all the cables and shall project a minimum of 80mm on either side of the cable. Cable under road crossings and any surfaces subjected to heavy traffic, shall be protected by running them through Hume pipes of suitable size and Heavy grade quality.

Cables under paved areas (which form part of the building) shall be protected by running them through Stoneware/Hume pipes of 150 mm dia(minimum size) one meter below road level.

## 2.11. CABLES INSIDE BUILDINGS

Cables inside buildings shall be laid either in masonry trenches or carried on through trays or brackets. Where cables run in ducts inside the buildings the cables shall be adequately clamped to angle iron brackets, secured to the wall, as directed and approved by the Consultant. Where cables are suspended from ceilings they shall be carried over troughs or trays as directed and approved by the Architect. The supports shall be placed not more than 1.0 meter apart. All cables passing through walls below paved area, and concrete shall run through stone ware pipes or Hume pipes of adequate diameter recessed or exposed as directed. Cables running along walls shall be supported and clamped to saddles, or hanger rigidly anchored at close intervals. Clear space between parallel cables shall be equal to the diameter of the cable but not less than 50mm. Where called for cable trenches shall be filled with fine sand. The contractor shall ensure that hangers, brackets and other supporting arrangements for cables are placed in proper position at the time of building the walls, concreting slabs, etc. cutting holes or opening in concrete may be carried out only with prior permission of the Architect.

All excavations and back fill including timbering, shoring and pumping required for the installation of the cables shall be carried out as per the drawings and requirements laid down elsewhere. Trenches shall be dug true to line and grades. Back fill for trenches shall be filled in layers not exceeding 150mm. Each layer shall be properly rammed and consolidated before laying the next layer. The Contractor shall restore all surfaces roadways, side walks, curbs, walls or other works cut by excavation of their original condition, to the satisfaction of Consultant.

## 2.12. MARKERS AND WARNING PLATES

Approved CI cables markers shall be provided along the route of the cables at every 30 meter distance and at both ends of road crossing, indicating HV cables and MV cables as applicable. Special CI markers shall be provided at all buried cable joints indicating "Electrical Cable Joints. GI plates engraving the size of cable and the place it serves shall be tied to the cable at regular intervals of 2 meters for easily identification of the cables.

## 2.13. TESTING OF CABLES

Prior to burying of the cables, following tests shall be carried out:

- a. Insulation test between phases and phase to earth for each length of cable before and after jointing.

On completion of cable laying work and jointing the following tests shall be conducted in the presence of the Consultants.

- a. Insulation Resistance test (Sectional and Overall)
- b. Continuity Resistance Test.
- c. Sheath continuity Test.
- d. Earth Test.
- e. Physical Dimensions Test.

All tests shall be carried out in accordance with relevant Indian Standard Codes of practice and Indian Electricity Rules. The contractor shall provide necessary instruments, equipment and labour for conducting the above test and shall bear all expenses in connection with such tests. All tests shall be carried out in the presence of the Architect / Consultant.

## 3.0 EARTHING

### 3.1 EARTHING

All the non-current metal parts of electrical installation shall be earthed properly. All metal conduits, trunking, cable sheaths, switchgear, outlet boxes, distribution boards, light fittings, fans and all other parts made of metal or conductive material shall be bonded together and connected by means of specified earthing system.

All earthing will be in conformity with the relevant provision of Rules 33 and 61 of the Indian Electricity Rules 1956 and Indian Standard Specifications IS:3043-1987 with latest amendments.

### 3.2. EARTHING CONDUCTORS

All earthing conductors shall be of high conductivity electrolytic copper of 99 % purity and shall be protected against mechanical injury or corrosion.

### 3.3. SIZING OF EARTHING CONDUCTORS

The cross sectional area of copper earthing conductor shall be same as the active conductor for sizes of active copper conductor upto 4.0 sqmm and shall be half the size for 16 sq mm active copper conductor and above. All fixtures, fans, outlet boxes and junction boxes shall be earthed with 1.5 sqmm PVC Insulated copper conductor wires. All power sockets and single phase A/C units shall be earthed with 4.0 PVC Insulated copper conductor wires. All Three phase Final Distribution Boards shall be earthed with 2 nos 4 mm dia bare copper conductor wires. The sizes of the earth continuity conductors should not be less than half of the largest current carrying conductors.

The Sub-Distribution Board shall be earthed to 2 nos 600mm x 600mm x 3mm copper plate earthing stations through 25m x 3 mm copper strips.

### 3.4. CONNECTION OF EARTHING CONDUCTORS

Main earthing conductors shall be taken from the earth connections at the main switchboards to an earth electrode with which the connection is to be made. Submain earthing conductors shall run from the main switchboard to the sub-distribution boards. Final distribution boards earthing conductors shall run from sub-distribution boards.

### 3.5. PROHIBITED CONNECTIONS

Neutral conductor, sprinkler pipes, or pipes conveying gas, water, or inflammable liquid, structural steel work, metallic enclosures or cables and conductors, metallic conduits and lightning protection system conductors shall not be used as a means of earthing an installation or even as a link in an earthing system. The electrical resistance of metallic enclosures for cables and conductors measured between earth connections at the main switchboard and any other point on the completed installation shall be low enough to permit the passage of current necessary to operate fuse or circuit breakers and shall not exceed 1 ohm.

### 3.6. PROTECTION FROM CORROSION

Connections between copper and galvanised equipment shall be made on vertical face and protected with paint and grease. Galvanised fixing clamps shall not be used for fixing earth conductors. Only copper

fixing clamps shall be used for fixing earth conductors. When there is evidence that the soil is aggressive to copper, buried earthing conductors shall be protected by suitable serving and sheathing.

### 3.7. EARTHING STATION

Plate Electrode Earthing : Earthing electrode shall consist of a tinned copper plate not less than 300mm x 300mm x 3mm thick as called for in the Schedule. The plate electrode shall be buried as far as practicable below permanent moisture level but in any case not less than 4.2 meters below ground level. Wherever possible earth electrodes shall be located as near the water tap, water drain or a down take pipe as possible. Earth electrodes shall not be installed in proximity to a metal fence. It shall be kept clear of the buildings foundations and in no case shall it be nearer than 2 meters from the outer face of the wall. The earth plate shall be set vertically and surrounded with 150mm thick layer of charcoal, dust and salt mixture. 20mm GI pipe shall run from the top edge of the plate to the ground level. The top of the pipe shall be provided with a funnel and a mesh for watering the earth through a pipe. The funnel over the GI Pipe shall be housed in a masonry chamber, approximately 300mm x 300mm x 300mm deep. The masonry chamber shall be provided with a cast iron cover resting over a GI frame embedded in masonry. Refer Sketch for additional details.

Pipe Electrode Earthing: Earthing electrode shall consist of a GI Pipe (class 'A') Indian Tube Company make or approved equal not less than 40mm dia and 4.5 meters long. GI Pipe electrode shall be cut tapered at the bottom and provided with holes of 12mm dia drilled at 75mm interval upto 2.5 meters length from bottom. The electrode shall be buried vertically in the ground as far as practicable below permanent moisture level with its top not less than 1.25 M below ground level. The electrode shall be in one piece and no joints shall be allowed in the electrode. Wherever possible earth electrodes shall be located as near water tap, water drain or a down take pipe. Earth electrodes shall not be located in proximity to a metal fence. It shall be kept clear of the building foundations and in no case shall be nearer than 2 meters from the outer face of the wall. Refer Sketch for additional details.

The pipe earth electrode shall be kept vertically and surrounded with 150mm thick layer of charcoal dust and salt mixture upto a height of 2.5 meters from the bottom. At the top of the electrode a funnel with a mesh shall be provided for watering the earth. The main earth conductors shall be connected to the electrode just below the funnel, with proper terminal lugs and check nuts. The funnel over the GI pipe and earth connection housed in a masonry chamber, approximately 350mm deep. The masonry chamber shall be provided with a cast iron cover resting over a CI frame embedded in masonry.

### 3.8. EARTH CONNECTION

All metal clad switches and other equipment carrying single phase current, shall be connected to earth by a single connection. All metal clad switches carrying medium voltage and high voltage shall be connected with earth by two separate and distinct connections. The earthing conductors inside the building wherever exposed shall be properly protected from mechanical injury by running the same in GI Pipe of adequate size.

Earthing conductors outside the building shall be laid 600mm below the finished ground level. The overlapping in copper strips at joints where required, shall be minimum 75mm. The joints shall be riveted and brazed with copper rivets and greased in approved manner. Sweated lugs of adequate capacity and size shall be used for all termination of wires above 1 Sqmm size and bare copper wire above 2.0mm dia. Lugs shall be bolted to the equipment body after the metal body is cleaned of paint and other oily substance and properly tinned. The earth wires entering the Final Distribution Boards shall be terminated with copper sockets crimped to its ends and tightened to the terminal with the help of flat end brass screws.

### 3.9. EARTH RESISTANCE

The earth resistivity of the soil where the earthing stations are located shall be submitted to the Consultant before the earthing work starts and get the approval of the Consultant/Owner. If the earth resistance is too high and multiple electrode earthing does/not give adequate low resistance to earth, than the soil resistivity immediately surrounding the earth electrodes shall be reduced by adding sodium chloride, calcium chloride, sodium carbonate, copper sulphate, salt and soft coke or charcoal in suitable proportions as directed by the consultants.

### 3.10. RESISTANCE TO EARTH

The resistance of each earth system shall not exceed 1.0 ohm in the case of Medium Voltage system and 0.5 ohm in the case of High Voltage system.4 TESTING.

### 4.1. GENERAL

On completion of the work the entire installation shall be subject to following tests:

- a) Wiring Continuity Test
- b) Insulation Resistance Test
- c) Earth Continuity Test
- d) Earth Resistivity Test

Besides the above any other test specified by the local Authority shall also be carried out.

All tested and calibrated instruments for testing, labour, materials and incidentals necessary to conduct the above tests shall be provided by the Contractor at his own cost.

#### 4.2. TESTING OF WIRING

All wiring systems shall be tested for continuity of circuits, short circuits and earthing after wiring is complete and before energising. The Test Certificates for the complete wiring shall be submitted in the Format and the Total Electrical Installation shall be got approved by the Electrical Inspector.

#### 4.3. INSULATION RESISTANCE TEST

The insulation resistance shall be measured by applying between earth and the whole system of conductors, or any section thereof with all fuses in place and all switches closed (except in concentric wiring) all lamps in position of both poles of the installation, otherwise electrically connected together, a direct current pressure of not less than twice the working pressure (provided that it does not exceed 660 volts for medium voltage circuits) be applied. Where the supply is derived from A.C. three phase system, the neutral pole of which is connected to earth, either direct or through added resistance, pressure shall be deemed to be that which is maintained between the phase conductor and the neutral. The insulation resistance measured as above shall not be less than 50 divided by the number of points on the circuit provided that the whole installation shall not be required to have an insulation resistance greater than one mega ohm. The insulation resistance shall not be measured between all conductors connected to one phase conductor of the supply and all the conductors connected to the middle wire or to the neutral or to the other phase conductors of the supply. Such a test shall be carried out after removing all metallic connections between the two poles of the installation and in these circumstances the insulation resistance between conductors of installation shall not be less than that specified above.

The insulation resistance between the case of frame work of housing and power appliances, and all live parts of each appliance shall not be less than that specified in the relevant Indian Standard Specifications or where there is no such specification shall not be less than half a mega ohm.

#### 4.4. TESTING OF POLARITY OF NON-LINKED SINGLE POLE SWITCHES

In a two wire installation a test shall be made to verify that all non-linked single pole switches have been fitted in the same conductor through out, and such conductor shall be labeled or marked for connection to an outer or phase conductor or to the non-earthed conductor of the supply. In the three or four wire installation a test shall be made to verify that every non-linked single Pole switch is fitted in a conductor to one of the outer or phase conductor of the supply. The entire electrical installation shall be subject to the final acceptance of the Consultant as well as the local authorities.

#### 4.5. EARTH RESISTIVITY TEST

Earth resistivity test shall be carried out in accordance with Indian Standard code of practice for earthing IS:3043:1987. All tests shall be carried out in the presence of the Consultant/Owner.

#### 4.6. TEST CERTIFICATES

The Electrical Installation shall be tested as per relevant Indian Standards and Test Certificate to this effect shall be submitted to the Owner. The Contractor has to get the Total Electrical Installation approved by the Electrical Inspector and the permission to energise the same shall be submitted to the Owner.



5 SAFETY REQUIREMENTS

5.1 SCOPE

This section covers the requirements of items to be provided in the sub-station for compliance with statutory regulations, safety and operational needs.

5.2 REQUIREMENTS

Safety provisions shall be generally in conformity with the relevant Indian Standards and I.E. Rules and Regulations. In particular the following items shall be provided.

(a) Insulation Mats

Insulation Mats conforming to IS : 5424-1969 shall be provided in front of main switch boards and other control equipment as specified.

(b) First Aid Charts and First Aid Box

Charts (one in English, one in Hindi, one in Regional language), displaying methods of giving artificial respiration to a recipient of electrical shock shall be prominently provided at appropriate place. Standard First Aid Boxes containing materials as prescribed by St. John Ambulance brigade or Indian Red Cross should be provided in each sub-station.

(c) Danger Plate

Danger plates shall be provided on HV and MV equipments. MV danger notice plate shall be 200mm x 150mm made of mild steel atleast 2mm thick vitreous enameled white on both sides and with inscriptions in signal red colour on front side as required.

(d) Fire Extinguishers

Portable CO<sub>2</sub> conforming to IS : 2878-1976 dry chemical conforming to IS 2171-1976 extinguishers shall be installed in the sub-station at suitable places as specified.

(e) Fire Buckets

Fire buckets conforming to IS : 2546-1974 shall be installed with the suitable stand for storage of water and sand.

(f) Tool Box

A standard tool box containing necessary tools required for operation and maintenance shall be provided in sub-station.

(g) Caution Board

Necessary number of caution boards as "Man on Line" "Don't switch on' etc. shall be available in the sub-station.

(h) Key Board

A key board of required size shall be provided at a proper place containing castel key, and all other keys of sub-station and allied areas.

6.0 M V PANELS, SUB-DISTRIBUTION BOARDS & FINAL DISTRIBUTION BOARDS

All the M V Panels , Sub-Distribution Boards(SDB) & Final Distribution Boards(FDB) shall be suitable for operation on 3 phase, 4 wire, 415 Volts, 50 cycles, neutral grounded at transformer and short circuit level not less than 31 MVA at 415 volts.

The MV Panel, SDBs & FDBs shall comply with the latest edition of relevant Indian Standards and Indian Electricity Rules and Regulations. All Panels and Distribution Boards shall be fabricated by the contractor by using specified components as per the specifications given below:

6.1. CONSTRUCTION FEATURES

The Distribution Boards and Panels shall be metal enclosed sheet steel cubical, indoor, dead front, floor mounting type. The distribution boards shall be totally enclosed, completely dust and vermin proof.

Gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust proof. Panels and Distribution boards shall be preferably arranged in multitier formation. All doors and covers shall be fully gasketed with foam rubber and/or rubber strips and shall be lockable. All MS sheet steel used in the construction of distribution boards and Panels shall be 2mm thick and shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet metal shall be seam welded, all welding slag grounded off and welding pits wiped smooth with plumber metal.

All covers shall be properly fitted and square with the frame, and holes in the panel correctly positioned. Fixing screws shall enter into holes tapped into an adequate thickness of metal or provided with hank nuts. Self threading screws shall not be used in the construction of MV Panel & distribution boards. A base channel of 75mm x 40mm x 5mm thick shall be provided at the bottom. A minimum of 200 mm between the floor of MV Panel & Distribution board and lower most unit shall be provided. The MV Panel & Distribution Boards shall be of adequate size with a provision of 20% spare space to accommodate possible future additional switchgear in addition to spare feeders.

Knockout holes of appropriate size and number shall be provided in the Distribution Board and Panels in conformity with the location of incoming and outgoing cables.

Panels and distribution boards shall be provided with removable sheet steel plates at top and bottom to drill holes for cable entry at site. MV Panel shall be of Extendible type.

The Panels and SDBs shall be suitable for IP 42 protection.

#### 6.2. CIRCUIT COMPARTMENTS

Each circuit breaker, MCCB and switch fuse units shall be housed in separate compartments and shall be enclosed on all sides. Sheet steel hinged lockable door shall be duly interlocked with the ACB/MCCB/switch fuse unit in 'on' and 'off' position. Safety interlocks shall be provided for air circuit breakers to prevent the breaker from being drawn out when the breaker is in 'on' position. The door shall not form an integral part of the draw out position of the ACB. All instruments and indicating lamps shall not be mounted on the ACB compartment door. Sheet steel barriers shall be provided between the tiers in a vertical section. The Knobs for holding the cubicle door in closed position shall be spring operating rotating type and not screwed type.

#### 6.3. INSTRUMENT ACCOMMODATION

Separate and adequate compartments shall be provided for accommodating instruments, indicating lamps, control contractors and control fuses etc. These shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker, bus bar and connections.

#### 6.4. BUS BARS & BUS BAR CONNECTION

The bus bar and interconnections shall be of electrolytic Copper of 99.9 % purity of rectangular cross sections suitable for full load current for phase bus bars and full rated current for neutral bus bar and shall be extendible on either side. Minimum 200 Amps capacity bus bars shall be provided in the distribution boards. The bus bars and interconnections shall be insulated with PVC heat shrinking sleeves and colour coded. The bus bars shall be supported on unbreakable, non hygroscopic insulated SMC supports at regular intervals to withstand the forces arising from short circuit in the system. All bus bars shall be provided in a separate chamber and properly ventilated. The current density of copper shall be 1.6 Amps per sq.mm cross sectional area of Bus bar.

All bus bar connections in Panel and Sub-distribution boards shall be done by drilling holes in bus bars and connecting by cadmium plated M.S. bolts and nuts . 20% Additional cross section of bus bars shall be provided in all distribution boards to cover up the holes drilled in the bus bars. Spring and flat washers shall be used for tightening the bolts.

Automatically operated safety shutters to screen the live cluster when the breaker is withdrawn from cubicle is to be provided.

All connections between bus bars and switches and between switches and cable alley terminals shall be through solid copper strips of proper size to carry full rated current and insulated with PVC heat shrinking sleeves . All the M V Panels and SDBs shall be completely factory wired, ready for connection. All the terminals shall have adequate current rating and size to suit individual feeder requirements. Each feeder shall be clearly numbered from left to right to correspond with wiring diagram. All the switches and feeders shall be distinctly marked with a small description of the service installed. Minimum width of busbar Alley shall be 300 mm and that of cable alley shall be 450 mm.

#### 6.5. TERMINALS

The outgoing terminals and neutral link shall be brought out to a cable alley suitably located and accessible from the panel front. The current transformer for instruments metering shall be mounted on the terminal blocks. Cable compartments shall be provided for incoming and outgoing cables.

6.6. WIREWAYS

A horizontal wire way with screwed covers shall be provided at the top to take interconnecting control wiring between different vertical sections.

6.7. CABLE COMPARTMENTS

Cable compartment of adequate size shall be provided in the Sub Distribution Boards for easy termination of all incoming and outgoing cables entering from bottom or top. Adequate proper supports shall be provided in cable compartments to support cables. All incoming and outgoing switch terminals shall be brought out to terminal blocks in the cable compartment.

6.8. METERS

All meters shall be housed in a separate compartment and accessible from front only. Lockable doors shall be provided for the metering compartment. The details of other meters and indicating lamps are as described in each switch board and neutral selector switch of appropriate range and scale. Wiring for meters shall be colour coded and labeled with approved plastic ferrules for easy identification. All meters shall be digital.

6.9. CURRENT TRANSFORMERS

Where ammeters are called for CT's shall be provided for current measuring more than 60 Amps. Each phase shall be provided with separate current transformer of accuracy class 1 and suitable V.A. Burden for operation of associated metering. Current transformers shall be in accordance with IS:2705-1964 as amended upto date and Cast Resin Type.

6.10. INDICATING PANEL AND METERING EQUIPMENT

All meters and indicating instruments shall be accordance with relevant Indian Standards. The meters shall be flush mounted and draw out type. Indicating lamps shall be neon type and of low burden. Indicating lamps shall be backed up with fuses of 5 Amps and toggle switch.

6.11. MOULDED CASE CIRCUIT BREAKERS (MCCB)

MOULDED CASE CIRCUIT BREAKERS(MCCB) : MCCB's shall be in accordance with IS: 2516-1985 & IEC 157-1 with the latest amendments. It shall be enclosed type made of Heat resistant high strength, flame retarding, thermosetting material rated for 500 V, 50 Hz. It shall have three position indicator 'ON', 'OFF' & 'TRIP' at top, bottom & middle position. It shall be provided with shunt trip and additional 2 Nos. NO & NC contacts. The minimum breaking capacity of MCCB's shall be 20 KA up to 100 AMPS rating and 35 KA for MCCB's above 100 AMPS rating up to 200 A and 50KA for MCCBs above 200 A. All MCCB.s shall have door operating handle (Rotary Operating Handle). The short circuit with standing capacity shall be ICS Rating and not ICU Rating.

6.12. EARTHING

Copper earth bars of 25mm x 3mm shall be provided for MV Panel and SDBs for the full length and connected to the frame work of the Panel and SDBs.

Provision shall be made for connection from this earth bar to the main earthing bar on both side of the Panel and SDBs.

6.13. PAINTING

All sheet steel work shall under go a process of degreasing pickling in acid, cold rinsing, phosphating, passivating and then sprayed with a high corrosion resistant primer. The primer shall be baked in an oven. The finishing treatment shall be by application. Two coats of synthetic enamel paint of approved colour and powder quoted. The seven Tank process shall be adopted.

6.14. LABELS

Engraved anodized aluminium labels shall be provided on all incoming and outgoing feeder switches. Circuit diagram showing the control wiring shall be pasted on inside of the panel door and covered with transparent laminated plastic sheet. The Label shall indicate the name of the feeder, the specific area it is feeding, ampere rating and the cable size it is receiving. The Labels shall be provided on the backside of the Panel in case of back access.

All the SDBs and Panels shall be subject to tests specified in relevant Indian Standards and test certificate shall be furnished.

6.15. SHOP DRAWING

Before fabricating the Panels and the SDBs/FDBs the contractor has to submit shop drawing with the wiring diagram for all the Panels and SDBs/FDBs to the Consultant and get approval from the Consultant.

6.16. INSPECTION

At all reasonable times during production and prior to shipment of equipment the contractor shall provide and secure for Consultant/ Owners representative every reasonable access and facility at their plant for inspection.

6.17. TEST CERTIFICATES

Testing of Panels and SDBs shall be carried out at factory and at site as specified in Indian Standards. The test certificates for the tests carried out at factory shall be submitted in duplicate.

6.18. MINIATURE CIRCUIT BREAKER & FINAL DISTRIBUTION BOARDS

Miniature circuit breaker shall be quick make and break type and confirm with Indian Standards IS : 8828 – 1978 ( Specifications for Miniature Air Break Circuit breakers for voltage not exceeding 1000V ) The housing of MCB's shall be heat resistant and having a high impact strength. The fault current of MCB's shall not be less than 9000 Amps at 230 volts. The MCB's shall be flush mounted and shall be provided with trip free manual operating mechanism "ON" and "OFF" indications.

The MCB contacts shall be silver nickel and silver graphite alloy coated with silver. Proper arc chutes shall be provided to quench the arc immediately. MCB's shall be provided with magnetic fluid plunger release for over current and short circuit protection. The over load or short circuit devices shall have a common trip bar in the case of DP and TPN Miniature circuit breakers. The MCB shall be tested and certified as per Indian Standards prior to installation.

All final distribution boards shall be provided with MCB's. TPN final distribution boards shall consists of 3 rows of single pole MCB's for each circuit, and each phase shall be connected to the incoming supply through double pole MCB isolator. Separate neutral bus bars shall be provided for each phase in the case of TPN Distribution Boards. In case Earth Leakage Circuit Breaker( ELCB ) has to be provided in Final Distribution Boards then on the incoming side instead of DP MCB Isolator a DP ELCB shall be provided of Current rating same as that of DP MCB Isolator and current sensitivity maximum of 100mA. The ELCB shall conform to IS : 12640 - 1988 ( Residual Current-Operated Circuit Breakers-Specifications) Solid links between MCB Isolator and backed by HRC fuse/Rewirable fuse and Neutral bus bar shall be provided. The Neutral shall be looped from one phase to another through DP Isolators. MCB's shall be provided on the phase or live conductor of each circuit and a neutral bar for the earthed neutral. The individual MCB in each row shall be detachable without disturbing the row of MCB's. Phase separation barriers of 3mm thick bakelite sheet shall be provided between the back of MCB's fitting 3mm thick bakelite sheet cover shall be provided for each phase. There shall be ample space behind the back of MCB's to accommodate all the wiring. All the internal wiring of final distribution Boards shall be concealed behind 3mm thick bakelite sheet. All the distribution boards shall be completely factory wired, ready for connection. All the terminals shall have adequate current rating and size to suit individual feeder requirements. Each circuit shall be clearly numbered from left to right to correspond with wiring diagram. All the switches and circuits shall be distinctly marked with a small description of the service installed. A four way 60 A Brass/Copper neutral link shall be provided with terminals suitable to receive 16 sq mm stranded copper wires with end sockets. The final Distribution Boards shall be fabricated as per consultants design.

7. FIRE DETECTION AND ALARM SYSTEM

7.1 SCOPE

The scope of this section covers design, manufacturers, supply, installation, connecting, testing and commissioning of conventional type fire detection and alarm system.

The work include supply, installation, testing and commissioning of:

M S conduit work with all accessories.  
Complete wiring in existing concealed/surface conduits  
Photoelectric type smoke detectors.  
Rate of rise cum fixed temperature heat detectors.  
Manual alarm stations.  
Response indicators.  
Main control and indicating panel/zonal panel.

A high degree of operational safety, high quality and well designed detectors, signal panels and auxiliary equipment shall be accepted. Supplier shall confirm that the electronic components used in alarm and indicating panels are of standard manufacturers and are approved type, also the name of the manufacturer shall be indicated.

The Contractor shall obtain clearance and approval from the Local Fire Authorities, the insurance company insuring the building or any other agencies whom approval is required.

## 7.2 STANDARDS

For Spacing of detectors	BS	:	Code of Practice CP 1019, Section 2.7
For sensitivity of smoke detector	BS	:	5446 - 1977
For control and indicating panel	IS	:	2189 – 1988
For smoke Detector	IS	:	11360 - 1985
For Heat Detector	IS	:	2175 – 1988

## 7.3 OPERATING VOLTAGE

220 volts AC + 10% 50 cycles (single phase) and 24 volts DC +- 10%

## 7.4 DETECTORS IN GENERAL

### COMPATIBILITY

All automatic fire detectors shall be interchangeable without requiring different mounting bases nor alternations in the signal panel.

### RESPONSE SPECTRUM

Combustion gas detectors shall respond to both visible and invisible aerosols, size and colour of the aerosols shall not have a decisive influence on the response of the detector.

### SENSITIVITY

On average, 30 mgr of burned material per cu.m (as measured in a 1 cu.m chamber) shall release an alarm.

### POWER CONSUMPTION

Each detector shall use the minimum of power, for economic circuits, so that it shall be possible to connect atleast 20 detectors per zone. Distance upto 1000 meters from detector to signal panel shall not influence the number of detectors per zone.

### BUILT-IN-RESPONSE INDICATOR

Each detector shall incorporate indicator "LED" at the base of the detector which shall light up on actuation of the detector to located the detector which is operated. The detector shall not be affected by failure of the response indicator lamp.

### RESPONSE INDICATORS

It shall be possible to provide a secondary response indicator for the detector outside the closed room.

### MAINTENANCE

All detectors shall be fitted either with plug-in system or bayonet type connections only, from the maintenance and compatibility point of view.

### CONSTRUCTION

The detector shall be vibration and shock proof. When disassembling for cleaning purpose, its components must not be damaged by static over voltage.

## 7.4.1 ATMOSPHERIC AND THERMAL DISTURBANCES

The detector shall also be designed as to be practically immune to environmental criteria such as air currents, humidity, temperature fluctuations, pressure and shall not release false alarm.

#### 7.4.2 CONTINUOUS OPERATION

An alarm release shall not effect a detector's good functioning. After resetting the alarm the detector shall resume operation without re-adjustment of any kind.

#### 7.4.3 ADAPTABILITY TO AMBIENT CONDITIONS

Detectors shall be designed for adaptability to humid and explosion endangered locations.

#### 7.5 PHOTOELECTRIC SMOKE DETECTORS

Smoke detectors shall connect with two wires to one of the Fire Alarm Panel Loops. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog value for smoke density. The detectors shall be ceiling mounted type and shall include a twist-lock base.

The detectors shall provide dual alarm and power LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel. Both LEDs may be placed into steady illumination by the control panel; indicating that an alarm condition has been detected. An output connection shall also be provided in the base to connect an external remote alarm LED.

The area covered by each smoke detector shall be as per IS-2189.

Detectors shall be suitable for an operating temperature 0 degree C to 55 degree C and Relative humidity of 0% to 95%.

Detectors shall be suitable for a supply voltage of 17 to 28 V DC without affecting the sensitivity.

The detector shall have the approval of UL/FM/VDS/LPC only.

