

**NOTICE INVITING TENDER FOR  
OFFICE INTERIOR FURNISHING, ELECTRICAL, HEATING  
VENTILATION & AIRCONDITIONING (HVAC) AND ALLIED CIVIL  
WORKS**



(A Government of India Enterprise)

**You focus on exports. We cover the risks.**

**HYDERABAD BRANCH**

**AT ECGC LTD., SECOND FLOOR, HACA BHAVAN, OPP. PUBLIC  
GARDENS, SAIFABAD, HYDERABAD, 500004**

**Ref: ECGC/Tender-1 /HYD/ 2023**

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## **SECTION 1**

### **1. Introduction**

#### **1.1 Invitation to Bidders**

By way of this NOTICE INVITING TENDER ('**NIT**') Document (hereinafter also referred to as 'the Bid Document' or 'the Tender Document') **ECGC Limited** (hereinafter referred to as 'ECGC / the Company'), a company wholly owned by Government of India and set up in 1957, invites competitive Bids from reliable resourceful bonafide and experienced firms / companies / individual contractors (hereinafter referred to as ('**the Bidder(s)**'), who have experience in Similar Nature of work, for any Government of India Public Sector Companies/ PSU Banks / PSU Insurance companies for **Office Interior Furnishing, Electrical, Heating Ventilation & Air conditioning (hereinafter referred as 'HVAC') and allied Civil Works**, in an office space area of 2500 square feet **located at ECGC Ltd., Second Floor, HACA Bhavan, Opp. Public Gardens, Saifabad, Hyderabad – 500004.**

The "Technical Bid" and "Financial Bid" along with the supporting documents would be received in physical form. The Financial Bid will be opened by authorized representative of the Company after Technical evaluation.

The Bidder(s) are advised to study the Tender Document carefully. Submission of Bids shall be deemed to have been done after careful study and examination of the Tender Document with full understanding of its implications.

The Bid Document can be downloaded from the Company's website [www.ecgc.in](http://www.ecgc.in).

Please note that all the required information as sought in the Tender document is required to be provided by the bidders. Incomplete or Conditional information may lead to rejection of the Bid. The Company reserves the right to change the dates mentioned in this Tender Document, which will be communicated to the Bidder(s), and shall be displayed on the Company's website. The information provided by the Bidder(s) in response to this TENDER Document will become the property of ECGC and will not be returned. ECGC reserves the right to amend, rescind or reissue this Tender Document and all subsequent amendments, if any. Amendments or changes shall be displayed at ECGC's website only

## 1.2 Schedule of events:

Date of Notification	17/02/2023
Bid Document Availability	The Bid Document can be downloaded from website upto 09/03/2023
Earnest Money Deposit	Rs.5,00,000/- only ( Rupees Five Lakhs only )
Estimated Amount put to tender	Rs.1,12,95,930/- only, excluding GST as applicable ( Rupees One Crore Twelve Lakhs Ninety Five Thousand Nine Hundred and Thirty only )
Pre-bid Queries (if any)	Upto 23/02/2023 through email
Address for Communication and submission of bid	ECGC Ltd., Hyderabad Branch, 2nd Floor, HACA Bhavan, Opp. Public Gardens, Saifabad, Hyderabad 500004.
E-mail & Phone no.	<a href="mailto:hyderabad@ecgc.in">hyderabad@ecgc.in</a> , 040-23234334 / 23210944
Date and time limit for receipt of bids	09/03/2023 up to 05:00 PM.
Date & Place of opening of Technical Bid / Pre- qualification Bid	10/03/2023 at 03:30 PM . ECGC Ltd., Hyderabad Branch, 2nd Floor, HACA Bhavan, Opp. Public Gardens, Saifabad, Hyderabad 500004.
Date of opening of Financial Bid	Within 15 days of opening of Technical Bids. Date will be communicated to Bidder(s) who will qualify in the Technical Bids. The bidders will be informed one day in advance in case the bidders want to be present while the financial bid is opened. Only one person from each bidder can attend such bid opening.
Validity period of Bid	120 days from the last date of submission of Bid
In the event of any of the above-mentioned dates being declared as a holiday the tender will be opened on the next working day at the appointed time.	

**Note: Time lines are subject to change at the sole discretion of ECGC Ltd.**

## **SECTION - 2**

### **2. Disclaimer**

The information contained in this Tender Document or information provided subsequently to Bidder(s) in documentary form by or on behalf of ECGC, is provided to the Bidder(s) on the terms and conditions set out in this Tender document and all other terms and conditions subject to which such information is provided.

This TENDER Document is neither an agreement nor an offer and is only an invitation by the Company to the interested parties for submission of Bids. The purpose of this TENDER Document is to provide the Bidder(s) with information to assist the formulation of their bids.

This TENDER Document does not claim to contain all the information that each Bidder may require. Each Bidder should conduct its own investigations and analysis and should check the accuracy, reliability and completeness of the information in this TENDER Document and where necessary obtain independent advice at their own cost, if any. ECGC shall incur no liability under any law, statute, rules or regulations as to accuracy, reliability or completeness of this document.

The Company may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information in this Tender Document. No contractual obligation whatsoever shall arise from the Tender process until a formal letter from the duly authorized representative of the Company communicating award of Tender is received by the selected Bidder.

ECGC reserves the right to reject any or all the bids received in response to this document at any stage without assigning any reason whatsoever. The decision of ECGC in this regard shall be final, conclusive and binding on all the parties.

## **SECTION - 3**

### **3 Instructions for Bidder(s)**

#### **3.1 General Instructions**

- 3.1.1 The Bidder, irrespective of its participation in the bidding process, shall treat the details of the documents as privileged, secret and confidential.
- 3.1.2 Before bidding, the Bidder(s) are requested to visit the ECGC website <https://www.ecgc.in> and also carefully examine the Tender Document and the General and Special Terms and Conditions of the Contract (TCC) contained therein, and if there appears to be any ambiguity or discrepancy between any terms they should immediately refer the matter to ECGC for clarifications.
- 3.1.3 The Bidders are advised to study the terms and conditions of contract carefully before bidding and they shall be deemed to have fully acquainted themselves with the same.
- 3.1.4 The details of work to be carried out and its scope are given in the specifications and Schedule of Quantities of these documents which also indicate a brief description of the Project which is to be executed.
- 3.1.5 The Bidder should quote their (own) rates for undertaking the work.
- 3.1.6 The Bidders should note that the information, if any, in regard to the site and local conditions, as contained in these tender documents has been given merely to assist the Bidders and is not warranted to be complete.
- 3.1.7 The Bidders, in their own interest, are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders, in respect of the site conditions including but not restricting to the following which may influence or effect the work or cost thereof under the contract:
  - (a) Site conditions including access to the site, existing and required roads and other means of transport/communication for use by him in connection with the work.
  - (b) Requirement and availability of land and other facilities for his enabling works, stores and workshops etc.
  - (c) Ground condition including those bearing upon transportation, disposal, handling and storage of materials required for the work or obtained there from.



- (d) Source and extent of availability of suitable materials including water etc. and labours (skilled and unskilled) required for work and laws and regulations governing their use and employment;
  - (e) The type of equipment and facilities needed preliminary for and in the performance of the work and for successful completion of work.
  - (f) All other information pertaining to and needed for the work including information as to the risks, contingencies and other circumstances which may influence or affect the work or the cost thereof under this contract.
- 3.1.8 The Bidders should note and bear in mind that ECGC Ltd. shall bear no responsibility for the lack of acquaintance of the site and other conditions or any information relating thereto, on their part. The consequences of the lack of any knowledge as aforesaid on the part of the Bidders shall be at their risk and cost and no charges or claims whatsoever consequent upon the lack of any information, knowledge or understanding shall be entertained or payable by ECGC Ltd.
- 3.1.9 No employee of the ECGC Ltd is allowed to work under or as a contractor for a period of two years after his retirement from ECGC Ltd services, without the prior approval of the ECGC Ltd. Any bid is liable to be rejected if either the bidder or any of his employees is found at any time to be such a person who had not obtained the permission of the ECGC Ltd as aforesaid before submission of the tender or engagement in the bidder's service.
- 3.1.10 Canvassing in connection with Tenders is strictly prohibited and the bids submitted by the Bidders who resort to canvassing shall be liable to be rejected.
- 3.1.11 ECGC does not bind itself to accept the lowest of any Bid or any other bid received and shall have the right to reject any Bid without assigning any reason whatsoever. ECGC also reserves the right to re-issue the Tender Document and is not liable for any cost that might have been incurred by any bidder at the stage of bidding.
- 3.1.12 No queries or change in requirements specifications/line items will be entertained in terms of the Bid process, except if such changes are advised or are approved by the Company.
- 3.1.13 The Company reserves the right to cancel the NIT or issue corrigendum notices to the NIT due to unavoidable circumstances and no claim in this respect will be entertained whatsoever.

### **3.2 Cost of Bidding:**

The Bidder shall bear all the Costs associated with the preparation and submission of its Bid, and the Company will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the Bidding process.

ECGC does not bind itself to accept the lowest bid and reserves the right to reject any or all the quotations received, without assigning any reason whatsoever and is not liable for any cost that might have been incurred by any Bidder at the stage of Bidding.

### **3.3 Eligibility Criteria:**

3.3.1. Legal status of the Bidder shall be sole proprietor, partnership firm, Limited Liability Partnership or company. If bidder found to have applied severally for this Tender, all his bids will be rejected. Several bids by related parties will also be rejected.

3.3.2. The Bidder should not have been blacklisted / barred / disqualified by any Govt. Financial Institutions / Banks / Government/Semi- Government departments/ regulator/ statutory body/ judicial or any other authority in India.

3.3.3. In addition to above, participants fulfilling the following eligibility criteria will be considered as technically qualified:

i. Bidder shall produce credential in form of completion certificate of 1 (one) similar nature of work in Hyderabad or in Telangana of the minimum value of 200 Lakh put to tender during last 5 (five) years prior to the date of issue of this tender notice.

or

ii. Bidder shall produce credentials in form of completion certificate of 3 (three) similar nature of work in Hyderabad or in Telangana of the minimum value of 100 Lakh amount put to tender during last 5 (Five) years prior to the date of issue of this tender notice; (Only completed work shall be the criterion).

#### **Note:**

i) Copy of Completion certificate duly signed by the competent authority pertaining to past works shall be submitted with their bid. In the required certificate it should be clearly stated that the work has been completed to their satisfaction and also that no penal action has been initiated against the executed agency i.e., the tenderer.

ii) Payment Certificate will not be treated as completion certificate. Copy of completion certificate without actual date of completion will not be entertained.

- 3.3.4. Audited balance sheet for previous five financial years must be submitted as per **Annexure- B**. Average annual financial turn-over during the last 05 (five) previous financial year with latest FY ending on 31st March 2022, should be at least 250 Lakh value and as per pre-qualification Performa detailed in **Annexure-A**.
- 3.3.5. Valid Professional Tax Receipt Challan for the relevant period, Valid PAN issued by the IT Department, Govt. of India, Valid Goods and Services Taxpayer Identification Numbers (GSTIN) under GST Act 2017 as per notification No: - 4374 -F(Y) dated 13.07.2017 & Income Tax Acknowledgement Receipt for Assessment Year 2022-23 to be submitted.
- 3.3.6. A declaration (Affidavit) in this respect has to be furnished by the prospective bidders as per prescribed format vide **Annexure- G** without which the Technical/Pre-qualification Bid shall be treated non-responsive. Time period is essence of project no excuses will be entertained in regard of working, contractor have to perform the work with in time schedule otherwise the penalties will be imposed.
- 3.3.7. The documentary evidence of the Bidder's qualifications to perform the Contract in its Bid will be accepted only if it is established that the same are to the Company's satisfaction.
- 3.3.8. Bidder must have office of minimum 5 (Five) years old should be functional from the Hyderabad where the project is located. Bidder may produce documentary evidence in support of the same. ECGC may disqualify if any of the above requirement is not furnished in proper format.

### **3.4 Documents Comprising the Bid:**

- 3.4.1 Documents comprising the Bid envelope should contain the following completed forms/documents in accordance with the clauses in the Bid and duly signed by the authorized representative of the Bidder and stamped with the official stamp of the Bidder (Board Resolution, if applicable, authorizing representative to bid and make commitments on behalf of the Bidder to be attached):
- (i) Technical/Pre-qualification Bid Form as per Annexure-A
  - (ii) Price/ Commercial Bid as per Annexure-H
  - (iii) Supporting documents as mentioned in Annexure-B to G.
- 3.4.2 The Bid form and the documents attached to it shall not be detached from one another and no alteration or mutilation (other than filling in all the blank spaces)

shall be made in any of the forms or documents attached thereto. Any alterations or changes to the entries in the attached documents shall only be made by a separate covering letter otherwise it shall not be entertained for the Bidding process.

### **3.5 Language of Bid**

The Bid prepared by the Bidder, as well as all correspondence and documents relating to the Bid exchanged by the Bidder and the Company and supporting documents and printed literature shall be submitted in English.

### **3.6 Preparation of Bids**

- 3.6.1 The bid shall be in A4 size papers, numbered with index and highlighted with technical/Pre-qualification specification details. Bids should be spirally bound or fastened securely before submission. Bids submitted in loose sheets shall be disqualified.
- 3.6.2 The Bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to bind the Bidder to the Contract. The person or persons signing the Bids shall authenticate all pages of the Bids, except for un-amended printed literature.
- 3.6.3 All documents submitted in the context of this Tender Document, whether typed, written in indelible ink, or un-amended printed literature, should be legible / readable. Non-compliance to this clause shall result in Bid being considered as non- responsive, and shall be rejected at the outset.
- 3.6.4 The Bidder, for the purpose of making the Bid, shall complete in all respects, the form(s) annexed to the Tender Document, quote the Rates, with Amount (prices) and furnish the information/ documents, called for therein, and shall sign and put date on each of the forms/documents in the space provided therein for the purpose. The Bidder shall affix its initial on each page of the Bidding Documents.
- 3.6.5 No questions or items in the annexures shall be left blank or unanswered. Where bidders have no details or answers to be provided a 'No' or 'Nil' or 'Not Applicable' statement shall be made as appropriate. Forms with blank columns or unsigned forms will be summarily rejected.
- 3.6.6 The Bidder should ensure that there are no cuttings, over-writings, and illegible or

undecipherable figures to indicate their Bid. All such Bids may be disqualified on this ground alone. The decision of the Company shall be final and binding on the Bidder. The Bidder should ensure that unrealistic (lower than workable rates, or excessively high rates), ambiguous or unquantifiable costs / amounts are not included in the Bid, which would disqualify the Bid.

- 3.6.7 Tender containing any condition leading to unknown / indefinite liability, are liable to be summarily rejected.
- 3.6.8 The Bid shall contain the address, Tel. No., Fax No. WhatsApp number and e- mail id, if any, of the Bidder, for the purposes of serving notices required to be given to the Bidder in connection with the Bid.
- 3.6.9 The Bid shall be signed by a person or persons duly authorized by the Bidder with signature duly attested. In the case of a body corporate, the Bid shall be signed by the officers duly authorized by the body corporate with its common seal duly affixed.
- 3.6.10 The Bidder, at his own responsibility, costs and risk should visit the site to check the Drawing of Tender on Scale Print, ascertain the working conditions and local authority rules/ regulations / restrictions if any and other information required for the proper execution of the work and obtain all information that may be necessary for preparing the Bid as mentioned in the Notice Inviting Tender, before submitting the bid with full satisfaction. The successful Bidder shall not be entitled to any claim of compensation for difficulties faced or losses incurred on account of any site conditions which existed before the commencement of the work or which in the opinion of the Company might be deemed to have reasonably been inferred to be so existing before commencement of work. Necessary permission, wherever required, to be taken from the nodal contact person of ECGC – Ms.Sivasankari Murugan , AGM & Branch Manager.
- 3.6.11 The quantities of various items given in the Bill of Quantity are approximate. The quantities of work may vary at time of allotment / execution of work. Company reserves the right to omit / delete any item(s) of work from the schedule before the order for purchase of the same has been placed by the Vendor. The schedule of quantities shall be filled in as follows:

- (i) The rates column to be legibly filled in both English figures and English words.

(ii) Amount column to be filled in figures for each item and the amount for each subhead as detailed in the "Schedule of Quantities".

(iii) All corrections are to be initialed.

3.6.12 The Bidders 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 Company, detailed analysis of any or all the rates shall be submitted by the contractor. The Company shall not be bound to recognize the contractor's analysis.

### **3.7 Submission of Tender**

3.7.1 Each Bidder can submit only one Bid.

3.7.2 Bids shall be submitted in two parts i.e. (a) Technical/Pre-qualification Bid and (b) Financial/Commercial Bid.

#### **a. Envelope No.1 (Technical/Pre-qualification Bid)**

The Envelope No.1 shall contain 1) Technical bid as per **Annexure – A**; 2) Supporting documents for Technical bid and 3) Earnest money deposit in the form of Crossed Demand Draft of Rs.5,00,000/- (Rupees Five Lakhs Only) in favor of ECGC Ltd. payable at Hyderabad, for "Notice inviting Tender for Office Interior furnishing, electrical, Heating, Ventilation and air conditioning (HVAC) and allied civil work at ECGC Ltd.'s Hyderabad office." This envelope shall be superscribed "Envelope No.1 (Technical Bid and Earnest Money) for "Notice inviting Tender for Office Interior furnishing, electrical, Heating, Ventilation and air conditioning (HVAC) and allied civil work at ECGC Ltd.' Hyderabad office." The tenders not accompanied by the earnest money deposited by demand draft are liable to be rejected as NON-RESPONSIVE.

#### **b. Envelope No.2 (Financial Bid)**

Envelope No.2 shall contain Financial Bid as per **Annexure - H** on the letter head of the bidder duly filled in with complete details and description including all data which are to be supplied by Bidders as specified in this Bid. The bidder shall quote their rate for each & every item in Schedule of Quantities rate column, and arrive at the amount of that item by multiplying quoted rate with quantity of the item. The quoted rate should be whole number. The bids containing fractions, any notes and conditions will be rejected. This envelope

shall be super scribed " Envelope No.2 (Financial Bid) for "Notice inviting Tender for Office Interior furnishing, electrical, Heating, Ventilation and air conditioning (HVAC) and allied civil work at ECGC Ltd.' Hyderabad office."