#### 7.6 THERMAL DETECTORS

Thermal detectors shall connect with two wires to one of the Fire Alarm Panel loops. The detectors shall use an electronic detector to measure thermal conditions caused by a fire and shall, on command from the control panel, send data to the panel representing the level of such thermal measurements. The detectors shall be ceiling-mounted type and shall include a twist-lock base.

The detectors shall provide dual alarm and power LEDs. Both LEDs shall flash under normal conditions. Both LEDs may be placed into steady illumination by the control panel, indicating that an alarm condition has been detected.

Detectors shall be suitable for an operating temperature 0 degree C to 22 degree C and relative humidity of 0% to 95%.

Detectors shall be suitable for a supply voltage of 17 to 28 V DC without affecting the sensitivity.

The detector shall have the approval of UL/FM/VDS/LPC only.

#### 7.7 MANUAL CALL STATIONS

Manual Call stations shall be provided to connect to the Fire Alarm Panel loops.

Manual stations shall be constructed of high impact LEXAN sheet with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters. Press/back stations with reset table capacity shall be acceptable.

Stations shall be suitable for surface mounting as shown on the plans, or semi-flush mounting, and shall be installed not less than 42 inches, nor more than 48 inches above the finished floor unless otherwise specified by applicable building codes.

#### 7.8 RESPONSE INDICATOR

Response indicator shall be LED (light emitting diode) type, and shall indicate when a detector senses the fire.

#### 7.9 REPEATER PANEL

Repeater panels are to be provided at remote location for monitoring the health of FAS. It should have 2 line 40 inches character display along with CEO status indicator. Battery backup shall be provided as an in-built feature and all information will be presented in clear English language. It shall be suitable for operation from 0 degree C to 49 degree C and shall be flush mounted.

#### 7.10 ELECTRONIC HOOTERS

All Hooters should be able to provide at least a minimum of 3 different tones, which should be user configurable. The minimum decibel level of each hooter should be 90db at 1 mtr. All hooters should be UL/FM listed.

The Electronic Hooters shall be housed in MS enclosure of 1.5 mm sheet metal.

The Hooters shall be with built on oscillator & amplifier.

The Hooters shall give wailing sound whenever it received 24 V supply from panel on receipt of Fire signal.

The MS box shall be painted with Fire Red ( Power Coated)

#### 7.11 MAIN FIRE ALARM CONTROL PANEL

Control Panel

The control cabinet shall be dust proof and shall be provided with a glass door with lock and key to prevent tempering by unauthorized persons.

The control circuit shall consists of glass epoxy (PCB) printed circuit board, silver plated and treated with protective layer of special lacquer for protection against corrosion.

The alarm circuitry shall be 100% solid state without the use of any relays anywhere in zone card.

The zone cards shall be modular and interchangeable.

Every zone shall have individual control for test acknowledge and any zone shall be isolated without effecting the working of the other zones in the panel.

Sounder silencing control shall be provided which shall remain in visual indication at the same time making the panel from to receive alarm from any other zone without the need for resetting the entire panel.

Silencing switches/push buttons – the system shall be so designed that once an alarm has been given it shall continue till the alarm sounder is switched off. The silencing switches/push buttons in their 'OFF' position shall give an indication of this fact on the main control panel or transfer the alarm signal to supervisory sounders under the supervision of the responsible person so that they may put use of the smallest number of call points. Operation of silencing switch shall not prevent sounding of alarm from any other zone simultaneously.

Central control and indicating panel shall be suitable for conventional Fire Detection and Alarm System and shall comply with IS:2189-1988.

Control panel shall support the following Fire-Detection components.

Smoke Detectors

Detectors (Both fixed & rate of temperature rise type)

Manual Call Stations

System shall be completely backed up against Mains failure for atleast 8 hours and shall be suitable for the following types of batteries.

Lead acid Maintenance free.

Tender doc. of our 'ECGC LTD.' West Delhi Branch Office Located in K.L.J. Tower (North)  
, Netaji Subash Place, 305-306, Third Floor, Pitampura, New Delhi- 110034.

Lead acid non-maintenance free  
Lead acid semi-maintenance free  
Nickel Cadmium.

System shall be self diagnostic and shall cover the following:  
Components/Modules of the fire panel.  
Faulty detectors  
Missing detectors  
Open circuit short circuit conditions of the detector cable.  
Suitable indication shall be given on the panel.

Zone wise annunciation of alarm by using:  
Buzzer Sounders

#### 7.12. BATTERY

Suitable rating ampere Hours 24 Volts DC sealed maintenance free batteries shall be provided for Fire Detection and Alarm System. The battery rating is indicative only. It shall be sized by bidder to cater to all momentary and short time loads in addition to supplying the continuously rated loads for a duration of 8 hours. However minimum size shall be 65 AH.

##### Battery Charger

Bidder shall furnish the battery charging system complete with all necessary accessories such as transformer, rectifier, switches, fuses, starters, contactors, ammeter, voltmeter, protections and other, devices for trouble free operation.

##### Construction features

Housing of battery charger shall be 2 mm thick CRCA steel sheet cabinet for indoor installation and shall be floor mounted type. The cabinet shall be folded and braced as necessary to provide a rigid support for all components. Louvers shall be provided in the cabinet for ventilation. PVC sheets of 3 mm thick shall be provided on the selves on which the batteries are to be placed.

##### Input

240 volts AC 50 cycles, single phase with tappings of 0-200-220-240-260 volts on the primary side of the transformer.

##### Output

DC output shall be 24 volts. DC bridge rectifier shall be of silicon type, having full wave rectification. Suitable contactor, relay, reset shall be provided as required.

#### 7.13 CABLES

All PVC insulated FRLS copper conductor stranded cables shall be 650 volts grade and shall generally conform to IS-1554-1988 and meet the signal cabling requirement of the system manufacturer.

Strands of cables shall not be cut to accommodate & connect to the terminals. Terminals shall have sufficient cross-sectional area to take all the strands.

Cables shall be laid by skilled and experienced workmen using adequate rollers to minimize stretching of the cable. The cable drums shall be placed on jacks before unwinding the cable. Great care shall be exercised in laying cables to avoid forming kinks. At all changes in direction in horizontal and vertical planes, the cable shall be bent smooth with a radius as recommended by the manufacturer's. All cables shall be laid with minimum one diameter gap and shall be clamped at every metre and shall be tagged for identification with aluminium tag and clamped properly. Tags shall be provided at both ends and all changes in directions both sides of wall and floor crossings. All cable shall be identified by embossing on the tag the size of the cable, place of origin and termination.

These shall be measured on linear basis including the fittings required like, end termination junction boxes.



LIST OF APPROVED MAKES FOR ELECTRICAL

Sl.No.	Details of Materials	Manufacturers Name
1.	MV CABLES	SKYLINE / HAVELLS/ Bonton
2.	M V SWITCHGEAR	L & T/GROUP SCHNEIDER / SIEMENS /ABB
3.	CAPACITOR BANKS	L&T/ SIEMENS/ALSTOM
4.	PVC INSULATED COPPER CONDUCTOR STRANDED CONTROL WIRES OF 1100 V GRADE	FINOLEX/ SKEYLINE/RRKABEL
5.	CABLE GLANDS	COMET/POWER ENGG.
6.	COPPER LUGS HEAVY DUTY	DOWELLS
7.	RELAYS	ALSTOM/ABB/L&T
8.	MEASURING METERS	AUTOMATIC ELECTRIC/KAPPA/ENERCON
9.	INDICATING LAMPS	VAISHNO/CONCORD/SIEMENS/GE POWER
10.	BREAKER CONTROL SWITCH	ALSTOM/L&T/ABB/SIEMENS
11.	SELECTOR SWITCH	KAYCEE/L & T /SIEMENS
13.	MCCB's	L & T/GROUP SCHNEIDER/ABB/SIEMENS
14.	DIGITAL METERS & KWH METERS	SECURE/L&T/ENERCON
15.	PUSH BUTTONS	L & T/SIEMENS/ABB
16.	MCB's	MDS/L&T HAGGAR/SCHNEIDER-MG/SIEMENS
17.	Terminal Blocks	Elmex
18.	CABLE TRAY	SLOTCO/VENUS/ ERA ONTROL SYSTEM
19.	M.S. Conduits and accessories	BEC
20.	P.V.C. conduits and accessories	BEC/ Polypack
21.	Switches, plugs , telephone outlets ( Modular Type)	M.K. India/Legrand/Crabtree/north west /clipsal (Modular Clip on type)
22.	G.I. Pipe	Tata /Jindal
23.	Earth Leakage Circuit	Hager/ MDS/ ABB/Merlin Gerin
24.	PANELS	ERA CONTROL SYSTEM/DEWELDOGEN/ EVA ENGINEERS
33.	FIRE ALARM SYSTEM	System Sensor/ EDWARDS/APPOLO
34.	Data Components	AMP/ SYSTMATICS

The names of manufacturers are mentioned in order of preference. The Contractor shall quote rates for materials of first preference only and that the Contractor has satisfied himself regarding the availability of the materials and that only materials called for under first preference shall be supplied and installed. In the event of the materials of makes called for are not available and alternative makes are approved (by the consultant) for incorporation in the work, the rates quoted shall be suitably amended based on the

price variation between the specified makes and alternative makes on the day the alternative makes are accepted.

#### POINT WIRING

The rates for all point wiring items shall include :

1. Conduits, Conduit specials, bushes and other fittings concealed or exposed as called for.
2. Embedding conduit and allied fittings including the outlet boxes in walls, floors etc., during construction and/or in chases including cutting chases and making good with cement mortar as necessary in the case of concealed conduit work.
3. Providing and fixing approved fixing devices, saddles and grouting the same as required for exposed conduits.
4. Fabrication and Supply of G.I .boxes for switches, ceiling fan hooks, Exhaust fans outlet and lighting fixtures with 1.6 mm thick sheet steel.
5. Providing and fixing junction boxes with 3mm Hylam or 3mm/5mm thick Perspex sheet cover duly painted from inside to match the colour of the walls. All Junction boxes shall be MS only.
6. All fixing accessories such as clips, brass screws/brass washers rawl plugs etc.
7. All work & material necessary (including circuit wiring from DB to first tapping point of each circuit with 2.5 sq. mm wires) in complete wiring of a switch circuit of any length from the distribution board to the following via the switch:
  - a) Ceiling rose
  - b) Connector
  - c) Back plate
  - d) Socket outlet
  - e) Lamps Holder
  - f) Any other terminal outlet boxes
  - g) Ceiling fan and Exhaust fan
8. Switch, socket outlet as called for.
9. Cable/wire as required upto lamp holder.
10. All metal boxes and boards concealed or surface mounted including those required for housing fan regulators.
11. All accessories necessary to complete wiring as specified.
12. FRLS PVC Insulated stranded Copper conductor earth wire for fixtures, switch outlet boxes and third pin of 5/15 Amps. socket to common earth.
13. Painting all exposed M.S. conduits, outlet boxes and junction boxes.
14. M.S. conduit for concealed and exposed wiring.
15. 2 mm dia G.I. pull wires in conduit work, wherever necessary.
16. The switch plate shall be made of I.S.I. grade Urea Formaldehyde Moulding powder. The base of the switches shall be made from high heat resistant phenol formaldehyde powder. The cost of switches shall include the cost of cover plates, cadmium fixing screws etc.  
The switches/sockets shall be rocker operated.
17. Separate Earth wire shall run along with each circuit both for power and light circuits.
18. Cutting of floor and making good for carrying conduits also.
19. Numbering of Circuits with ferrules for all circuits at both ends.  
Providing 15 Amps capacity Bakelite terminal Blocks for terminating the phase, neutral and earth wire at each fixture location.  
PVC insulated copper conductor wire ends before connection shall be properly soldered (at least 15 mm length) with special Cu solder for copper conductor or shall be properly crimped with copper lugs/sockets as the case may be. Strands of wires shall not be out for connecting to the terminals. All stands of wires shall be soldered at the end before connection. The connecting brass-screws shall have flat ends.  
All looped joints shall be soldered and connected through terminal block/connectors.  
Provide embossing on the sockets engraving "UPS" and "RAW"

#### CONDUITING & WIRING FOR TELEPHONE & COMPUTER SYSTEM

The rates for conduit work shall include :

1. All necessary specials and fittings.
2. M. S. inspection, junction and outlet boxes as required.
3. 3/5 mm thick perspex sheet covers for inspection & junction boxes.
4. All fixing accessories such as clips, nails, brass screws/brass washers, etc.
5. 2 mm dia G.I. pull wires in conduit work, wherever necessary.
6. Providing and fixing approved saddle, hooks and grouting the same as required in the case of all exposed conduit work.
7. Embedding conduit and allied fittings including the outlet boxes in walls, floors etc., during construction and/or in chases including cutting chases and making good with cement mortar as necessary in the case of concealed conduit work.
8. Painting all inspection, junction and outlet boxes.
9. PVC conduit for concealed conduit wiring .
10. Painting of Hylam /perspex sheet cover from inside to suit the colour of the surrounding wall with two coats of paint.
11. Supply and fabrication of G.I. outlet boxes .
12. The outlet cover plate for Telephone outlets shall be made of I.S.I. grade Urea Formaldehyde Moulding powder. The cost of outlets shall include the cost of cover plates, cadmium fixing screws etc. also.
13. Numbering of wires on both ends of the wires for easy identification with PVC ferrules.

#### EARTHING

The rates for earthing items include :

1. All fixing accessories such as brass saddles, brass screws, rawl plugs etc.
2. Jointing by riveting in case of copper earth strips ( 2 per joint) and by welding in case of GI strips.
3. Cutting chase, making holes and making good the same wherever required.
4. All masonry work including earth work for earthing stations, earthing tapes and wires.
5. Effecting adequate and proper interconnections.
6. Use of copper thimbles for all wire terminations in the Distribution Boards , switches and sockets.

#### CABLES, MAINS AND SUB-MAINS

The rates for all items of work shall include:

1. Embedding conduits and allied fittings in walls, floors, etc., during construction and/or in chases including cutting chases and making good as necessary in the case of concealed conduit work.
2. Providing and fixing approved saddles, hangers, trays etc., and grouting the same as required for exposed conduits where called for. Providing dash fasteners for the threaded MS down rods(primer coated) used for hanging the cable \trays.
3. Providing and fixing junction boxes with 5 mm thick 'Hylam' sheet covers.
4. Effecting adequate and proper connections at terminations.
5. Ensuring that provision is left in various buildings components and trenches as the work proceeds, for incorporation of cable supports at a later date.

6. Providing all fixing accessories such as clamping devices, nuts and bolts, screws etc.
7. Clamping to supports where laid in trenches.
8. Excavation of trenches and bringing the trenches to exact level as required.
9. Providing sealing compound, thimble, solder etc., at joints and terminations as called for.
10. Providing proper supports for cable terminal boxes as called for.
11. Wherever cables pass through walls, ceiling, paved area or below roads provide sleeves/ hume pipes and making good as necessary.