- 3.7.3 The tenders are to be submitted in one non-window envelope containing technical and financial bids in two separate non-window envelopes each sealed and clearly identified as to envelope number and contents as indicated above. Both envelopes shall be contained in a large envelope super scribed "Notice inviting Tender for Office Interior furnishing, electrical, Heating, Ventilation and air conditioning (HVAC) and allied civil work at ECGC Ltd.'s Hyderabad office.". Bids are liable to be rejected if all Bids (Technical/Pre-qualification Bid and Financial Bid) are not received together and in separate envelopes.
- 3.7.4 The outer envelope shall be addressed to the Company at the given address: Branch Manager, **ECGC Ltd., Second Floor, HACA Bhavan, Opp. Public Gardens, Saifabad, Hyderabad – 500004.**, up to 5.00 PM. on 09/03/2023. Sealed tenders are to be delivered in person to the Nodal contact person nominated for the purpose or put in a sealed tender box kept in the office before the stipulated time.
- 3.7.5 All envelopes should indicate the name and address of the bidder on the cover.
- 3.7.6 If the envelopes are not sealed and marked, the company will assume no responsibility for the Bid's misplacement with premature opening.
- 3.7.7 Bidder shall apply with self- attested photocopies of all credentials and other relevant documents such as valid certificates, valid Partnership deed (in case of Partnership firm), current Professional Tax deposit Challan/ Professional Tax clearance certificate, PAN card, Trade License from the respective Company, Municipality, Panchayat, etc. for participating in this Tendering process of ECGC Limited.
- 3.7.8 Any Technical/Pre-qualification and Financial Bid not conforming to the above list of documents will be rejected.
- 3.7.9 The Technical/Pre-qualification Bid should not contain any price information. Such bid, if received, will be rejected.

### **3.8 Bid Prices**

- 3.8.1 Prices are to be quoted in Indian Rupees only and the quotation shall be in figures as well as words and if there is any discrepancy between the two, the lowest

amount will only be accepted.

3.8.2 Prices quoted by the Bidder shall remain fixed during the Bidder's performance of the Contract and shall not be subject to variation on any account, including exchange rate fluctuations, during the validity period of the contract. GST, Cess etc. levied by Central or State Governments may be charged as per actuals, and are allowed to be varied. A Bid submitted with an adjustable price quotation will be treated as non-responsive and shall be rejected.

3.8.3 The work is to be carried out on Second Floor level as per actual site condition and requirement. Please note that materials and machines may be required to be carried on head load and the same must be accounted in the costing and no separate cost shall be allowed for head load.

### **3.9 Partial bids**

3.9.1 Partial Bids will not be accepted and shall be rejected. Bidder(s) shall have to quote for the entire scope of work.

### **3.10 Period of Validity of Bids**

3.10.1 Bids shall remain valid for a period of 120 days from the last date of submission of Bids. If the Bidder withdraws the Bid, any time after deadline prescribed for submission of the bid till the period of Bid validity his Earnest Money Deposit shall be forfeited.

3.10.2 In exceptional circumstances, the Company may solicit the Bidder's consent to an extension of the period of validity of the Bid on the same terms and conditions. The request and the responses thereto shall be made in writing. At this point, a Bidder may refuse the request without risk of exclusion from any future TENDERS or any debarment.

3.10.3 The Company reserves the right to call for fresh quotes any time during the validity period of the Bid, if considered necessary.

3.11 **ADDITIONAL INFORMATION:** Bidder may include additional information which will be essential for better understanding of the proposal. This may include diagrams, excerpts from manuals, or other explanatory documentation, which would clarify and/or substantiate the bid. Any material included here should be specifically referenced elsewhere in the bid.



3.12 **GLOSSARY:** Provide a glossary of all abbreviations, acronyms, and technical terms used to describe the services or products proposed. This glossary should be provided even if these terms are described or defined at their first use or elsewhere in the bid response.

### **3.13 Deadline for Submission of Bids**

- 3.13.1 Bids must be received by the Company at the address specified, no later than the date & time as specified in the “Schedule of Events” in Invitation to bid.
- 3.13.2 In the event of the specified date for submission of Bids being declared a holiday for the Company, the bids will be received up to the appointed time on the next working day.
- 3.13.3 The Company may, at its discretion, extend the deadline for submission of Bids by amending the appropriate terms and conditions in the Bid Document, in which case, all rights and obligations of the Company and Bidders previously subject to the deadline will thereafter be subject to the extended deadline, which would also be advised to all the interested Bidders on the Company’s website.
- 3.13.4 ECGC is not responsible for non-receipt of bids within the specified date due to any reason including postal delays or holidays.
- 3.13.5 Any Bid received after the deadline for submission of Bids prescribed, will be rejected. No Bids shall be returned.

### **3.14 Late Bids**

Any Bid received after the deadline for submission of Bids prescribed, will be rejected.

### **3.15 Modification and Withdrawal of Bids**

- 3.15.1 The Bidder may modify or withdraw its Bid after the Bid’s submission, provided that written notice of the modification, including substitution or withdrawal of the Bids, is received by the Company, prior to the deadline prescribed for submission of Bids, the Bidder may do so without any penal action including debarment or exclusion from any future Tenders / contracts / business, provided the Bidder submits its decision to the Company in writing, along with its reasons for the same.
- 3.15.2 No Bid shall be modified after the deadline for submission of Bids.

3.15.3 No Bid shall be withdrawn in the interval between the deadline for submission of Bids and the expiration of the period 120 days from last date of submission of Bid. Withdrawal of a Bid during this interval shall result in forfeiture of EMD and may further result in penal action including debarment or exclusion from any future Tenders / contracts / business.

3.15.4 Bidders who wish to be present at the time of opening of Tender may be present at the Office address as mentioned above on the date and time fixed for opening of the Tender.

### **3.16 Preliminary Evaluation**

3.16.1 Bids not confirming to the requirement of the Tender may not be considered by ECGC. However, ECGC reserves the right at any time to waive any of the requirements of the Tender.

3.16.2 The Company will examine the Bids to determine whether they are complete, whether the required formats have been furnished, the documents have been properly signed, and that the Bids are generally in order.

3.16.3 Prior to the detailed evaluation, the Company will determine the responsiveness of each Bid to the Bid Document. For purposes of these clauses, a responsive Bid is one, which conforms to all the terms and conditions of the Bid Document without any deviations.

3.16.4 The Company's determination of a Bid's responsiveness will be based on the contents of the Bid itself, without recourse to extrinsic evidence.

3.16.5 If a Bid is not responsive, it will be rejected by the Company.

3.16.6 ECGC reserves the right to verify the validity of bid information and reject any bid, where the contents are found incorrect whether partially or fully, during the process of Tender or even after the issuance of work order.

3.16.7 During the scrutiny, if it comes to the notice of the Company that the credential(s) and/or any other paper(s) of any bidder is / are incorrect/ manufactured/ fabricated, that bidder(s) will not be allowed to participate in the tender and that application will be rejected outright. If found necessary, the Company shall verify the credential(s) and/or other document(s) of the Bidders before opening of price bid and/or of the lowest Bidder before issuance of the work order. After verification, if it is found that the document(s) submitted by the lowest Bidder is/are either manufactured or false, the work order shall not be issued in favour of the said

Bidder.

3.16.8 During the evaluation of the bids or at any time before or after issuance of the work order, if it comes to the notice of the Company that the credential(s) and/or any other documents(s) of any bidder is / are incorrect/ manufactured/ fabricated, and/or if any bidder has made wilful misrepresentations or fraudulent claims as regards any material fact, such bidder(s) will be made ineligible to participate in the tender process resulting in rejection of the concerned bid or cancellation of the work order, as the case may be. The Company reserves its right to lawfully proceed against such bidders, inter alia, for recovery of damages and/or otherwise.

### **3.17 Evaluation of Technical Bids**

3.17.1 Sealed bids shall be opened by designated Tender opening Committee at the specified time and place.

3.17.2 Only those Bidders and Bids which have been found to be in conformity of the eligibility terms and conditions during the Technical Bid evaluation would be taken up by the Company for further detailed evaluation. The Bids which do not qualify the eligibility criteria and all terms during Technical evaluation will not be taken up for further evaluation.

3.17.3 The Company reserves the right to evaluate the Bids on technical & eligibility parameters.

3.17.4 The Technical Evaluation would be first carried out as per the Eligibility Criterion detailed In Clause 3.3 above and relevant Annexure such as A, B, & C.

3.17.5 During evaluation and comparison of Bids, the Company may, at its discretion ask the Bidders for clarification of their bid. The request for clarification shall be in writing and no change in prices or substance of the Bid shall be sought, offered or permitted. No post Bid clarification at the initiative of the bidder shall be entertained.

### **3.18 Evaluation of Price Bids and Finalization**

3.18.1 The Bidder(s) from the list of earlier shortlisted Bidder(s) shall be deemed eligible for further evaluation and Price/Commercial bids for these Bidder(s) shall be opened.

3.18.2 Company may waive off any minor infirmity or non-conformity or irregularity in a Bid, which does not constitute a material deviation, provided such a waiving does not prejudice or affect the relative ranking of any Bidder. Bidder(s) having any

doubt/ queries/ concerns with any clause of this document or selection process shall raise their concern within 7 days of release of TENDER Document. ECGC will not be liable to accept or provide any explanation towards any doubt/ concerns later on whatever the same may be.