#### DISTRIBUTION BOARDS

The rates for the following items of work generally include :

1. The supporting rigid steel frame work.
2. 1.6 mm thick MS boxes complete with dust proof and vermin proof covers and locking arrangements, mounted flush with surfaces.
3. All fixing accessories such as dash fasteners , bolts, nuts, screws, etc. as required.
4. Building into masonry/concrete work including all necessary cutting and grouting with cement mortar 1:2.
5. Effecting adequate and proper connections.
6. Effecting proper bonding to earth.
7. Painting/lettering on switches and distribution boards the location they serve and providing on each board its circuit diagram.
8. Touching up all damaged paint over exposed work with one coat of red oxide primer and two finishing coats of approved synthetic enamel paint.
9. Main Distribution Board and Final Distribution Boards shall be fabricated by Contractor with the specified equipment.  
  
Provide 6 Amps. SP MCB for Light Points Circuits, 20 Amps. SP MCB for Power Circuits and 32 Amps. SP MCB for 1.5 Ton AC Unit .

#### FIXING OF LIGHTING FIXTURES AND FANS

The rate for fixing of lighting fixtures and fans shall include:

1. Receiving the fixtures from the Owners's stores and assemble the same at site and testing the fixture before fixing.
2. All components that may be required to make the installation complete in all respects such as:
  - a. Suitable length of down rod, hanger and connecting wires, where called for.
  - b. Wires for connecting the fixtures to the point through connector blocks.
  - c. All wood and metal blocks to serve as base of fixtures.
  - d. Bonding with common earth wires.
3. Drilling holes in supports where required.
4. Fixing clamps, GI bolts and nuts, clips, brass screws, dash fasteners and other fixing accessories as required, including leaving necessary provision for fixing at time of concreting.

5. Approved enamel painting for hanger rods, clamps and other components and fixing accessories as called for.
6. Testing and commissioning of all fixtures and fans after installation.
7. The lighting fixtures shall be suitable for 230 Volts, single phase 50 cycles A.C. supply system.  
Incandescent lamps shall be 100 Watts (maximum) and fluorescent lamps shall be 18 watts and 36 watts.
9. Use G.I. suspenders and clamping to the slab with dash fasteners( 4 per fitting) , including turn buckle arrangements for adjustable heights for hanging. They should be the same suspenders as used for hanging the False Ceiling grid ceiling.

The contractor to mark the size of light fittings, speaker and fire alarm components on the false ceiling for the interior contractor to cut holes.

**A) AIR DISTRIBUTION SYSTEM:**

**1.0 GENERAL:**

Supply, fabrication, installation and testing of all sheet metal/aluminium ducts & supply, installation, testing and balancing of all grilles, registers and diffusers, in accordance with these specifications and the general arrangement shown on the drawings.

Duct work shall mean all ducts, casings, dampers, access doors, joints, vanes, stiffeners, hangers and supports etc.

All ducts shall be fabricated from galvanised steel sheets of the following thickness as indicated in schedule of quantities & as described in the IS:655 with latest edition.

**2.0 RECTANGULAR DUCT:**

Dimensions of Ducts	Gauge G.I	Aluminium	Type of Joints	Type of Bracings
Upto 600	24	22	G.I. Flange at 2.5 Centre	Cross Bracings
601 to 750	24	22	25 x 25 x 3 mm angle iron frame with 6mm dia nuts and bolts.	25 x 25x 3mm MS angles bracing at 1500 mm from joints.
751 to 1000	22	20	25x25x3mm angle iron frame with 6mm dia nuts and bolts.	25 x 25 x 3mm MS angle bracing at 1500mm from joints.
1001 to 1500	22	20	40x40x5 mm angle iron frame with 8mm dia nuts and bolts.	40 x 40 x 3mm MS angle bracing at 1500mm from joints.
1501 to 2250	20	16	50x50x3 mm angle iron to be cross braced diagonally with 10 mm dia nuts & bolts at 125 centre.	40 x 40 x 3mm MS angle bracing at 1200mm from joints or 40x 40x 3mm MS angle diagonal bracing.
2250 and above	18	14	50x50x6 mm angle iron frame 10 mm nuts & bolts at 125 mm centre.	50 x 50 x 3mm MS angle bracing at 1200mm from joints or 50x 50x 3mm MS angle diagonal bracing

Sheet metal ducts shall be fabricated out of galvanized steel sheets conforming to BIS 655, BIS 277, BIS 737 & SMACNA. Sheets used shall be produced by Hot dip process and galvanizing shall be Class VIII- Minimum Average Coating 120 gm/sq.m as per BIS 277: 1992.

**3.0 HANGERS FOR DUCT:**

Duct Size (mm)	Spacing(M)	Size of MS angle (mm x mm)	Size of rod dia (mm)
Upto 750	2.5	40 x 3	10
751 to 1500	2.0	40 x 3	12
1501 to 2250	2.0	50 x 3	15
2251 to above	2.0	50 x 3	15

**4.0 FABRICATION:**

All ducts shall be fabricated and installed in workman like manner, generally conforming to IS 655. Round exposed ducts shall be die formed for achieving perfect circle configuration.

- a) Ducts so identified on the drawings shall be acoustically lined with thermal insulation as described in the section 'Insulation' and as indicated in schedule of quantities. Duct dimensions shown on drawings are overall sheet metal dimensions inclusive of the acoustic lining, where required and indicated in schedule of quantities.
- b) Ducts shall be straight and smooth on the inside with neatly finished joints. All joints shall be made air tight.
- c) All exposed ducts within conditioned spaces shall have slip joints - no flanged joints. The internal ends of slip joints shall be made in the direction of air flow. Exposed ducts, where required or as indicated in Schedule of quantities, shall be painted with two coats, of enamel paint of approved colour. Ducts and accessories within ceiling spaces, visible from air conditioned areas shall be provided with two coats of mat black finish paint.
- d) Changes in dimensions and shape of ducts shall be gradual. Curved elbows, unless otherwise indicated, shall have a centre line radius equal to one and a half times the width of the duct. Air turns shall be installed in all vanes, arranged to permit the air to make the turn without appreciable turbulence. Suitable vanes shall be provided in duct collar to have uniform/ proper air distribution.
- e) Ducts shall be fabricated as per details shown on drawings. All ducts shall be rigid and shall be adequately supported and braced where required with standing seams,tees, or angles of sample size to keep the ducts true to shape and to prevent bulking, vibration or breathing.
- f) All sheet metal connections, partitions and plenums required to confine the flow of air to and through 18g GI/16 gauge aluminium, thoroughly stiffened with 25mm x25mm x 3mm angle iron braces and fitted with all necessary doors as required to give access to all parts of the apparatus. Access Doors shall be not less than 45cm x 45cm in size.

**5.0 INSTALLATION:**

All ducts shall be installed generally as per the drawings and in strict accordance with approved shop drawings to be prepared by the Contractor.

- i. The Contractor shall provide and neatly erect all sheet metal work as may be required to carry out the intent, of these specifications and drawings. The work shall meet with the approval of Owner's site representative in all its parts and details.
- ii. All necessary allowances and provisions shall be made by the Contractor for beams, pipes, or other obstructions in the building, whether or not the same are shown on the drawings. Where necessary to avoid beams or other structural work, plumbing or other pipes, and/or conduits, the ducts shall be transformed, divided or curved to one side, the required area being maintained, all as per the site requirements.
- iii. If a duct cannot be run as shown on the drawings, the contractor shall install the duct between the required points by any path available, in accordance with other services and as per approval of Owners site representatives.

- iv. All duct work shall be independently supported from building structure. All horizontal ducts shall be rigidly and securely supported, in approved manner with trapeze hangers formed of MS rods and angle iron under ducts at not greater than 2 meter centres. All vertical duct work shall be supported by structural members at each floor. Air conditioning contractor shall supply and install 50mm cube MS boxes with 10mm dia steel rod passing through box, all given two coats of redoxide paint, the MS rod tied with reinforcement bar at point of suspension shall be neatly exposed and opening subsequently filled with plastic compound after duct hangers are installed.  
If duct is passing through in such areas where space between ceiling slab to false ceiling is more than 1500 mm than duct should be supported by wall mounted brackets of 40 x 40 x 3 mm angle.
- v. Ducting over furred ceiling shall be supported from the slab above, or from beams, after obtaining approval of Owner's site representative. In no case shall any duct be supported from false ceiling hangers or be permitted to rest on false ceiling. All metal work in dead or furred down spaces shall be erected in time to occasion  
no delay to other contractors on the building.
- vi. Where metal ducts or sleeves terminate in wood work, tight joints shall be made by means of closely fitted heavy flanged collars. Where ducts pass through brick or masonry opening and wooden frame work shall be provided within the opening and crossing ducts provided with heavy flanged collars on each side of wooden frame work, so that duct crossing is made leak-proof.
- vii. All ducts shall be totally free from vibration under all conditions of operation. Whenever duct work is connected to fans, air handling units or blower coil units that may cause vibrations in the ducts, ducts shall be provided of closely woven, rubber impregnated double layer asbestos/canvas or neoprene coated fibre glass fire resistant flexible connection. The flexible connections located close to the unit, in mutually perpendicular directions. The flexible sleeve at least 10cm long securely bonded and bolted on both sides. Sleeve shall be made smooth and the connecting duct work rigidly held by independent supports on both ends. The flexible connection shall be suitable for pressures at the point of installation.
- viii. Air conditioning unit and exhaust fans shall be connected to duct work by inserting at air inlet and air outlet a double canvass sleeve. Each sleeve shall minimum 150 mm securely bolted to duct and the connecting duct work rigidly held in line with unit inlet or outlet.

#### **6.0 SPLITTERS AND DAMPERS:**

All dampers shall be opposed blade type dampers of robust construction and tight fitting. They shall be made of G.S. sheet minimum 16 g thick and shall have brass bushes. The design, method of handling, and control shall be suitable for the location and service required.

Dampers shall be provided with suitable links, levers and quadrants as required for their proper operation control or setting devices shall be made robust, easily operatable and accessible through suitable access doors in the ducts. Every damper shall have an indicating device clearly showing the damper position at all times. Handles will be provided with extended arms to account for insulation thickness.

Dampers shall be placed in ducts and at every branch supply or return air duct connection, whether or not indicated on the drawings, for the proper volume control and balancing of the system.

#### **7.0 FIRE DAMPER :**

All supply/return air duct or path at AHU room wall or slab crossing shall be provided with fusible link type fire damper. The fire rating shall be of 90 minutes fire damper blades and outer frame shall be formed of 1.6mm galvanised sheet steel. The damper blade shall be pivoted spindles in self lubricated bronze bushes, stop seals shall be provided on top and bottom of the damper housing made of 16g galvanised sheet steel. Side seal shall be provided to preventing fire leakages.

#### **8.0 SUPPLY AND RETURN AIR GRILLES:**

Supply and return air grilles shall be M.S. or anodized extruded aluminium construction with individually adjustable bars as shown on drawings and indicated in schedule of quantities. Supply air grilles shall be generally double deflection type, with removable key operated volume control dampers. Return air grilles shall be generally double deflection type similar to supply air grilles but without dampers. All supply and return air grilles behind wooden frame shall be single deflection type with one way bars only, the supply air grilles being provided with removable key operated volume control dampers. Mild steel supply and return air grilles shall be factory coated with rust resistant primer and shall be finished with two coats of paint as per



client's choice. Aluminium supply and return grilles shall be powder coated and to have colour of client's choice or extruded aluminium as per bill of quantities.

For fixing of grilles in the walls HVAC Contractor has to provided 50 mm x 50 mm wooden frame of kail wood. The frames have to be given coating of fire retardant paint. Nothing extra shall be paid on this account.

#### **9.0 SUPPLY AND RETURN AIR DIFFUSERS:**

Supply and return air diffusers shall be shown on the drawings and indicated in schedule of quantities. The supply air diffuser shall be provided with removable key operative volume control dampers. Mild steel diffusers/dampers shall be factory coated with rust resistant primer. These shall be finished with two coats of paint as per client's choice.

Aluminium supply and return air diffusers shall be powder coated and to have colour of client's choice or shall be extruded aluminium.

##### **i. Round or Rectangular Diffusers:**

Supply/return air linear diffuser shall be M.S. or Extruded aluminium construction, square, rectangular, or round diffusers with flush fixed pattern or adjustable flow pattern. Diffusers for different spaces shall be selected in consultation with the Architect/Consultants. Supply air diffusers may be equipped with fixed airdistribution grids, removable key-operated volume control dampers, and antismudge rings as per requirements of schedule of quantities.

##### **ii. Linear Supply air/ Return Air Grilles:**

This shall be M.S. or extruded aluminium construction with fixed horizontal bars at 15 dig inclination and flange on both side. The thickness of fixed bar louvers shall be at least 5.5mm & angle shall be 20mm/30mm inside . The grilles shall be suitable for concealed fixing volume control damper of extruded. Aluminium construction with black anodized finished shall be provided in SA duct collars.

#### **10. LINEAR DIFFUSER :**

Liner diffuser shall be extruded aluminium construction multi-slot type with air pattern controlled provided in each slot. Supply air diffusion shall be provided with volume damper in each slot of the supply air diffuser. Plenum shall be provided for each supply air diffuser.

##### **The Material of Grilles shall be as follows:**

- i. All grilles shall be selected in consultation with the Client/Architect/Consultant. Different spaces shall require horizontal or vertical face bars, and different width of margin frames.
- ii. All grilles shall have a soft, continuous rubber gasket between the periphery of the registers and the surface on which it has to be mounted. The effective area of the registers shall not be less than 75 percent.
- iii. Grilles shall be adjustable pattern as each grille bar shall be pivot able to provide pattern with 0 to 100 deg horizontal arc and upto 30 deg C deflection up or down. Bars shall hold deflection settings under all conditions of veloRegional and pressure. Extruded aluminium grilles shall have fixed bars.
- iv. Bars longer than 45cm shall be reinforced by set-back vertical members of approved thickness.

The material thickness of grills, diffuser, damper shall be as follows :

<b>Diffuser</b>	<b>MS</b>	<b>Aluminium</b>
a) Frame	20 gauge	18 gauge
b) Louvers	20 gauge	18 gauge

##### **Grills :**

a) Frame	20 gauge	18 gauge
b) Louvers	26 gauge	24 gauge

##### **V.C. Damper :**

a) Frame	20 gauge	18 gauge
b) Louver	26 gauge	24 gauge

##### **v. Fresh air intake and extract louvers:**

All the louvers shall be rain protection type and shall be fabricated from extruded aluminium section. The louvers shall additionally be provided with heavy duty expanded metal (aluminium –alloy) bird screeed. 50 mm x 75 mm wooden frame made out of kail wood to be provided by HVAC contractor free of cost for fixing of louvers.

**vi. Testing & Balancing:**

After the installation of the entire air distribution system is completed in all respects, all ducts shall be tested for air leaks before painting the interiors of conditioned spaces air distribution system shall be allowed to run continuously for 48 hours for driving away any dust or foreign material logged within ducts during installation.

**B) THERMAL/ACOUSTIC INSULATION:**

**GENERAL:**

Scope of this specification comprises of supplying, installing, testing and commissioning of insulation on duct, pumps, chilled water piping, chillers, expansion tank, AHU room and duct lining.

**1.0 DUCT INSULATION:**

Resin bonded, glass wool, pre-laminated with aluminium foil. The thermal conductivity of glass wool shall not exceed 0.024 Kcal/hr.sqm deg C (0.19 BTU in/Hr Sq.ft deg F at 10 deg C - mean temperature and density shall not be less than 48 kg/m3.

**1.1 Thickness of Insulation:**

- |   |        |
|---|--------|
| a. For Duct passing through return air areas          | = 25mm |
| b. For Duct passing through non air conditioned space | = 50mm |
| c. Treated fresh air duct                             | = 50mm |

**1.2 Application: (For unexposed duct)**

- Clean the surface of duct and apply coat of Black Japan paint of approved make applied @ 7 Sq.mt./Kg.
- Fix the insulation material of required thickness before adhesive dries up. All longitudinal joint will have an over lap of minimum 50 mm followed by covering firmly by 75 mm width aluminium sticking tape to seal all transverse & longitudinal joints.

Where the duct is exposed to atmosphere material shall be same as for ducts not exposed to atmosphere but without aluminium foil.

**Application: (For exposed duct)**

- Cleaning the surface of ducts with wire brush to remove dirt, rust etc.
- Applying a coat of adhesive.
- Fixing the expanded polystyrene insulation.
- Cover the insulation with 2 nos. polystyrene shall 500g and seal the joint with black Japan.
- Fixing 24 x 3/4" Hexagonal wire netting tied with G.I. wire.
- Finally applying sand cement plaster in ratio 1:3 in two layers each 10mm thick.
- Paint it to required colour with brush.

**1.3 Duct Lining:**

- Clean the inner surface of duct which is to be lined with wire brush to remove the dirt.
- Fixing 25 mm x 25 mm/50 mm GI frame work of 22 gauge 600mm distance screwed with the duct and making size as per requirement.
- Apply a cold setting adhesive compound over the frame/duct.
- The adhesive shall be non flammable vapor proof , odorless type.
- Fixing insulation material of specified thickness overlapped with R P Tissue paper over it and then covering the material with 24 gauge perforated aluminium sheet & should have 2-3 mm dia perforation at 3 to 4 mm center to center distance with the help of self tapping screws and shall be neatly finished to give true surface finish.

**C) LIST OF APPROVED MAKES/AGENCIES:**

The tenderer shall quote his rates on the basis of the price of the brand/make stipulated in the item of works as described in BOQ, specifications and furnished in Technical data. The owner reserves the right to select any of the brands indicated in the "List of Approved Makes/Agencies" incase of delay in delivery of ordered `make of item'. The contractor cannot claim anything extra if the owner changes the make/agencies but within the list of approved make.

<b>S.NO.</b>	<b>ITEM ACCEPTABLE</b>	<b>MAKES</b>
1.0	G.I. Sheets	: TATA/SAIL/ National/Jindal
1.1	Aluminium Grilles Diffusers/ Linear Griles/Fire Dampers	: Caryaire, Ravi Star, Mapro, Titus
1.2	MS Grilles/Diffusers/Volume Control Damper/Louvers	: Caryaire , Airflow, Ravi Star,
<b>1.0</b>	<b>INSULATION</b>	
2.1	Glass wool	: UP Twiga, Owens Corning/KIMCO
2.2	Expanded Polystrene (TF Quality) Styrene Packing	: Lloyd Insulation, Beardsell Ltd,
2.3	Closed cell rubber insulation	: Torcellen, Vedioflex, Armaflex

**BILL OF QUANTITIES:**

**For Interior and allied work:-**

S.No.	Item Description	Qty.	Unit	Rate (Rs.)	Amount (Rs.)
<b>1.0</b>	<b>Civil work</b>				
1.a	4 ½" Thk. Brick Work in partition wall including stacking, cleaning with cement mortar 1:4(1 cement :4 coarse sand) using brick designation A, including laying of two nos. 6 mm M.S. Bars every 6th course , Complete in all respect.	450	Sft.		
1.b	P/Applying cement plaster 12 mm thk. in 1:4 (1 cement, 4 fine sand) on new work complete in all respect.	900	Sft.		
<b>2.0</b>	<b>Flooring</b>				
2.a	P/F of 600x600 size double charge vitrified flooring of minimum 8mm thick in 1:4 cement mortar /synthetic adhesive as applicable. all joints filling shall be completed in all respect. Rate shall include the finishing joints with matching colour pigments (Basic rates of tiles Rs. 66/- per sq.ft. ). Floor shall be leveled properly before fixing of tiles with cement mortar.	1035	Sft.		
2.b	P/Laying skirting 4" high in same tiles as above, Skirting shall be flushed with POP / wooden paneling with 4 mm. groove.	100	Rft.		
2.c	P/F kajaria / johnsons equivalent anti skid floor tiles(300x300) in toilet . The tile to be fixed with cement mortar base 20 mm thk. In 1:4(1 cement : 4 coarse sand)and white cement slurry, and joint to be finished with white cement mixed with colouring pigment to match the colour of tile. Complete in all respect. (Basic rate for tile Rs. 50/-sq.ft.) Floor shall be leveled properly before fixing of tiles with cement mortar.	80	sft		
2.d	P/F of glazed ceramic dado tiles of approved makes of two or more shade ,size 12" x 24" , up to 7'-0" height using cement mortar 1:3(1cement:3 sand) including joints filling with white cement with colouring pigments matching to tile and complete in all respect as per pattern, drawing and manufacturer specifications. The tiles to have dark colour high lighter as per pattern directed by architect. (Basic rate for tile Rs. 45/-sq.ft.) Rate to include the base plaster after repairing base.	450	sft		
<b>3.0</b>	<b>Water proofing of toilets</b>				
	a) The sub-base (R.C.C.) of the roof top structure should be cleaned of all dirt, loose material and kept dry. In case of pot holes/cracks, the same shall be repaired with cement putty using bonding agent like SIKA LATEX TM or equivalent. b) Applying and grouting a slurry coat of neat cement using 2.75 kg/sqm. of cement admixed with proprietary water proofing compound conforming to IS:2645 over the	3	Nos.		

	RCC slab and side walls upto 400 mm high, including cleaning the surface before treatment. c) Filling of sunk floor in brick bat coba in all position, consisting of waterproofing material with brick bat coba, including making it water tight as per specifications of specialized agency mentioned in the approved list.				
<b>4.0</b>	<b>Plumbing and Toilet work</b>				
	<b>All Required Sanitary ware will Be Hind-ware &amp; C.P. Fittings Will Be Jaguar – Florentine collections</b>				
4.1	Providing and fixing ,testing and commissioning , star-white glazed vitreous china European type water closet floor mounted two piece (as specified below) closet , manufacture hind-ware, with fitting, seat cover, uPVC Connector, Rubber Seal complete including cutting and making good floors wherever required.				
	Model : Pure EWC , cat. no. 92070 , cistern cat no 92125 two piece WC , with seat cover s trap at 30 cm. complete in all respect. Of Hindware.	3	Nos.		
4.2	Providing ,fixing, testing and commissioning of Star white colour vitreous china wash basin with R.S or C.I brackets painted white, 32mm C.P brass waste of standard pattern, 32mm dia C.P cast brass bottle trap & Union, 32mm dia CP pipe to wall and CP wall flange complete including cutting and making good the walls/ floors where required.				
a	Cleo cat. No. 10012 wash basin 50 x 40x82 cms wall mounted with full pedestal Hindware Cat. No. 11003	1	Nos.		
b	Wall mounted without pedestal cat. No. 10004	2	Nos.		
4.3	Providing & fixing white coloured glazed vitreous china urinal Integrated EFS dc TOUCH FREE Code C8098 of Parry ware or equivalent with concealed sensor for better aesthetics , complete in all respect including bottle trap all fittings and fixtures.	1	Nos.		
4.4	Providing ,fixing ,testing and commissioning C.P. Brass basin mixer (Single lever) without popup waste & 450mm long Copper pipes & nuts etc. including necessary and making good. Jaguar Cat No FLR-5167 NB central hole basin mixture.	3	Nos.		
4.5	Providing C.P brass angle valve with flange & with flexible ( Heavy Duty) connecting pipe, union & nut (jaguar) Angular stop cock cat. No. FLR-5053N	12	Nos.		
4.6	Providing , fixing , testing and commissioning of ISI mark vertical gysar ( Venus / Racold make) complete with all respect including copper inlet outlet pipes , 5-6 liter capacity.	1	Nos.		
4.7	Providing , fixing C.P. Grating complete.(chilli, Camry Make) Including cutting hole in stone ,	6	Nos.		

	including groutings, 125/100 mm dia. Weight not less than 100 grms.				
4.8	Providing, fixing, testing, Health Faucet along with one meter long flexible tube and hanging hook etc. (Jaquar 563/573 )	3	Nos.		
4.9	Providing & fixing towel rings along with necessary fixing arrangements etc. (Jaquar Code: ACN-1121N, square towel ring )	3	Nos.		
4.10	Providing & fixing paper holder along with necessary fixing arrangements etc. (Jaquar Code: ACN-1153N) with flap.	3	Nos.		
4.11	Providing and fixing beveled mirror 12 mm thk. Float glass with 6 mm thk. water proof ply backing , fixed to wall with SS studs. complete in all respect.	12	Sq.ft.		
4.12	Providing and fixing robe hook ( twin type)	3	No.		
4.13	P/F single lever long body bib cock for pantry sink complete in all respect.	1	No.		
<b>5.0</b>	<b>Water supply system and sanitary</b>				
	<b>All require pipes &amp; fittings will be " C.P.V.C. Make (ajay/aashirwad/astral)</b>				
	<b>All Required uPVC Pipes &amp; Fittings will be Supreme Make ( IS Type " B' IS 13592 SWR Range</b>				
	<b>Note : No. extra Payment shall be made for any C.I. / uPVC Fittings, all are inclusive with piping rates.</b>				
5.1	Providing and fixing " CPVC " SDR 11 Pipes with all necessary fittings, clamps, including cutting chases and making good the walls, etc.				
	20 mm Dia	50	Rft.		
	25 mm dia	15	rft		
5.2	Providing & Insulating hot water lines with extended synthetic Rubber Polymeric compound performed pipe sleeves, using propriety adhesive and self adhesive tapes all as per manufacturer's specifications ( for hot water supply and return pipe work.				
	15-20 mm. dia nomial bore.	10	Rft.		
5.3	Providing and fixing uPVC pipes (confirming to IS 4985-2000) including all fittings (plain or door) e.g. bends, tees, offsets etc. and fixing with as recommended by the manufacturer, necessary fixing arrangement including cutting chase or holes in walls / floors and making good the same complete as per specification.				
	a. 75 mm dia ( with 6 Kg/cm2 pressure	25	Rft.		
	b. 110 mm dia ( with 6 Kg/cm2 Pressure	25	Rft.		
5.4	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone	40	Rft.		

	aggregate 25 to 40mm nominal size) 75mm in bed and all around Soil and waste pipe (embedded in the flooring / ground)				
<b>6.0</b>	<b>False Ceiling</b>				
6.1	<p>P/F False ceiling in 12.5 mm thk. gypsum board as per design and pattern shown in the tender drawing. This includes, providing and fixing G.I. perimeter channels for gypsum part of ceiling of size 27mmx1.5mm thk. having one of flange of 20mm and another flange of 30mm along with the edge board is screw fixed but the joints are staggered. Then tapered and square edge of the boards are filled and finished with jointing compound, paper tape suitable for Gypsum plaster boards (as per recommendation of M/S India Gypsum Limited). Finally a layer of veneer plaster 5mm thick is applied followed by two coat of top the face boards to give the smooth seamless finish.</p> <p>Rates are inclusive of</p> <ol style="list-style-type: none"> <li>3 or more coats of plastic emulsion paint.</li> <li>Provision of cove for lights as per design</li> </ol> <p>Note:</p> <ol style="list-style-type: none"> <li>Provision for lighting and light fittings etc. cutouts have to be made with the frame of perimeter channels of size 20mm x 27mm x 0.5mm extra supported as suitably.</li> <li>trap doors (2 nos)in the false ceiling made out of 19 mm thk. louvered shutter aluminium ,T-frame (25x20 mm) all around with powder coated finish and complete in all respect</li> </ol>	780	Sft.		
6.2	<p>P/F False ceiling in Armstrong Ceiling Tiles with tegular edges, slim line suspension system grid fine fissured or approved pattern, Complete in all respect as per manufacture's specifications, designs and architect's approval.</p> <p>The cost is inclusive of the cost of frame work for fixing light fittings fixtures. The light fixtures shall not be fixed directly on the tiles.</p>	372	Sft.		
<b>7.0</b>	<b>Painting and P.O.P. on Walls.</b>				
7.1	P/A P.O.P. 8 mm thk. on internal wall, with line, plumb and level surfaces for the smooth base of paint work. Rates to including v groove in P.O.P at distance of 6' appx.c/c.	600	Sft.		
7.2	P/A plastic emulsion paint of approved make and shade complete three or more coats, as per manufacturer's specification. Including preparation of base with putty priming.	750	Sft.		
<b>8.0</b>	<b>Main Entry Door.</b>				
8.1	Providing & fixing in position main entrance door at branch with single leaf glass shutter 3'-9" wide and 7'-6" high , made of 12 mm thick (impact resistant glass) toughen glass with pencil polish edges all around and including glass film of patterns and emblem as per design fixed with patch fittings of Ebco /Ozone make assembly including top and bottom patches, floor spring	1	No.		