3.18.3 An item rate tender containing percentage below/above will be summarily rejected. However, where a tenderer voluntarily offers a rebate for payment within a stipulated period. This may be considered.

3.18.4 The queries may be communicated only through the e-mail id provided, which is [hyderabad@ecgc.in](mailto:hyderabad@ecgc.in)

3.18.5 Bidder(s) bidding in the process shall give as a part of the Bidding documents a statement on their letter head, as per the format provided under **Annexure - E**, that they have no objection with any clause of the Tender Document.

### **3.19 Contacting the Company**

3.19.1 The Bidder may submit in writing any tender enquiry on matters where clarifications or additional information is desired as per the dates mentioned in the schedule.

3.19.2 If considered appropriate, the ECGC Ltd reserves the right to issue addendum(s) or amendment(s) to any condition/ specifications/ schedules to all Bidders before the date of submission. Tenders submitted by the Bidders shall be deemed to cover the effect of such addendum(s)/ amendment(s) issued and such addendum(s)/ amendment(s) duly signed by the Bidders shall be submitted along with the tenders.

3.19.3 No Bidder shall contact the Company on any matter relating to its Bid, from the time of opening of Price/Commercial Bid to the time the Work order is issued.

3.19.4 Any effort by a Bidder to influence the Company in its decisions on Bid evaluation, Bid comparison or contract award may result in the rejection of the Bidder's Bid and may be barred from any future Tenders / contracts / business with ECGC.

### **3.20 Award Criteria**

3.20.1 Only the Bidders who qualify the technical bid shall be eligible to participate in financial bid. Bidder who quotes the lowest (L-1) shall be awarded the Contract.

ECGC will notify the successful Bidder in writing, by letter or by e- mail, that its Bid has been accepted. The notification of award will constitute the formation of the offer to contract. The selected Bidder should convey acceptance of the award of contract by returning duly signed and stamped duplicate copy of the award letter within 10 (ten) working days of receipt of the communication along with copy of signed agreement as per Annexure-J.

3.20.2 In case the selected Bidder fails to accept the award then the L2 Bidder among the Bidder(s) (other than the Bidder who has failed to accept the award) will be considered for the award and so on.

3.20.3 On acceptance of tender, the name of the authorized representative(s) of the Bidder who would be responsible for taking instructions from the Employer/Architect shall be communicated to the Employer/Architect.

3.20.4 The Bidder shall submit the insurance cover for the work in the form of **Contractor's All Risk Insurance Policy (CAR)** policy within seven (7) days from the acceptance of award of tender letter, from insurance company approved by IRDA.

3.20.5 ECGC Ltd. will not be bound to accept the lowest bid and reserves the right to accept or reject any or all the tenders without assigning any reasons whatsoever.

### **3.21 Company's Right to Accept Any Bid and to reject any or All Bids**

3.21.1 Notwithstanding anything mentioned above, the Company reserves the right to accept or reject any or all Bids or to cancel the Bidding process at any time prior to contract award, without incurring any liability to the affected Bidder or Bidder(s) or any obligation to inform the affected Bidder or Bidders of the grounds for the Company's action.

3.21.2 All decisions taken by the Company are binding and final.

### **3.22 Earnest Money Deposit (EMD) & Performance Bank Guarantee**

3.22.1 Earnest Money may be deposited through (a.) Demand Draft (DD) issued from any schedule bank in favour of "ECGC Limited" payable at Hyderabad. It should be submitted under sealed cover along with the Bid documents. Bids submitted without EMD are liable to be rejected. However, all Micro and Small Enterprises (as defined in the Micro, Small and Medium Enterprises Development Act 2006) are exempted from depositing EMD amount. The eligible firms claiming exemption

under Micro and Small Enterprises need to submit certificate of Registration under Ministry of Micro, Small and Medium Enterprises, GOI.

3.22.2 EMD of the unsuccessful bidders will be returned to them latest on or before the 30th day after receipt of acceptance of tender from the successful bidder. The EMD of successful Bidder shall be refunded after submission of 3% Performance Bank Guarantee. No interest will be paid on EMD.

3.22.3 Forfeiture of Earnest Money Deposit: The Earnest Money shall be forfeited –

- a. If the Bidder withdraws the Bid after the deadline prescribed for submission of bids.
- b. In case of a successful Bidder, if the Bidder fails within the specified time limit to accept the award of contract.
- c. If the successful bidder does not start work within the time specified in tender document or refuses accept the award of tender.
- d. The successful bidder shall furnish Performance Bank Guarantee of 3% of the value of the contract within 07 days of acceptance of tender award letter. The Performance Bank Guarantee will be released after successful completion of the project duly certified by the Architect. The Company may terminate the contract in the event the successful bidder fails to furnish the Performance Bank Guarantee for an amount equal to 3% of the value of the contract.

**3.23 Special Note:** It may be noted that the work under the contract will have to be carried out 24 hrs. or as per the directions of the branch head. The work to be carried without causing nuisance to the other occupants. Contractor should follow rules of HACA Bhavan building guide lines for such civil work strictly.

## **SECTION - 4**

### **4. Terms and Conditions of Contract (TCC)**

#### **4.1 Definitions:**

In this Section, the following terms shall be interpreted as indicated herein below:

- i. "Architect" means the Architect appointed by ECGC Limited for this project.
- ii. "The Company" means ECGC Limited.
- iii. "Vendor" is the successful Bidder whose financial Bid has been accepted and to whom notification of award has been given by the Company.
- iv. "The Services" means the scope of services which the Vendor is required to provide to the Company under the Contract.
- v. "The Contract" means the agreement entered into between ECGC and the Vendor, and signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein;
- vi. "The Contract Price" means the price payable to the Vendor under the Contract for the full and proper performance of its contractual obligations;
- vii. "The Project" means Office Interior furnishing, Electrical, Heating Ventilation Air Conditioning (HVAC) and allied works at ECGC LTD, Second Floor (2500 Sft), HACA bhavan, Opp. Public Gardens, Saifabad, Hyderabad 500004
- viii. "The Project Site" means designated locations of the Company as may be specified in Contract.
- ix. "Departmental Schedule" means the (i) Public Works Department Schedule of Rates in Telangana or Hyderabad; (ii) Latest edition of the book published for the specification of various works by CPWD.
- x. "Drawings" means the graphical representation of the design and execution of the Project, the components, framework, and dimensions prepared by the Architect in consultation with Vendor within seven (7) days from the date of acceptance of tender award letter.
- xi. "Start date" means the date of start of the work; which shall be seven (7) days from the date of acceptance of tender award letter.
- xii. "Site Engineer" means the person posted at site who shall be appointed by Architect and will work under the orders of Architects and the Company to inspect the works.
- xiii. "The works" shall mean the work or works to be executed or done under this

contract.

- xiv. "The Schedule of Quantities" (SOQ) shall mean the schedule of quantities as specified and forming part of this Request for Tender.
- xv. "Priced Schedule of Quantities" shall mean the schedule of quantities duly priced with the accepted quoted percentage of the contractor.

## **4.2 Scope of Work**

- 4.2.1 The Scope of Work includes Office Interior furnishing, Electrical, Heating Ventilation Air Conditioning (HVAC) and allied works at ECGC LTD, Second Floor (2500 Sft), HACA Bhavan, Opp. Public Gardens, Saifabad, Hyderabad 500004 as per details given in accordance with the "Specifications" and "Schedule of Quantities" at **Annexure H** and as per the Drawings.
- 4.2.2 The Vendor shall provide everything necessary for the proper execution of the work according to the intent and meaning of the drawings, schedule of quantities and specifications taken together whether the same may or may not be particularly shown or described therein provided that the same can reasonably be inferred there from and if the Vendor finds any discrepancies therein, he shall immediately and in writing refer the same to the Company whose decision shall be final and binding.
- 4.2.3 The rates quoted against individual items are inclusive of everything necessary to complete the said items of work within the contemplation of the contract and beyond the unit price. It includes furnishing all materials, labour, tools, equipment, Municipal Fees for water supply, Royalty on road materials (if any), electricity and other charges of Municipalities or statutory local bodies, all statutory and levy/cess, transportation charges required for carriage and supply of materials, Toll charges, loading and unloading charges, handling charges, overhead charges, taxes applicable, etc. and its management necessary for, and incidental to, the construction and completion of the work. All work, during its progress and upon completion shall confirm to the lines, elevations and grades as shown on the drawings furnished by the Architect. 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 Architect and to furnish and install such detail with the Company's concurrence, so that upon completion of the



proposed work the same will be acceptable and ready for use. No extra claim in this regard beyond the specified rate as per work schedule whatsoever in this respect will be entertained.

4.2.4 The Vendor shall provide and maintain proper sheds for the proper storage and adequate protection of the materials etc., and other work that may be executed on the site including the tools and materials and remove same on completion. No separate charges shall be paid for traffic control measures, shoring, shuttering, dewatering, curing etc. and the rates of respective items or works are to be deemed as inclusive of the same.