	,bottom lock (ozone/ebco make) ,SS brushed finished 2'-0" long (Neki make-kich -PHS 25 18 S) and 1" dia. handle on both sides of shutter, complete in all respect, as per design.				
8.2	P/F Rolling shutter (Mechanical type) (on opening size 3'-9" x 7'-6") fitted with ball bearing, Operational by gear box and handle, complete with guide channel of 32 mm lath sections with bridge depth of about 16 mm. ,provided with min. three fixing cleat/ supports for attachment to the wall /column .by mean of bolt and secure. the spaces of cleat shall not exceed 0.75 mm . Bracket plate shall be fabricated out of mild steel of 2.5 mm thickness min. with size 325x325x2.5 complete in all respect including , locks, handles , primer painting and three or more coats of <b>duco paint</b> .	1	Nos.		
<b>9</b>	<b>Panelling</b>				
9.1	P/F wooden paneling with hardwood framing 2" x 1" section at 2'-0" c/c both ways, fixed rigidly with the wooden plug/raw plug with 8mm MDF back up with 1mm laminate of approved make and shade in plumb line and level, fixed with groove as per design . Top of paneling to be finished with white cedar wood moulding /beading ¾"x 1 ¼"as per design, all exposed wooden surfaces shall be melamine. Complete in all respect. (Rates includes making provision for electrical conduit, switches stained to approved colour finished with and junction boxes and provision of soft board with fabric mounted above.)	500	Sft.		
9.2	P/F Ecgc LED GLOW sign board of size 2'-6" x 5' appx. As per requirement of ECGC complete in all respect.	1	no		
<b>10</b>	<b>Partition work.</b>				
10.1	<b>Full Height Glazed Partition at Manager</b>				
	Providing and fixing of fully glazed partition with 12mm thick toughened glass fitted with heavy duty SS patch fittings at the interval of minimum 2' interval at top, sides /or steam beech wooden beading , at bottom fixed with S.S. "C" channel embedded in floor and complete in all respect including 3 mm glass film of pattern.  Door in partition shall be measured as partition, including toughened glass (12mm thk. ) door of 3.6' x 8'-0" size with pencil polish edges all around and including glass film of pattern and emblem as per design fixed with necessary patch fittings assembly including top and bottom patches, heavy duty floor spring, bottom lock, SS brushed finished 2' long (Neki make-kich -PHS 25 18 S) and 1" dia. handle on both sides of shutter etc. all complete in all respect.	105	Sft.		
10.2	<b>Full height partially glazed/solid partition</b>				
	P/F Partitions in Aluminium main frame 2" x 2"(clear size , hollow tube) thk.14 guage , placed at distance of 2'-0" c/c both ways fixed rigidly at floor lvl, Grouted to Floor 2" Deep , other end	320	Sft.		



	<p>fixed to R.C.C. roof. With 8 mm thk. MDF fixed both sides and both-side 1mm thk. Laminated (approved shade), including laminated groove as per design. The item include P/F 6 mm thk. Modi Float glassas per design fixed with 1 ¼" x ¾" steam beech wood beading with etching / film as per design. Rates to include all fittings fixtures hardware, complete in all respect.</p> <p>Door in partition shall be measured as partition, Including door frame for shutter (2 ¾" x 1 ¼") of steam beech wood with single leaf shutter 3'-0" x 8', made with wooden laminated flush door with glass slit 9"x4', handle on both sides of shutter ((Neki make-kich-PHS 19 08 S)or equivalent approved , lock , and door closer, complete in all respect, as per design.</p> <p>Rates to include conduit provision inside partition, and Switch boxes fixing etc.</p> <p>Height will be measured finish floor level to bottom of false ceiling i.e. finished area of the partition.</p>				
<b>10.3</b>	<b>Low Height Partition</b>				
	<p>P/F Partitions in Aluminium main frame 2" x 2"(clear size )of 14 guage , placed at distance of 2'-0" c/c both ways , fixed rigidly at floor lvl, Grouted to Floor 2" Deep , with 8 mm thk. MDF fixed both sides and both-side 1mm thk. Laminated (approved shade), including laminated groove as per standard. The item include p/f 12 mm thk. Toughen glass with pencil polish edges of size appx. 18" high appx., fixed with sbw wooden beading or SS fittings D-bracket, / fixing of soft board panel /White Board appx. 4' x12" with fabrick mounted above (basic price 100/-m) wherever required. All exposed surfaces shall be stained to natural colour finished with melamine. Rates to include, making provision for electrical conduits, switches and junction boxes.</p>	32	sft		
<b>10.4</b>	<b>Flush door wooden laminated</b>				
	<p>P/fixing doors shutter with frame at toilet and UPS . Frame shall be made out of 4" x 1 ½" steam beech wood as per design, Frame member should be in single piece of wood. The shutter shall be 32 mm thick non decorative type flush door White Cedar wood margin all around with 1 mm thk. Laminate at both the sides. The item includes 5mm thk. Glass as slit with etching fixed with white cedar beading. Complete in all respect including all hardware, door closure, SS finished 53 mm dia cylindrical lock cum handle ( Godrej / doorset make) , SS heavy duty hinges ,(door closer C 071 product code – 8292 Silver finish 60 kg., 7345 Gold finish gold finish 60 kg.) etc. All exposed wooden surfaces shall be stained to approved colour finished with melamine.</p>	4	Nos.		
<b>11.0</b>	<b>Tables and counters</b>				
	<p>P/F Tables in 19 mm. commercial ply with 1mm thick laminated complete at front modesty panel, skirting, table sides and storage front and Table</p>				

	Top in 25 mm thk. post form laminated MDF Board of approved shade with edge moulding as per approval, Laminate / rubber tape at margin, inclusive of side rack with top of 25 mm thk. Post form MDF board with edge moulding and support system, hardware, latches, ss handles, central locks of godrej , (all telescopic channels should be of hettich and all hinges should be "ecomat clipon hinges" of Hettich for cabinet shutter ) etc.				
	Table shall have following				
a	MS ivory /matching to top powder coated wire manager, foot rest made of 19 mm thk .commercial ply , with complete enamel painted.				
b	Key board tray				
	Providing and installing 2'-6" wide, 16" deep wooden laminated all sides, wooden key board, with heavy duty telescopic channels of approved make as specified , made out 19 mm thk. Comm. ply having 1 ¼" laminated edge at front and sides .				
c	CPU trolley				
	Providing and placing heavy duty CPU trolley, (125mm to 240mm adjustable CPU trolley made out of MS with white powder coating and lockable castors)				
d	Drawer unit				
	Drawer unit consist of Three drawer with telescopic sliding channels with all around boxing made of 19mm th. Ply wood with vertical support of the table as one side. Drawer shall be made of 12mm marine grade ply wood. The drawer bottom shall be made of 6mm thick ply. The front and side face of the drawer shall be finished with 1.0 mm thk laminate of approved shade and make. Drawer unit shall have central locking system and each drawer with SS handle. All exposed edges are sealed with wooden margins.				
e	All inner surface and outer surface of table shall be laminated with 1.0 mm laminate and storage/ drawer units inside painted with two or more coats of enamel paint over a coat of primer, including sand papering, filling and preparation of surface.				
11.1	P/F Manager table T-1 (6'-0"x3'-0") and side credenza /storage units (3'-6"X 1'-6" ) with readymade CPU trolley , chest of drawer and keyboard provision complete in all respect as specified above and as per detail. Rates to include 10mm thick float glass with beveled edges on top of tables as per shape and design of table.	1	Nos.		
11.2	P/F Officer table (5'-0" x 2'- 6") with side rack (3'-3"x1'-6") with CPU, storage keyboard provision complete in all respect as specified above.	4	Nos		
11.3	<b>Reception table</b> P/F Tables arch shape, in 19 mm. commercial ply with 1mm thick laminated front modesty panel in frame work of wooden batten and 6 mm ply both sides , skirting and top in 19 mm thk. Board with	1	Nos.		

	1.0 mm thk. Laminate of approved shade all inside and outside surfaces of table , with half round wooden edge moulding at top. Table to have heavy duty CPU trolley, foot rest, key board tray, cable manager, drawer unit as specified above in item no. 11. (Size 5'-0" x 2'-0" at mid point in circular form)				
11.4	<b>Conference table</b>	1	Nos.		
	Providing and placing conference table , size (10'-0" x 3'-6"x ) with top in 19 mm thk. Commercial ply , with 1 mm thk. Laminate and 2" thk. Edge moulding . Table base in 19 mm thk. Commercial ply laminated all sides Complete in all respect as per .				
12.0	<b>Storage unit</b>				
12.1	<b>Storage 18"deep and 2'-6" ht.,</b>				
	P/f 18" deep side additional storage units, and 30" high made of 19mm thk. Ply wood BWR grade-top shall be made of 25 mm thk. Post form MDF Board of approved shade with half round edge moulding as per approval, sides bottom, shutters partition and shelves all made of 19mm thk. Ply wood BWR grade-ISI at maximum spacing of 32" c/c or as per drawing .The width of each shutter shall not exceed 18". The back shall be made of 6 mm thk. Plywood duly painted with anti-termite paint(on outer face).The storage shall be finished with 1 mm thk. Laminate of approved shade and quality on all the exposed sides. The exposed edge of ply shall have wooden lipping. The rates are all inclusive of necessary hardware SS locks, hinges (clip-on from hettich) tower bolt, SS handle, Magnetic catcher, of approved design. All inner surfaces shall be painted with two or more coats of enamel paint. The Front elevation area shall be considered for payment.	40	Sft.		
12.2	<b>Storage unit 8'-0" ht.</b>				
	P/f 21" deep full storage units, made of ¾"thk. Ply wood BWR grade- top shall be made of 19 mm thk. Ply wood with laminate and half round edge molding as per approval, sides bottom, shutters partition and shelves all made of 19mm thk. Ply wood BWR grade-ISI at maximum spacing of 32" c/c or as per drawing .The width of each shutter shall not exceed 18". The back shall be made of 6 mm thk. Plywood duly painted with anti-termite paint(on outer face).The storage shall be finished with 1 mm thk. Laminate of approved shade and quality on all the exposed sides. The exposed edge of ply shall have wooden lipping. The rates are all inclusive of necessary hardware SS locks, hinges , tower bolt, SS handle, Magnetic catcher, of approved design. All inner surfaces shall be painted with two or more coats of enamel paint over a coat of primer, including sand papering, filling and preparation of surface. The Front elevation area shall be considered for payment.	190	Sft.		

<b>12.3</b>	<b>Pantry storage</b>				
	<p>P/F wooden pantry cabinet 21" deep and 2'-9" high , in 19 mm thk. Water proof ply with 19 mm thk. Granite at top with edge moulding (Ruby Red or as approved), with provision shelf inside, and stain less steel sink of size 18" x 16"( complete with waste pipe etc.) laminated shutter, complete in all respect including 2 mm PVC margin at exposed edges , laminated inside and outside complete with 1 mm laminate.</p> <p>Rates are inclusive of</p> <ol style="list-style-type: none"> <li>hinges, Hardware, latches, magnetic catchers, locks etc. from Hettitch, kaff or equivalent approved by Architect.</li> </ol> <p>The Front elevation area shall be considered for payment.</p>	12		Sft.	
<b>13</b>	<b>Plants</b>				
<b>13.1</b>	Providing and fixing artificial plants of approved quality and design not less than 3'-0" height and foliage should not be dense.( Plants can be Dieffenbachia plant , Areca plant, Aglaonema plant ,Croton plant etc.)	3	Nos.		
<b>13.2</b>	Supplying and Placing in position stainless steel brushed finished planter box of 12" dia and 16" high.	3	Nos.		
<b>14</b>	<b>vertical Blinds</b>				
	P/F in position roller blinds, of approved colour of vista, Track , similar make, complete in all respect as per manufacturer's spec. and Architect approval.( Basic cost Rs. 90/- to 100/- sft.)	125	Sft.		
<b>15</b>	<b>Chairs and Sofa</b>				
<b>15.1</b>	Providing and supplying : MODEL : Sofa -6 Triple seater with chrome frame and leatherite Upholstery of approved shade , complete in all respect as per specs. Of Span. seating.	1	No.		
<b>15.2</b>	<b>Executive Chairs</b> Providing and supplying : MODEL – CH- 012 with premium chrome base , gaslift , torison bar (knee tilt mechanism) , chrome arms and mesh upholstery , complete in all respect as per specs. Of "Span. Seating".	6	Nos.		
<b>15.3</b>	<b>Visitor Chairs</b> Providing and supplying : MODEL – Groove (Indian) with Nylon base, single position locking mechanism, gaslift, fixed PP arm, black mesh on seat and back complete in all respect as per specs. Of "Span. Seating".	23	Nos.		
	<b>TOTAL CARRIED OVER TO SUMMARY</b>				

**2. Specifications And BOQ For Air Conditioner.**

S. No.	Description	Qty.	Unit	Rate (Rs.)	Amount (Rs.)
1.	Dismantling & Installation, testing and commissioning of Existing factory fabricated Double Skinned Chilled Water Air- handling unit Ceiling Suspended type as per AC layout Plan , fabricated out of extruded aluminum section with 0.63mm pre-plasticized / pre-coated Galvanized steel sheet outside & 0.63 mm plain Galvanized steel sheet inside with DWDI blower, blower section and blower motor TEFC type suitable for operation on 415 volts ± 10%, 50 Hz ± 5% AC supply, 6 Row cooling coil made of Aluminum finned Copper tube with coil section, pre-filter section with non woven synthetic media of 10 micron particle size with an efficiency of 90%, polished stainless steel drain pan made out of 22 G sheet duly insulated complete with motor and belt drive package etc. without face and bypass dampers. The AHU panels shall be insulated with 25 mm thick & 36 Kg/m <sup>3</sup> density PU foam. The motor & blower assembly shall be mounted on Aluminum extruded section only The complete AHU shall confirm to standard specification.				
	<b>MAKES MACHINES: CARRIER ,ZEO,WAVES</b>				
	<b>4.25 TR. 1700 CFM.</b>	2	Nos.		
2	Galvanised sheet steel ducting				
	Site Fabricated duct Supply, Fabrication , Installation and testing of sheet metal ducts in accordance with the approved shop drawings and specifications and shall also confirm to specification, The duct shall be fabricated at site to suit pieces, and as mentioned in the drawing. Note: While taking duct measurements, vanes, collars, etc, will also be measured and accounted for				
	24 Gauge	25	Sq.mtr.		
	22 Gauge	20	Sq.mtr.		
3	P/F Duct accoustic lining with 25 mm thick fibre glass (density 32 Kg/cbmt) covered with RP Tissue paper.	5	Sq.mtr.		
4.	P/F Duct thermal Insulation with aluminum foil faced Nitril Rubber of 9 mm thickness .	20	Sq.mtr.		
5.	Grill				
	Supply, Installation, Testing and commissioning of single louvered continuous linear supply / return air grilles as per approved colour and shop floor drawings. Powder coated extruded aluminum grilles of approved shade and colour, without VCD.	2.6	Sq.mtr		
6.	P/F M.S. volume control dampers for supply air – collars.	0.72	Sq.mtr		
7.	P/F GI Volume control dampers for manual control of air through ducts	0.34	Sq.mtr		
8	P/F of PVC drain piping of 40 mm dia	15	Rmt.		
10.	P/F of Fresh air arrangement with Bird screen & volume control damper (1.0 sqft.)	2	Nos.		