4.2.5 Company may in their absolute discretion issue further drawings and/or written instructions, details, directions and explanations, which are, hereafter collectively, referred to as "the company's instructions" in regard to:

- a) The variation or modification of the design quality or quantity of works or the addition or omission or substitution of any work. Should the Vendor desire to substitute any materials and workmanship, he/they must obtain the approval of the Company in writing in advance.
- b) Any discrepancy in the drawing or between the schedule of quantities and/or drawings and/or specifications.
- c) The removal from the site of any defective materials brought thereon by the contractor and the substitution of any other material thereof.
- d) The demolition/removal and/or re-execution of any work executed by the contractors.
- e) The dismissal from the work of any persons deployed on the Project Site thereupon.
- f) The opening up for inspection of any work covered up.
- g) The rectification and making good of any defects under clauses hereinafter mentioned and those arising during the maintenance period (Defect Liability period).

No variation shall vitiate the contract.

- 4.2.6 The contractor shall forthwith comply with and duly execute any work comprised in instructions contained herein, provided always that verbal instructions, directions and explanations given to the Vendor's or his representative upon the works by the Company shall if involving a variation be confirmed in writing to the Vendor/s within seven days. No works for which rates are not specifically mentioned in the priced schedule of quantities, shall be taken up without prior written permission of the Company.
- 4.2.7 Rates of Extra items: Rates of Extra items shall be determined in the following order of preference whereby only when the first rate is completely ruled out, can the second rate be opted for and so on until the fourth rate which shall be the final rate if none of the preceding rates are found suitable.
- First: - Similar comparable item rate quoted in the SOQ,  
Second: - Similar nearest comparable item rate quoted in the SOQ,  
Third: - Nearest comparable CPWD Schedule or rates/or practices;  
Fourth: - Market rates substantiated by purchase bills/vouchers
- 4.2.8 No Additional/supplementary work/item, other than work/items mentioned in the printed tender be carried out by the contractor without prior approval of the Architect and Company.
- 4.2.9 The responsibility for stacking the serviceable materials (as per decision of the Company/ Architect) obtained during dismantling of existing structures/walls/tiles except those for disposing off under salvage value item & property/ materials of ECGC which are required to be handed over to ECGC lies with the Vendor and nothing will be paid on this account. In case of any loss or damage of serviceable materials prior to handing over the same to ECGC, full value will be recovered from the Vendor's bill at rates as will be assessed by the Architect.
- 4.2.10 The Vendor shall remove all unserviceable materials/debris obtained during execution at place as directed. The Vendor shall dress up and clear the work site after completion of work as per direction of the Architect. The debris shall be disposed off by the Vendor. No extra payment will be made on this account.
- 4.2.11 The under-noted records books at the site of work shall be maintained in addition to normal routine requirements by the contractor

- (a) Daily progress record;
- (b) Work site order book;
- (c) Instruction by the Company's Officers;
- (d) Test registers of other materials/fittings fixtures equipment as stipulated in the tender;
- (e) Register of drawings and working details;
- (f) Log book of defects;
- (g) Hindrance register giving details of commencement and removal of each hindrance;
- (h) Dismantled materials account register;
- (i) Supply and consumption register of scarce / costly materials like laminates special paints white cement, or any material as directed by Architect or Company;
- (j) Specifications C.P.W.D. & I.S.I. as applicable to the contract;
- (k) IS: 1200 relating to measurements;
- (l) Conversion Table IS 786.

These registers are to be signed by the Site Engineer as and when required.

4.2.12 The Vendor shall do photography / video photography of the site firstly before the start of the work, secondly mid-way in the execution of different stages of work and lastly after the completion of the work.

4.2.13 On completion of the works, the contractor shall clear away and remove from the site all constructional plant, surplus materials, rubbish and temporary works of every kind and leave the whole of the site and the works clean and in a workmanlike condition to the satisfaction of the Employer and Architects.

### **4.3 Drawings and Programme of work**

4.3.1 The Vendor in consultation with the Architect shall prepare drawings of the work to be executed. All works shall be carried out in conformity with the drawings and scope of work and in consultation of the project architect.

4.3.2 On finalizing the drawings, the Vendor shall furnish:

- a) Construction schedule showing all activities of work in details and in the form of Bar Chart proposed to be completed within the stipulated period duly signed as token of acceptance.

- b) Details of equipment, Machinery and labour to be deployed on the work.
- 4.3.3 All the drawings relating to work given to the contractor together with a copy of schedule of quantities are to be kept at site and the Company & 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 Company prior to taking up such work.
- 4.3.4 The contractor shall ask in writing for all 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 is required for implementations so that the Employer may be able to give decision thereon.
- 4.3.5 Two copies of each of the drawings and one copy of each of the condition of contract specification tender preamble and bill of quantities will be provided for the use of the Vendor who must satisfy himself as to the accuracy of the said copies in every detail, and make all other copies necessary for the conduct of the work.
- 4.3.6 One copy of each drawing or sketch furnished to the Vendor shall be kept at the Project Site and the Architect or Site Engineer or any person authorised by the Company shall have free access to the drawings and sketches whenever they desire
- 4.3.7 Before actual commencement of work the Vendor shall submit a programme of construction of work with methodology clearly showing the required materials, men and equipment.
- 4.3.8 Any ambiguity observed shall be brought to the notice of Company and be executed after obtaining approval from the Company.

#### **4.4 Commencement of work and Duration**

The work shall start from the Start Date. The project, as per the scope of work and Drawings should be completed within 90 days from the issue of work order.

#### **4.5 Co-operation and safety**

- 4.5.1 All works are to be carried out by the Vendor shall be in close co-ordination with the Architect, Site Engineer and the Company. The Vendor shall at all times give access to workers employed by the Architect and officials of the Company or any men employed on the buildings and to provide such parties with proper sufficient

and if required special scaffolding, hoists and ladders and provide them with water and lighting and leave or make any holes, grooves etc. in any work were directed by the Company as may be required to enable such workmen to lay or fix pipes, electrical wiring, special fittings etc. The quoted rates of the tenders shall accordingly include all these above-mentioned contingent works.

- 4.5.2 The work should also be carried out with due regard to the convenience of the common area users and other occupants of the building, if any. All arrangements and programme of work must be adjusted accordingly. All precautions must be taken for the protection of the public and safety of any adjacent roads, streets, walls, houses, buildings, all other erections, matters and things and the Vendor shall take down and remove any or all such scaffolding, etc. as occasion shall be required or when ordered to do so and shall fully reinstate and make good all matters and things distributed during the execution of works to the satisfaction of the Company/Architect. The Vendor must see that all damages to any property which, in the opinion of the Architect are due to the negligence of the contractor are promptly rectified by the Vendor at his own cost and expenses and according to the direction and satisfaction of the Architect.
- 4.5.3 The Vendor shall carefully execute the work without disturbing or damaging underground or overhead service utilities viz. Electricity, Telephones, Gas, Water pipes, Sewers, Lifts, etc. In case disturbances of service utilities is found unavoidable the matter should immediately be brought to the notice of the Architect and necessary precautionary measures as would be directed by the Architect shall be carried out at the cost and expenses of the Vendor. If the service utilities are damaged or disturbed in any way by the Vendor during execution of the work, the cost of rectification or restoration of damages as would be fixed by the Architect concerned will be recovered from the Vendor.
- 4.5.4 The Vendor shall, throughout the execution and completion of the Works and the remedying of any defects therein:
- (a) have full regard for the safety of all persons and the Works.
  - (b) provide and maintain at his own cost all lights, guards, fencing, warning signs and watching, when and where necessary or required by the Architect for the protection of the Works and/or for the safety and convenience of its workers, the public and/or others,

- (c) take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation,
  - (d) ensure that all lights provided by the Vendor shall be screened so as not to interfere with any signal light of the railways or with any traffic or signal lights of any local or other authority.
  - (e) Vendor should provide a Contractor All Risks Policy as explained in this Tender document(s).
- 4.5.5 The Vendor 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, building structure other than those approved by the Company.
- 4.5.6 The Vendor shall give due notice to the Company and 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 option of the Architect be either opened up for measurement at the contractor's expense or no payment 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 cannot be conveniently tested or checked, the notes of the Employer shall be accepted as correct and binding on the contractor.
- 4.5.7 The Vendor shall afford the Site Engineer every facility and assistance for examining the works and materials 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 in written by the Company.
- 4.5.8 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 Company is obtained. The work will from time to time be examined by the Architects, Nodal Officer on behalf of the Company and the Site Engineer. But such examination shall not in any way exonerate the contractor from the obligation

to remedy and 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 Vendor shall take instructions only from the Nodal Officer of the Company. Nodal Officer of the Company to be kept informed about progress of the work from Site Engineer and Architect.

#### **4.6 Authorized Representative of Vendor and Vendor's Employees**

- 4.6.1 The Vendor shall not assign the agreement or subcontract any portion of the work. The whole of the works included in the contract shall be executed by the Vendor and the Vendor shall not directly or indirectly transfer or assign the contract or any part, share or interest therein nor, shall take a new partner without a prior written consent of the Company and no sub-contracting shall relieve the contractor from the full and entire responsibility of the contract or from active superintendence of the work during their progress. The contractor, may however, appoint and authorize representative in respect of one or more of the following purposes only:
- a. General day to day management of work.
  - b. To give requisition for Departmental materials, Tools etc., if any, to receive the same and sign hand receipts thereof.
  - c. To attend measurements when taken by the ECGC's Officers and sign the records of such measurements which will be taken upon acceptance by the Vendor. The selection of the authorized representatives shall be subject to the prior approval of the concerned Architect in writing. Even after first approval, the Architect may issue at any subsequent date, revised directions without any reasons, about such authorized representative and the contractor shall be bound to abide by such directions.
- 4.6.2 The Contractor shall employ technically qualified and competent work force having the appropriate skill or ability to perform their job efficiently who shall be available (by turn) throughout the working hours to receive and comply with instructions of the Employer/Architects.
- 4.6.3 The contractor shall employ local laborers on the work as far as possible. No laborers below the age of sixteen years and who is not an Indian National shall be employed on the work.
- 4.6.4 Any laborer supplied by the contractor to be engaged on the work on day work basis either wholly or partly under the direct order or control of the Company or

his representative shall be deemed to be a person employed by the contractor.

- 4.6.5 The Vendor shall arrange to provide first aid treatment to the laborers engaged on the works whenever required. 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 Company and also to the competent authority where such report is required by law.
- 4.6.6 Dismissal of Vendor's employees: The Vendor shall on the request of the Company 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 claim for compensation or damages against the Company or any of their officers or employee.

#### **4.7 Procurement, Quality, Approval and Rejection of Materials**

- 4.7.1 All materials required to complete execution of the work shall be supplied by the Vendor after procurement from authorized and approved source. Contractor shall not use modified/redirected old material of other projects.
- 4.7.2 Samples of all materials to be supplied by the Vendor and to be used in the work shall have to be approved by the Architect and checking the quality of such materials shall have to be done by the Architect in consultation with the Company.
- 4.7.3 All materials and workmanship shall be in accordance with the specifications laid down in the Tender and the Architect reserves the right to test, examine and measure the materials/ workmanship direct at the place of manufacture, fabrication or at the site of works or any suitable place. The Vendor shall provide such assistance, instrument, machine, labour and materials as the Architect may require for examining, measuring and testing the works and quality, weight or quantity of materials used and shall supply samples for testing as may be selected and required by the Architect without any extra cost.
- 4.7.4 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 may from time



to time be given by the Company as proposed by Architect during the execution of the work, and to its entire satisfaction

- 4.7.5 Should the work be suspended by reason of rain, strike, lockouts 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.
- 4.7.6 The Vendor shall cover up and protect from damage, from any cause, all 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 tradesmen or subcontractor and any damage caused must be made good by the contractor at his own expenses.
- 4.7.7 The Company 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 Company/Architect 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 Vendor refuses to comply with the order the Company shall have the power to employ and pay other agencies to carry out the work and all expenses consequent thereon or incidental there to as certified by the Company shall be borne by the Vendor or may be deducted from any money due to or that may become due to the Vendor. No certificate which may be given by the Architects shall relieve the Vendor from his liability in respect of unsound work or bad materials.
- 4.7.8 Any cement/ equipment/ basic material lying at Vendor's custody which is found at the time of use to have been damaged shall be rejected and must immediately be remove from the site by the Vendor or disposed of as directed by Architect at the costs and expenses of the Vendor.

#### **4.8 Completion of the Project**

- 4.8.1 All the supply and the work must have to be completed in all respects within the time specified in Notice Inviting Tender from the date of commencement of the work. Time for completion as specified in the tender shall be deemed to be the essence of the contract.

- 4.8.2 The Vendor shall be responsible for the true and perfect setting out of the work and for the correctness of the position, levels, dimensions and alignments of all parts of work, if any rectification or adjustment becomes necessary the Vendor shall have to do the same at his own cost according to the direction of the Architect. During progress of works, if any, error appears or arises in respect of position, level, dimensions or alignment of any part of the work contractor shall at his own cost rectify such defects to the satisfaction of the Architect. Any setting out that may be done or checked by either of them shall not in any way relieve the contractor from their responsibility for correctness and rectification thereof.
- 4.8.3 For cogent reasons over which the Vendor will have no control and which will slow down the progress, [contractor shall maintain hindrance record, duly signed by the Architect, on same day of such occurrence / event, and approved by company] extension of time for the period lost may be granted on receipt of application from the Vendor before the expiry date of contract. No claim whatsoever for idle labour, additional establishment, enhanced cost of materials and labour and hire charges of tools & plants etc. would be entertained under any circumstances. The Vendor should consider the above factor while quoting this rate.
- 4.8.4 The Vendor shall not be entitled for any compensation for any loss due to delays arising out of modification of the drawing, addition & alterations of specifications.

#### **4.9 Payments**

- 4.9.1 The works will be paid for as "measured work" on the basis of actual work done and not as "lump sum" contract.
- 4.9.2 Payment shall be made via electronic fund transfer only to the bank account specified, as per the form provided under **Annexure-D**, in the Tender response.
- 4.9.3 All bills shall be submitted by the Vendor in the form prescribed by the Company. Normally one interim bill shall be prepared each month 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 bill shall be checked at site by Site Engineer and thereafter the Architect shall issue a certificate after due scrutiny of the Vendor's bill which may be further verified by the Company and the Vendor shall be entitled to payment thereof, within the period of 15 working days honoring/interim certificates named in these

documents, as per final verified amount by the Company.

- 4.9.4 10% of the value of each running bill shall be deducted as Retention Money, till the amount so accumulated equals 10% of the work order. The Retention Money shall be refunded after Defect Liability Period provided all defects are attended satisfactorily. Such certificate shall only include the value of said material and goods as and from such time as they are reasonably, properly required and not prematurely brought to or placed adjacent to the work.
- 4.9.5 All payments shall be subject to TDS and any other taxes as applicable from time to time and any other amounts as may be deductible / recoverable as per the terms and conditions of contract.
- 4.9.6 No payment shall be made in advance on award of the contract. No mobilization Advance and secured Advance will be allowed.
- 4.9.7 It may be noted that ECGC will not pay any amount / expenses / charges/ fees / travelling expenses / boarding expenses / lodging expenses / conveyance expenses / out of pocket expenses other than the agreed amount as per the purchase order / contract.
- 4.9.8 Any decrease in taxes must be passed on to ECGC.
- 4.9.9 No adjustment of Price or Price escalation of any kind will be allowed.
- 4.9.10 The final bill will be released on satisfactory completion of the entire work and compliance of all the terms and conditions / obligations mentioned and on proper submission of the bill together with the measurements. Any sum of money due and payable to the Vendor (including any EMD returnable to him) under this contract may be appropriated by the Company and set off against any claim of the Company for the payment of sum of money arising out of this tender or under any other contract made by the Vendor with the Company.
- 4.9.11 The Vendor shall, upon the request of the Company 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 Vendor 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 Company shall be final and binding on the contractor as to the amount of materials, the Vendor is required to use for any work under this contract.

#### **4.10 Indemnity**

4.10.1 Vendor shall indemnify, defend and hold harmless the Company from and against any and all liability, losses, costs and expenses (including reasonable attorney's fees) relating to or arising out of the breach of this Agreement, the negligence or willful misconduct of Vendor or its employees or agents. No party shall however be liable for any loss or damage arising from reliance on any information or materials supplied by the other party or any third party on behalf of the other party, or for any inaccuracy or other defect in any information or materials supplied by the other party or any third party on behalf of the other party. In addition to this, the vendor shall keep the Company saved, harmless and indemnified against claims if any of the workmen or any other person and all costs and expenses as any be incurred by the Company in connection with any claim that may be made by any workman or any other person.

4.10.2 The contractor shall pay all fees required to be given or paid under any statute or any regulation or by-law of any local or other statutory authority which may be applicable to the works and shall keep the ECGC protected against all penalties and liabilities of every kinds for breach of such statute regulation or law.

4.10.3 The Vendor shall also fully indemnify the Company in respect of any cost, charges or expenses arising out of any claim or proceedings at law and also in respect of any award of compensation of damages arising there from.

#### **4.11 Liquidated Damages**

In case, completion of the project is delayed due to reasons attributable to the Vendors, the Company shall impose liquidated damages @ 0.5 % (Zero-point five percent) on awarded contract value for each week of delay subject to a maximum of 10% (ten percent) of the awarded contract value.

#### **4.12 Insurance and Defect Liability Period:**

4.12.1 The Vendor are required to take Contractor's All risk Insurance Policy (CAR Policy) and Workmen Compensation Policy with respect to the work and the workmen within 7 days from the acceptance of tender award letter with an IRDA approved Insurance Company in the name of the Vendor from the date of commencement of work till the end of Defect Liability Period. The value of the work to be insured would be 125% of the contract value for CAR Policy.

4.12.2 The CAR policy should have additional coverage under third party liabilities. The

liabilities should be one lakh rupees per accident. The premium receipt and the policies should be submitted to the Company. The contractor shall fully indemnify the Company against all claims which may be made against the Company by any member of the public or other third party in respect of anything which may arise in respect of the works or in consequence thereof. The contractor shall also fully indemnify the Company against all claims which may be made upon the Company, whether under the Workmen Compensation Act or any Statute in force during the currency of this contract or at common law in respect of any employee of the Vendor or any sub- contractor. The Vendor shall be responsible for anything which may be excluded from the insurance policies above referred to.

4.12.3 Defect Liability Period is 12 months from the date of satisfactory completion of the work, as certified by Architect, unless otherwise specified.