11.	Canvas Connection.	2	Nos.		
	<b>PIPING</b>				
	<b>VALVES (INSULATED)</b>				
	Supplying, fixing, testing and commissioning in position the following valves, strainer etc. in chilled water & Hot water pipe line complete with flanges etc duly insulated as per specifications & drawings.				
a	<b>Butterfly Valves:</b>				
i	32 mm dia	4	Nos.		
b	<b>Motorized 3 Way valve for AHU's</b>				
	Supply, installation, testing, commissioning of motorized 3Way valves (insulated) along with flanges of the following sizes:				
i	32 mm dia	2	Nos.		
c	<b>Balancing valves with Flanges:</b>				
	32 mm dia	2	Nos.		
d	<b>`Y' strainers:</b>				
	32 mm dia	2	Nos.		
f	<b>Auto Air Vent valves with Gate valves</b>				
i	10 mm dia	4	Nos.		
g	<b>Pressure Gauges &amp; Thermometers</b>				
	Providing and fixing in position dial type pressure gauges & dial type thermometers with isolating ball valves in both the scales (metric & British units) complete as per specifications.				
i	Pressure Gauges	4	Nos.		
ii	Thermometers	4	Nos.		
	<b>TOTAL CARRIED OVER TO SUMMARY</b>				

**3. BILL OF QUANTITIES FOR ELECTRICAL WOKS.**

S.No.	Description	Qty	Unit	Rate in Rs.	Amount in Rs.
<b>A.</b>	<b>POINT WIRING</b>				
	<b>Note</b>				
	<b>Point wiring rates are inclusive of 2x2.5+1x1.5 sq mm FRLS PVC insulated stranded copper conductor FRLS wires for circuit and 1.5 sq mm insulated earth wire. All wire should be FRLS.</b>				
1	Wiring for the following light points with 2X1.5+1X1.5 Sq.mm FRLS PVC insulated stranded copper conductor wires in concealed PVC conduits in F. ceiling / walls /ceiling as directed including providing 6 amps flush type switches, 5 sided G.I Boxes for housing switches and earthing complete as required.				
a.	First point controlled by one no. 6 amp switch.	20	Nos.		
b.	Loop Point	26	Nos.		
3	Wiring for 6 amps light plug outlets with 3x1.5 sq.mm PVC insulated stranded copper conductor wires in PVC Conduits in Ceiling/walls/floor as directed including providing 6 amps flush type 5 pin socket and 6 amps switch with cover plate, 5 sided G.I boxes for housing switches, sockets and earthing complete as required. (for general areas)	8	Nos.		
4	Providing and fixing 6 amps outlet on Light Point switch board including providing 6 amps flush type 5 pin socket and 6 amps switch with cover plate complete as required.	4	Nos.		
5	Wiring for 3 nos 6 amps light plug outlets with 3x2.5 sq.mm PVC insulated stranded copper conductor wires in PVC Conduits in ceiling/walls/floor as directed including providing 3 nos 6 amps flush type 5 pin socket at 18" lvl. and 1 no 6 amps switch with cover plate at 30" lvl., 5 sided G.I boxes for housing switches, sockets and earthing complete as required. (for UPS Outlets)	10	Nos.		
6	Wiring for exhaust / Wall Fan points with 3x1.5 sq.mm PVC insulated stranded copper conductor wires in concealed PVC conduits in F.ceiling / Wall/Ceiling as directed including providing 6 amps flush type switches 6 amps 3 pin socket near exhaust fan/wall fan, 5 sided G.I. boxes for housing switches and 6 amps 3 pin socket outlet and earthing and complete as required.	11	Nos.		

7	Wiring for 16 amps power outlet points with 2x4+1x2.5 sq.mm PVC insulated stranded copper conductor wires in concealed/recessed PVC conduit as directed including providing 16 amps flush type switch and 6 pin socket with cover plate 5 sided G.I. outlet boxes for switches and socket and earthing the third pin with 2.5 sq mm PVC stranded copper wire complete as required (Only one outlet shall be connected on each circuit)	2	Nos		
8	Wiring for 16 amps power outlet points with 4 sq.mm PVC insulated stranded copper conductor wires for the first power outlet and 2x4+1x2.5 sq.mm PVC insulated stranded copper conductor wires for the second outlet, in concealed PVC conduits in F.ceiling/ walls/Ceiling/floor ducts as directed including providing 16 amps flush type switch and 6 pin socket with cover plate, 5 sided G.I. outlet boxes for housing switches and socket, and earthing the third pin with 2.5 sq.mm PVC insulated copper conductor wires complete as required (Two power outlets shall be connected on each circuit)	1	Set of two		
<b>TOTAL CARRIED OVER TO SUMMARY</b>					
<b>B. CONDUITING AND WIRING FOR TELEPHONE , COMPUTER SYSTEM.</b>					
1	Providing and fixing of sheet metal enclose Krone Tag Block with following pairs consisting of necessary Back Mount Frame, disconnection modules and grommets complete as required.				
a.	20 pair Telephone Tag Block and box	1	Nos.		
2	Supply, drawing and making connections with Telephone Main Junction box and Telephone Outlet Box with annealed tinned copper conductor, PVC insulated and PVC sheathed GI strip armoured / Unarmoured Telecommunication cable in Conduit Pipe from the P & T J.				
	10 x ( 2 x 0.6mm ) armoured Telephone cable in Conduit Pipe	30	RM		
3	Providing and fixing in position suitable 1.6 mm thick G.I. outlet box along with 01 no RJ - 45 Data outlet with Cat-6 Data wire in Suitable size of PVC Conduit pipe and all fixing accessories as required. Including Punching in Cable both ends.	2	Nos.		
4	Providing and fixing in position suitable 1.6 mm thick G.I. outlet box along with 02 no RJ - 45 Data & voice outlet with Cat-6 Data wire in Suitable size of PVC Conduit pipe and all fixing accessories as required. Including Punching in Cable both ends.	11	Nos.		
5	Removing and refixing existing data rack including, Patch Cord for connections of Data cable in racks and other end etc as required.	1	Nos.		
<b>TOTAL CARRIED OVER TO SUMMARY</b>					
<b>C. SUPPLYING AND FIXING OF LIGHTING FIXTURES</b>					



1	Supplying and fixing the following Lighting fixtures including lamps at site. Rate shall include all taxes and duties, transportation etc. complete.				
a.	1 x 30 watts LED Light Fixture (4 feet Long) as per Philips /Wipro make	5	Nos		
b	1X 15 W Green LED Down lighter as Per Philips Cat No-DN192BLED9S-6500PSU WH or Equivalent make	24	Nos		
c.	40 W LED 2'x2' Light as per Cat No Philips RCI 40 B LED or Equivalent make.	18	Nos.		
d	1 x 11 watts PL Lamp Mirror Light fixture as per Philips Cat. No. FMS-200/111or Equivalent make.	3	Nos		
e	Exhaust fan 300mm sweep with 1400 rpm speed inclusive of gravity louver shutters.	4	Nos		
f	Wall Fan (450 mm ) dia	7	Nos		
<b>TOTAL CARRIED OVER TO SUMMARY</b>					
<b>D. EARTHING SYSTEM</b>					
1	Providing and fixing in position the following copper strips and wires including providing all fixing accessories and effecting proper connections.				
a.	GI tape 25mm x 6 mm	50	RM		
b.	Cu wire 8 SWG	40	RM		
c.	10 Sq Copper wire including terminations etc as required For UPS /Server Rack Earthigs	90	RM		
2	Supply, Installation, testing and commissioning of Maintenance Free Earthing of make Electrolytic Earthing comprising of type 'K' copper 2.4 mm wall thickness,60 MM Dia, hollow tube 10 feet long, 2.125 inches outer diameter completely filled with non hazardous metallic salts (Terrafill) to achieve an earth resistance of less than 1 ohms. (Provide Manhole chamber at the top for inspection purpose) Make - Teksai <b>(For Server &amp; UPS Earthings)</b>	2	Nos.		
<b>TOTAL CARRIED OVER TO SUMMARY</b>					
<b>E. DISTRIBUTION BOARDS</b>					
1	Supplying installing, connecting testing and commissioning of the following cubical type double door 3 rows vertical type 2mm thick sheet steel enclosed fully recessed type, TPN Miniature Circuit Breakers Distribution Boards dust proof, vermin proof, with hinged and lockable doors complete with DP MCB's and inter-connection with copper wires, or copper tapes, cable glands/conduit entry bushes, bonding to earth and painting. Also provide separate neutral busbar for each phase. Provide separate Earth Links. Use brass thimbles for connections of all wires.				
1	Light & Power Distribution Board				

a.	Supply and installation of sheet metal enclosed double door 10+2 Way TPN DB, each phase consisting of 10 Nos. 10/20 AMP SP MCB's and controlled by one number 100 mA sensitivity 63 AMPS DP ELCB in each Phase backed up with 1 no 63 Amps 4P MCB as Main Incomer. <b>(FOR LIGHT AND POWER.</b>	2	Nos..		
b.	Supply and installation of sheet metal enclosed double door 12+2 Way SPN DB, each phase consisting of 10 Nos. 10/20 AMP SP MCB's and controlled by one number 63 Amps DP MCB.(For <b>UPS Supply)</b>	1	Nos..		
c	Supply, installation, testing and commissioning of 63/40 amps DP MCB in M.S enclosure for UPS input/ Output including making connections etc as required.	2	Nos.		
<b>TOTAL CARRIED OVER TO SUMMARY</b>					
<b>F. CABLES,MAINS,SUBMAINS&amp;CABLE TRAY</b>					
1	Supplying ,laying, effecting proper connections, testing & commissioning of the following sizes of 1.1 KV armoured/ unarmoured PVC insulated PVC sheathed aluminium /copper conductor cables conforming to IS : 1554 Part I - 1976 with latest amendments laid over MS supports in existing RCC ducts/ laid in ground /laid on Cable Trays including clamping the cables to supports in an approved manner as required complete with all accessories.				
a.	4 c x 35 sq.mm AYFY Cable	90	RM		
b.	4 c x 16 sq.mm AYFY Cable for Light & Power DB	60	RM		
c.	4 c x 6 sq.mm AYFY Cable for AHU	30	RM		
d.	3c x 10 sq.mm Copper Flexible Cable for UPS Input /Output Supply.	50	RM		
2	Supplying and making terminal joints for the following size of 1.1 KV PVC insulated copper conductor armoured cables including providing heavy duty copper terminal crimping lugs, solder, insulation tape, approved sealing epoxy compound,Single compression brass cable glands, effecting gland connec-tions and effecting terminal connections to the equipment complete as required.				
a.	4 c x 35 sq.mm AYFY Cable	4	Jt		
b.	4 c x 16 sq.mm AYFY Cable for Light & Power DB	6	Jt		
c.	4 c x 6 sq.mm AYFY Cable for AHU	2	Jt		
d.	3c x 10 sq.mm Copper Flexible Cable for UPS Input /Output Supply.	4	Jt		

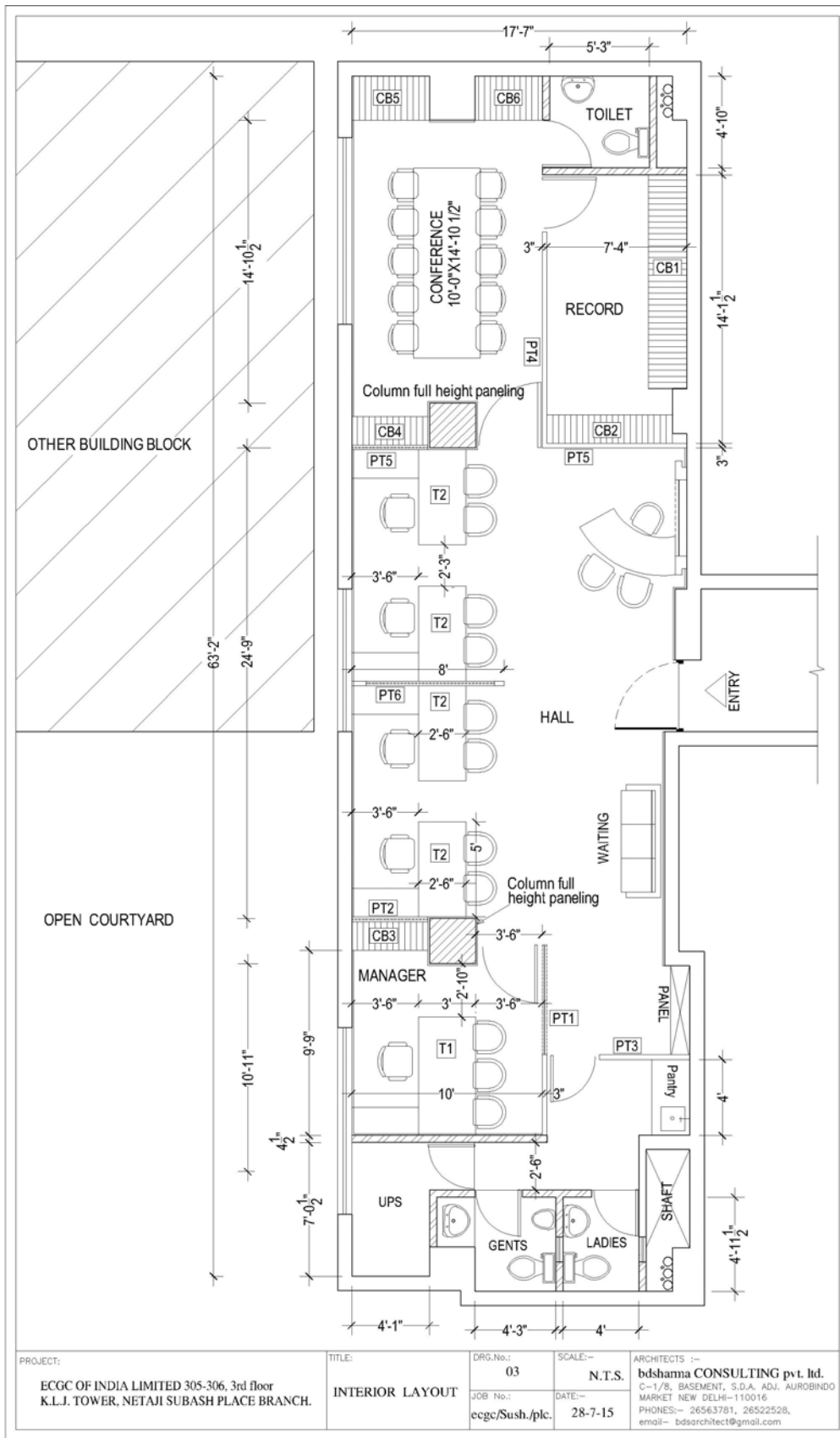
3	Design manufacture , supply and fixing in position the cable trays of the following sizes for supporting 1.1 KV grade armoured/unarmoured aluminium /copper conductor cables. Fabricate the cable trays from perforated 1.6/2mm thick M.S. CRCA sheet duly galvanised with expansion coupler plates duly galvanised, with bolts, washer and nuts. Knock out holes for cable connections as per approved design. The tray should comply with the specification of NEC (National Electric Codes) and NEMA (National Electric Manufacturers Association). The steel should be as per IS:226 and galvanising as per IS :2629/BS 729/ASTM 123. The rate shall also include for supporting steel , fish plates , fixing accessories , nuts bolts, supporting down rods, dash fastener, cutting the RCC etc. complete as required.				
a.	150 mm wide x 40 mm x 2.0 mm thk	30	RM		
	<b>TOTAL CARRIED OVER TO SUMMARY</b>				
<b>G.</b>	<b>SUB DISTRIBUTION BOARDS</b>				
1	<b>Sub Distribution Boards</b>				
	Design, manufacture, supplying, assembling at site, insta-lling, testing and commissioning of the following cubical type, dead front, 2mm thick sheet steel enclosed, free standing indoor type extendible Sub-distribution Boards with vermin proof hinged lockable doors for each compartment provide bus bar interconnections for incoming and outgoing including feeders earthing and painting and as per specifications.				
a.	<b>The Sub Distribution Board - 1 for Light &amp; Power SDB-1 shall consists of :</b>				
	<b>INCOMER</b>				
	Main Incomer 125 amps 4P On Load Type Manual Change Over switch on one side Cable connections and Busbar connection on the other side.				
	Main Incomer 125 amps TPN MCCB (35 KA) terminals to receive 4 x 35 sq. mm AYFY cable connection on one side and Busbar connection on the other side.				
	<b>BUSBARS</b>				
	200 amps 4 pole busbar chamber of suitable length with Copper busbars. All busbars and interconnections shall be of suitable size copper strips current density of copper shall not be more than 1.6 Amps/ sq.mm provide 100% capacity for neutral bus bar.				
	<b>INDICATING PANEL</b>				
	3 nos phase indicating lamps each backed up with MCB and switch shall be provided for incomer.				
	Provide Voltmeter and Ameter with selector switch for each incomer.				
	<b>OUTGOINGS</b>				