4.12.4 During the course of Defect Liability Period the Vendor has to rectify all the defects noticed free of charge.

4.12.5 In case the Vendor fails to attend the rectification work within 7 days of reporting the same in writing, Company will have the liberty to carry out the said work through any other means at the cost & risk of the Vendor. Such expenditure shall be recovered from the Retention Money or any other amount due to the Vendor in this or any other contract. The Defects Liability Period shall be extended for as long as defects remain to be corrected.

4.12.6 While carrying out the rectification work, Vendor should ensure that the surroundings should be protected against any possible damage. In case of any damage, the same should be made good by the contractor at his cost.

#### **4.13 Representation and Warranties**

4.13.1 Vendor shall be required to comply with statutory and regulatory requirements as imposed by various statutes, labour laws such as (a) Contract Labour (Regulation Abolition) Act, 1970, (b) Apprentice Act, 1961, (c) Minimum Wages Act, 1948, (d) Employees' Provident Fund and Miscellaneous Provisions Act, 1952; (e) Employees State Insurance Act, 1948, (f) Minimum wages according to the rates notified and/or revised by the State Government from time to time under the Minimum Wages Act, 1948; (g) Safety and welfare standards as per the provisions of the Building and other Constructions applicable in Hyderabad; etc., local body rules, state and central Government Body statutes, and any other regulatory

requirements applicable on the Vendor, and shall produce the same for records of ECGC Limited and / or its Auditors and / or its regulator on demand. If he fails to do so, the Company may at its discretion, take necessary measures over the Vendor and appropriate the amounts against the invoices of the Vendor. The Vendor shall also make himself liable for any pecuniary liabilities arising out on account of any violation of the provision of the said Act(s).

4.13.2 Vendor shall be required to obtain valid Registration Certificate & Labour License from respective Regional Labour Offices where construction work by them is proposed to be carried out.

4.13.3 The Vendor shall give all notices required by said act, rules, regulations and Byelaws etc. and pay all fees payable to such authorities for execution of the work involved. The cost, if any, shall be deemed to have been included in his quoted rates, taking into account all liabilities for licenses, fees for footpath encroachment and restorations etc. He shall indemnify the Company against such liabilities and shall defend all actions arising from such claims or liabilities.

4.13.4 The Vendor shall employ “A” grade Licence holder Electrical contractor to complete the electrical work in the scope of the tender.

4.13.5 The Vendor shall comply with the Company’s internal guidelines, instructions, manuals, scrutiny lists, procedures, further specifics and requirements (“Guidelines”) in relation to the Services, as may be provided in writing by the Company to the Service Provider. However, in the event there is a conflict between the guidelines and the terms set out in the Tender, the terms set out in the Tender shall prevail.

#### **4.14 Termination**

4.14.1 The Company may terminate all or any part of the Contract at any time during the term without assigning any reason, by giving 15 days prior written notice to the Vendor. In the event of termination, Company's liability shall be to the extent of the work already rendered by the Vendor and availed by Company under this Contract. In case the contract is terminated by the Company on account of any breaches committed by the Vendor in breach of its obligations under the Contract, the company may invoke the PBG given by the Vendor

4.14.2 Any notice correspondence etc. issued to the authorized representative or left at

his address, will be deemed to have been issued to the Vendor.

#### **4.15 Entire Agreement**

It is expressly agreed between the parties that the bid received from the Vendor along with its annexures, Tender Award Letter, Notice for Tender Document, any addendum or corrigendum issued thereafter and the completed Annexures thereto constitutes the Entire Agreement between the Parties.

#### **4.16 Confidentiality**

The Vendor and/or its personnel shall keep confidential at all times any/all information that is shared by the Company or Architect or has come to their knowledge during the performance of Services under the Contract.

#### **4.17 Intellectual Property Law**

4.17.1 All the manuals, guidelines, documents, drawings etc. provided by company shall be treated as existing intellectual property rights of the Company therein shall continue to vest with the Company. Any royalties or patents or the charges for the use of such intellectual property that may be involved in the contract shall be included in the price.

4.17.2 As per prevailing government notification the Contractor will have to submit the receipt of payment of royalty to the Government for use of sand, stone materials, laterite, moorum, gravel, earth etc. to the Architect before preparation of bill for payment, when they collect the materials directly from the source. If they collect the materials from the authorized quarry holder or commercials establishment who directly or indirectly pay the royalty to the Government, necessary certificate or cash memo for sale in that respect from them shall have to be produced to the Architect failing which necessary deduction from the dues of the contractor may be made as fixed by the Architect in consultation with the Company.

4.17.3 The Contractor shall save, protect and indemnify ECGC from and against all claims, demands, suit and proceedings for and/or an account of infringement of any patent rights, design, trade mark of name of other protected right in respect of any constructional plant, machine, work, materials, thing or process used for or in connection with works or temporary works or any of them.

#### **4.18 Relationship between Company and Vendor**

The relationship between Company and Vendor is solely that of an independent contractor and the relationship is on a principal-to-principal basis. Nothing in this

Agreement shall constitute the Parties as partners, joint ventures, or co-owners, or constitute either Party as the agent, employee or representative of the other, or empower either Party to act for, bind or otherwise create or assume any obligation on behalf of the other, and neither Party shall hold itself out as having authority to do the same.

**4.19 WAIVER**

Any modification to the terms and conditions can be made only in writing and signed by parties hereto. Any failure or delay by the Company to enforce any provision or right available to it under this Agreement shall not be deemed to be a waiver of such provision or right and shall not preclude the Company from exercising the same subsequently.

**4.20 Survival**

The termination of the Contract shall not affect the rights of and or obligations of the Vendor which arose prior to the termination.

**4.21 Force Majeure**

- 4.21.1. Notwithstanding the provisions of Contract, the Vendor shall not be liable for, liquidated damages, or termination for default, if and to the extent, that, the delay in performance, or other failure to perform its obligations under the Contract, is the result of an event of Force Majeure.
- 4.21.2. For purposes of this clause, "Force Majeure" means an event beyond the control of the Vendor and not involving the Vendor's fault or negligence and not foreseeable. Such events may include, but are not restricted to, acts of the Company in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.
- 4.21.3. If a Force Majeure situation arises, the Vendor shall promptly notify the Company in writing of such condition and the cause thereof. Unless otherwise directed by the Company in writing, the Vendor shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

**4.22 Governing Law and Jurisdiction**

The Courts in Hyderabad, shall alone have jurisdiction for the purposes of adjudication of any dispute of differences whatsoever in respect of or relating to or arising out of or in any way touching the works awarded or the terms and conditions of the Contract.

\*\*\*\*\*



**SECTION – 5****ANNEXURE – A****ELIGIBILITY /TECHNICAL/ PRE-QUALIFICATION BID**

<b>Sr No</b>	<b>Description</b>	<b>Details</b>
<b>1</b>	Name of the Company/ Firm/ Individual	
<b>2</b>	Legal Status (eg. Proprietorship, Partnership, Limited Liability Partnership, Company etc.	<Certified copy of the Certificate of Incorporation of Company issued by the Registrar of Companies / Partnership Deed etc. to be attached>
<b>3</b>	Registered Physical Address	
<b>4</b>	Correspondence Address	
<b>5</b>	Business profile of the company/firm (attach a separate write-up or brochure regarding business activities of the company/firm)	
<b>6</b>	Date of incorporation	
<b>7</b>	Board of Directors/ Management/ Promoters/ Partners/ Proprietor	(i)
		(ii)
		(iii)
		(iv)
		(v)
<b>8</b>	Contact Person Details (Name, Landline and mobile Number, e-mail id)	
<b>9</b>	E-mail id of the bidder,	
<b>10</b>	PAN of the bidder	<copy required>
<b>11</b>	TIN of the bidder	<copy required>
<b>12</b>	GST Registration No.	<copy required>

13	Work experience in similar nature of work in terms of Clause 3.3 (a) (i) & (ii) of NIT	< Evidences in form or work completion certificates should be provided along with the bid >
14	Annual turnover for the last five financial years	< IT returns acknowledgments and / or Audited Financial Statements / statements certified by Chartered Accountants to be provided for last five financial years ending on 31.03.2022.
15	Power of Attorney/authorization for signing the bid documents	
16	The Bidder should not have been blacklisted / barred / disqualified by any Govt. Financial Institutions / Banks / Government / Semi-Government departments/ regulator / statutory body/ judicial or any other authority in India.	< A self-declaration by the Bidder on its letter head>
17	The Bidder's Firm should not be owned or controlled by any Director or Employee of ECGC Ltd.	< A self-declaration by the Bidder on its letter head>
18	Projects taken up and completed during last 5 years	Details
19	Any project not completed due to any reason in last 5 years	Details

20	Any penalty imposed for delay or no-completion in past 5 years	Details
21	Status of ongoing/ completed litigation & arbitration related to projects	Details

.....