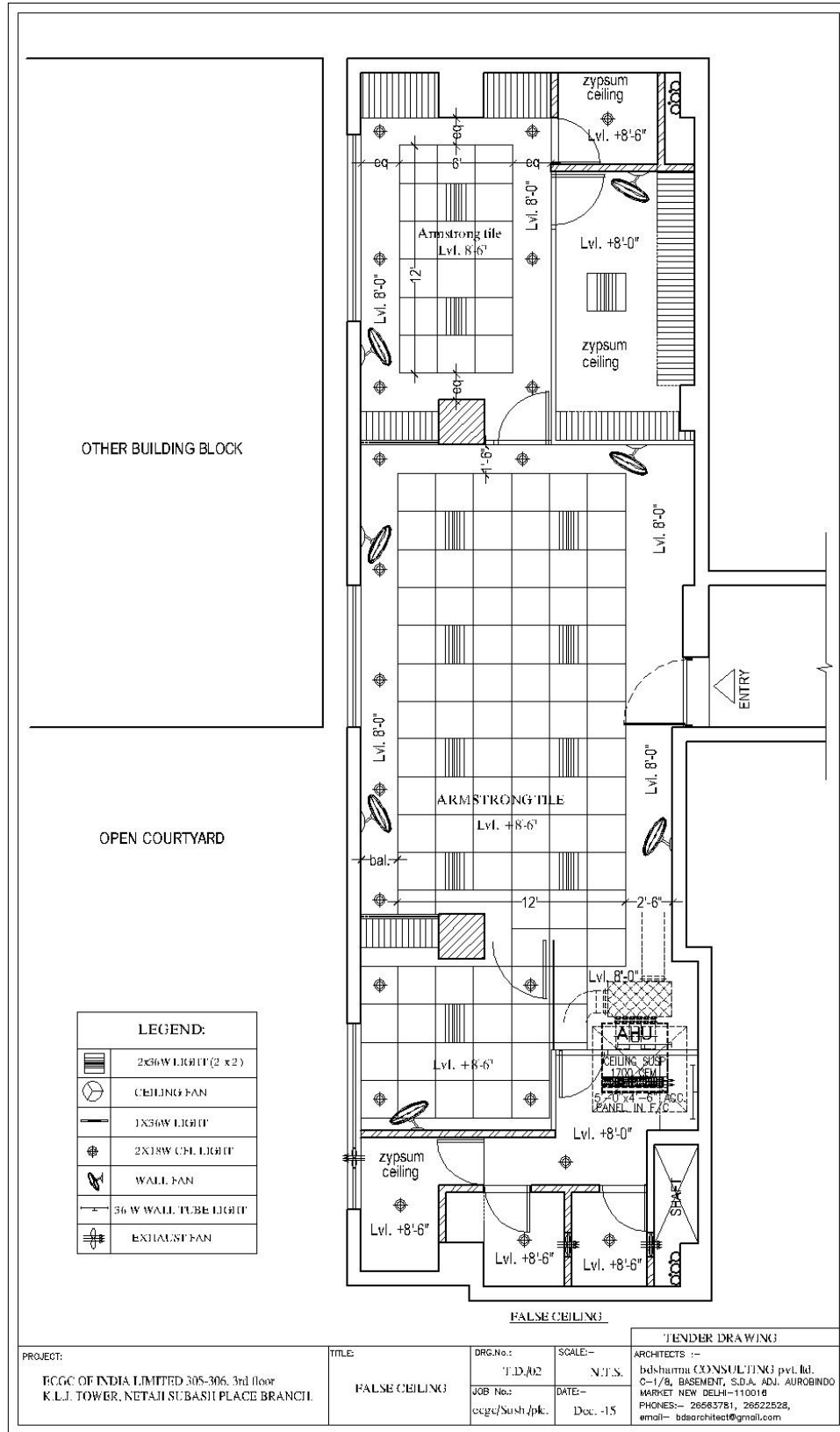
	4 Nos. 63 A TPN MCB (10 kA) suitable to receive 4 x 16 sq. mm AYFY Cable				
	2 Nos. 63 A DP MCB (10 kA) suitable to receive 3 x 10 sq. mm Copper Flexible Cable				
	1 Nos. 32 A TPN MCB (10 kA) suitable to receive 4 x 6sq. mm AYFY Cable				
	The Sub Distribution Board -1 as described above and specifications complete.	1	Set		
	<b>TOTAL CARRIED OVER TO SUMMARY</b>				
<b>H.</b>	<b>FIRE ALARM SYSTEM</b>				
1	Supply and drawing of the following FRLS PVC insulated copper conductor wires in M.S conduits.				
a.	2 x 1.5 sq. mm shielded ATC conductor loop cable in 20 mm dia M.S Conduit Pipe.	150	RM		
b.	2 x 2.5 sq. mm shielded ATC conductor loop cable in 20 mm dia M.S Conduit Pipe.	20	RM		
2	Supply, installation, connecting, testing and commissioning of Smoke Detectors (Optical) with blinking LED etc as required complete.	14	Nos		
3	Supply, installation, connecting, testing and commissioning of rate of rise cum fixed temperature Heat Detectors with mounting base, blinking LED etc. complete as required.	5	Nos		
4	Supply, installation, connecting, testing and commissioning of Electronic Hooters (30 M range) in suitable size of M.S. box. as required complete.	1	Nos		
5	Supply, installation, connecting, testing and commissioning of Manual Call Push button with Hammer etc.in suitable size of M.S. as required complete.	1	Nos		
6	Supply, installation, connecting, testing and commissioning of <b>2 Zone</b> Fire Control Panel as per specifications mentioned in the Document in specifications complete as required. <b>(Conventional)</b>	1	Set		
	<b>TOTAL</b>				

<b>ELECTRICAL SUMMARY</b>					
<b>A.</b>	<b>POINT WIRING</b>			Rs.	
<b>B.</b>	<b>CONDUITING AND WIRING FOR TELEPHONE, COMPUTER &amp; T.V. SYSTEM .</b>			Rs.	
<b>C.</b>	<b>SUPPLYING AND FIXING OF LIGHTING FIXTURES</b>			Rs.	
<b>D.</b>	<b>EARTHING SYSTEM</b>			Rs.	
<b>E.</b>	<b>DISTRIBUTION BOARDS</b>			Rs.	
<b>F.</b>	<b>CABLES,MAINS,SUBMAINS &amp; CABLE TRAY</b>			Rs.	
<b>G.</b>	<b>SUB DISTRIBUTION BOARDS</b>			Rs.	
<b>H.</b>	<b>FIRE DETECTION SYSTEM (CONVENTIONAL)</b>			Rs.	
	<b>GRAND TOTAL</b>			<b>Rs.</b>	

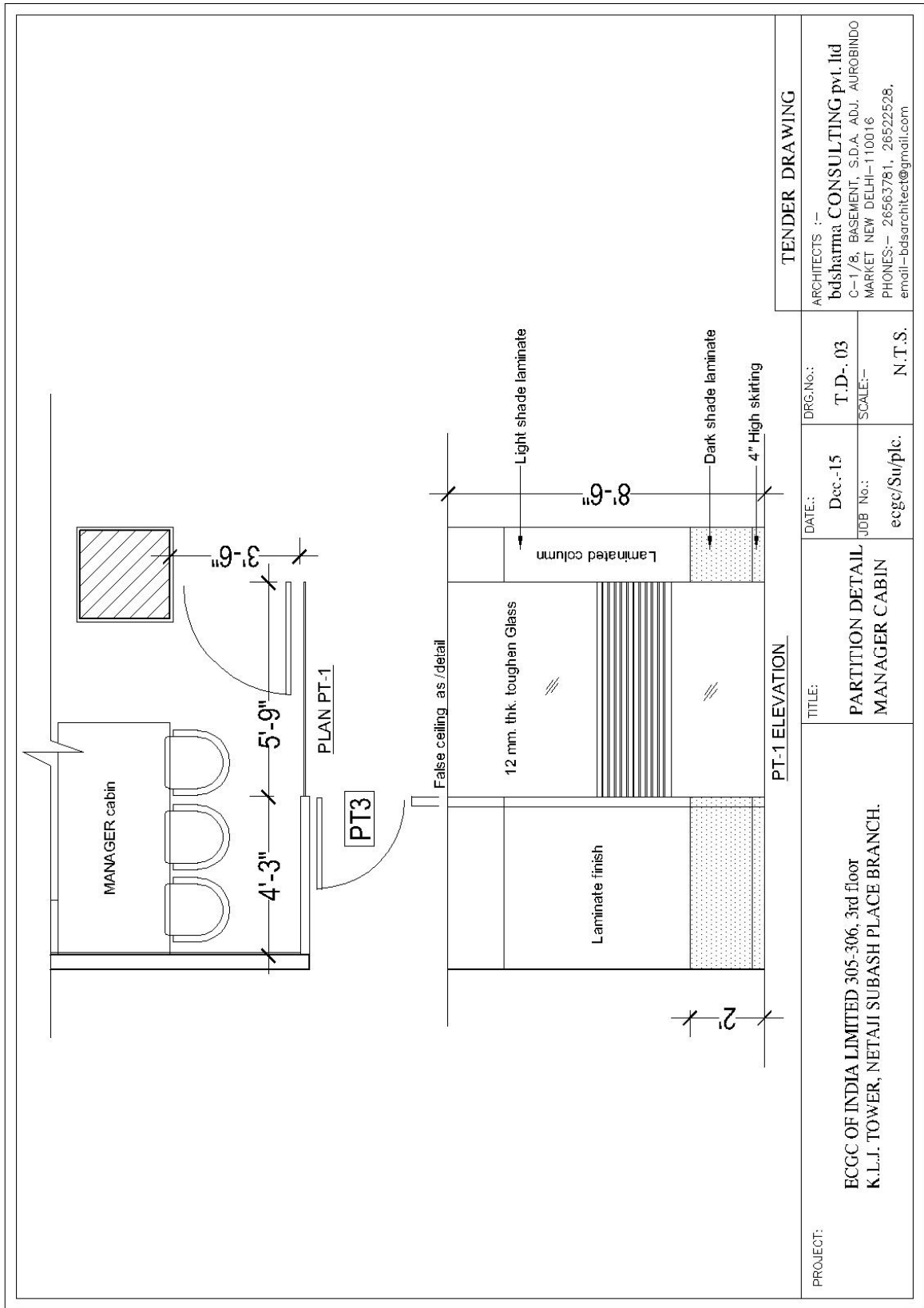
**SUMMARY OF CONTRACT.**

<b>S.NO.</b>	<b>ITEM</b>	<b>UNIT</b>	<b>AMOUNT.</b>
<b>1.</b>	<b>INTERIOR FINISHING WORKS.</b>	<b>RS./-</b>	
<b>2.</b>	<b>A.C. WORKS.</b>	<b>RS./-</b>	
<b>3.</b>	<b>ELECTRICAL WORKS.</b>	<b>Rs./-</b>	
	<b>GRAND TOTAL =</b>	<b>RS./-</b>	
	<b>DISCOUNT IF ANY</b>	<b>%</b>	
	<b>NET AMOUNT</b>	<b>RS./-</b>	









PROJECT:	ECGC OF INDIA LIMITED 305-306, 3rd floor K.L.J. TOWER, NETAJI SUBASH PLACE BRANCH.		
	TITLE:	PARTITION DETAIL MANAGER CABIN	
DATE:	Dec.-15	DRG.No.:	T.D.- 03
JOB No.:	ecgc/Su/plc.	SCALE:	N.T.S.
ARCHITECTS :- bdsharma CONSULTING pvt. ltd C-1/8, BASEMENT, S.D.A. ADJ. AUROBINDO MARKET NEW DELHI-110016 PHONES:- 26563781, 26522528, email-bdsarchitect@gmail.com			



**NOTES:**

1. ALL DIMENSIONS ARE IN FEET.
2. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
3. ALL SPRAY AIR DUCTS TO BE INSULATED WITH 2 IN. THICK MINERLE FIBRE.
4. ALL DIMENSIONS OF THE DUCT TO BE APPROXIMATELY 1/8" SMALLER THAN THE ACTUAL SIZE.
5. ALL DIMENSIONS OF THE DUCT TO BE APPROXIMATELY 1/8" SMALLER THAN THE ACTUAL SIZE.

NO.	DATE	REVISION	BY	CHKD.	DATE

PROJECT: ECGC LTD. WEST DELHI BRANCH OFFICE  
 LOCATION: K.L.J. TOWER (NORTH), NETAJI SUBASH PLACE, PITAMPURA, NEW DELHI-110034

CLIENT: ECGC OF INDIA LIMITED  
 PROJECT: WEST DELHI BRANCH OFFICE

DATE: 10/10/2018  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 SCALE: AS SHOWN

PROJECT: ECGC OF INDIA LIMITED  
 PROJECT: WEST DELHI BRANCH OFFICE

PROJECT: ECGC OF INDIA LIMITED  
 PROJECT: WEST DELHI BRANCH OFFICE