Signature of the authorized Signatory of Company/Firm/ Individual(Company Seal)

Name :

Date: Designation :

Contact No (Mobile)Fax No.:

Email Id

## **ANNEXURE-B**

### **ANNUAL TURNOVERS FOR THE LAST FIVE FINANCIAL YEARS**

Furnish certified copies of audited balance sheet and profit & loss account (audited) for the last five preceding years-

<b>S.No.</b>	<b>Financial Year</b>	<b>Turnover from renovation and repairing work [Rs in Lakhs]</b>	<b>Turnover from all other sources (Rs in Lakhs)</b>	<b>Remarks</b>
<b>1</b>	2017-18			
<b>2</b>	2018-19			
<b>3</b>	2019-20			
<b>4</b>	2020-21			
<b>5</b>	2021-22			

**Note:**

1. Please attach certified copies of the latest Income Tax, Balance Sheet and Profit & Loss account statement to support the information furnished, failing which your firms shall be summarily disqualified.
2. Where copies are required to be furnished, the same are to be self-certified.
3. Please attach Certificate of financial soundness of your firm issued by Bank
4. Additional sheets may be used for providing information and the same shall be signed and stamped by the Bidder.

**SIGNATURE OF THE BIDDER WITH SEAL**

**DATE:**

**ANNEXURE-C****EXPERIENCE PROFILE DETAILS OF SIMILAR WORKS AND ALL WORKS  
COMPLETED IN LAST FIVE YEARS**

S. No.	Description of the Work	Name and address of the Tenderer	Contract No. and date	Date of award of work	Stipulated date of completion	Actual date of completion	Value of completed work (in Lakhs)	Penalty if any	Work completion certificate enclosed
1.									
2.									
3.									

**NOTE:**

- i. Contractor must enclose the work completion letter or certificate issued by competent authority of tenderer of earlier works. Any other letter such as work order copies, running bill advises, architect's letters etc. shall not be accepted as proof of having completed the works.
- ii. Additional sheets may be used for providing information and the same shall be signed and stamped by the Tenderer.

**SIGNATURE OF THE BIDDER WITH SEAL AND DATE:**

## ANNEXURE – D

### **BANK DETAILS OF THE BIDDER**

Sr No	Description	Details
1	Name of the Bank	
2	Address of the Bank	
3	Bank Branch IFSC Code	
4	Bank Account Number	
5	Type of Account	

.....

Signature of the authorized Signatory of Company/Firm/Proprietor (Company Seal)

Name : Designation :

Contact No (Mobile) Email Id

## **ANNEXURE – E**

### **ACKNOWLEDGEMENT**

To,  
ECGC Limited,  
Hyderabad Branch,  
2nd Floor, HACA Bhavan,  
Opp. Public gardens, Saifabad,  
Hyderabad 500004.

Dear Sir/Madam,

**SUBJECT: RESPONSE TO THE REQUEST FOR PROPOSAL FOR “OFFICE INTERIOR FURNISHING, ELECTRICAL, HEATING VENTILATION & AIR CONDITIONING (HVAC) AND ALLIED CIVIL WORKS”, AT ECGC LTD, SECOND FLOOR, HACA BHAVAN, OPP. PUBLIC GARDENS, SAIFABAD, HYDERABAD - 500004**

Having examined the Request for Proposal Document including Annexures, the receipt of which is hereby duly acknowledged, we, the undersigned offer to provide services in accordance with the scope of work as stated in the TENDER Document within the cost stated in the Bid.

- (1) If our Bid is accepted, we undertake to abide by all terms and conditions of this TENDER.
- (2) We certify that we have provided all the information requested by ECGC in the requested format. We also understand that ECGC has the right to reject this Bid if ECGC finds that the required information is not provided or is provided in a different format not suitable for evaluation process for any other reason as it deems fit. ECGC's decision shall be final and binding on us.
- (3) We agree that ECGC reserves the right to amend, rescind or reissue this TENDER Document and all amendments any time during the tendering.
- (4) We agree that we have no objection with any of the clauses and bidding process of this Tender Document.

.....

Signature of the authorized Signatory of Company/firm/Proprietor(Company Seal)

Name: Designation:

Contact No (Mobile):

Email ID:



## ANNEXURE-F

### **FORMAT FOR LETTER OF AUTHORIZATION**

**(To be submitted on the Bidder's letter head)**

To  
ECGC Limited,  
Hyderabad Branch,  
2nd Floor, HACA Bhavan,  
Opp. Public Gardens, Saifabad,  
Hyderabad 500004.

#### **Letter of Authorization for Attending Bid Opening for Tender**

Any one of the following persons is hereby authorized to attend the bid opening on \_\_\_\_\_(date) in the tender for work: **“OFFICE INTERIOR FURNISHING, ELECTRICAL, HEATING VENTILATION & AIR CONDITIONING (HVAC) AND ALLIED CIVIL WORKS”**, at the following address: ECGC Ltd., Hyderabad Branch, 2nd Floor, HACA bhavan, Opp. Public Gardens, Saifabad, Hyderabad 500004 mentioned on behalf of M/s.\_\_\_\_\_ (Name of the Bidder) in the order of preference given below:

Order of Preference   Name   Designation   Specimen   Signature

I

II

(Authorized Signatory of the Bidder)

Date \_\_\_\_\_

**(Company Seal)**

1. Maximum of one person can be authorized for attending the bid opening.
2. Permission for entry to the hall where bids are opened may be refused in case authorization as prescribed above is not submitted or for any other exigency.

## **ANNEXURE G**

### **AFFIDAVIT**

**(To be furnished in Non – Judicial Stamp paper of appropriate value duly notarized)**

1. I, \_\_\_\_\_ the undersigned do certify that all the statements made in the attached documents for the work “**OFFICE INTERIOR FURNISHING, ELECTRICAL, HEATING VENTILATION & AIR CONDITIONING (HVAC) AND ALLIED CIVIL WORKS**”, at ECGC LTD, Second Floor, HACA bhavan, Opp. Public Gardens, Saifabad, Hyderabad 500004 are true and correct. In case of any information submitted proved to be false or concealed, the application may be rejected and no objection / claim will be raised by the under-signed.
2. The under-signed also hereby certifies that neither our firm/partners nor any of constituent partners have been debarred to participate in tender by ECGC LTD. or any other body during the last 5 (five) years prior to the date of this NIT.
3. The under-signed would authorize and request any Bank, person, Firm or Company to furnish pertinent information as deemed necessary and / or as requested by the company to verify this statement.
4. The under-signed understands that further qualifying information may be requested and agrees to furnish any such information at the request of the Authority.
5. Certified that I have applied in the tender in the capacity of individual / as a partner of a firm & I have not applied severally for the same tender.
6. I/ We hereby agree and undertake that we have not directly or through any other person or firm offered, promised or given nor shall we offer, promise or give, to any employee of ECGC involved in the processing and/or approval of our proposal/ offer/ bid/ tender/ contract or to any third person any material or any other benefit which he/she is not legally entitled to, in order to obtain in exchange advantage of any

kind whatsoever, before or during or after the processing and/or approval of our proposal/offer/bid/tender/contract.

---

**Signature of the declarant identified by me**

**Signature of Advocate**

**Seal & Signature of Notary**

## ANNEXURE – H

### **SPECIFICATIONS**

S.NO	DESCRIPTION		PAGE NO
1	PART-A	INTERIOR FURNISHING	
2	PART-B	ELECTRICAL	
3	PART-C	HVAC	

### **SCHEDULE OF QUANTITIES**

S.NO	NAME OF WORK	AMOUNT
1	INTERIOR WORKS	
2	FURNITURE WORKS	
3	ELECTRICAL WORKS	
4	HVAC WORKS	
5	CIVIL WORKS	
6	PLUMBING WORKS	
	<b>GRAND TOTAL</b>	
	GST EXTRA	

Amount in Words:

Signature of the bidders  
With the Seal of the Company

Date:

## **SPECIFICATIONS – PART A**

### **INTERIOR FURNISHING**

#### **1. GENERAL DATA**

##### **1.1 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. Architect instruction shall be binding over and above specification described in SOQ, in writing only with CC to Owner.

##### **1.2 DRAWINGS/DIMENSIONS PROCEDURE**

Figured dimension on drawings shall supersede measurements by scale and drawings to a large scale take precedence over these to a smaller scale. 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 responsibility of bidder, shall verify them for himself and examine the nature of the ground, conduct procedure & coordinated from electrical, HVAC and fire SOQ items.

Procedure for coordination is, creating mockup sample and all trades work men shall install items, shall conduct operational coordination, physical execution satisfaction in accordance to drawing, or modification suggested from feedback from team at work, shall be understood consented by all trade work men. Drawing shall be kept permanently displayed at site, with necessary pictures. Marking leveling and dimensions permanently marked at site. Owner and Architect representative have discretion to observe witness coordinated team work for up to mark work progress, take note and pictures for record.

For items which are many in count, or designs that are repeated multiple sites, one true unit sample set at site with manufactures test certificate and again tested for work-men-ship and specification at site, during procedure. by bidder, not test certificate shall issue by Owner/architect. Owner and Architect representative have discretion to observe witness coordinated teamwork for up to mark work progress, take note and pictures for record

##### **1.3 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.

Any discrepancy shall be brought to notice for timely rectifications for architect response if any,

that may take up to 15 days. Communication shall be done in advance, no time extension is available to contractor in this response time and shall not be entertained as hindrance.

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.

#### **1.4 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 carry out as per latest C.P.W.D. specification for material and workmanship unless specified otherwise.

#### **1.5 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 benchmarks 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 benchmarks shall consist of masonry pillars with top neatly plastered and horizontal as per the approval of Architect. Benchmarks shall be well connected with GTS, or any other benchmarks approved by Architect.

## **2. P.O.P. (PLASTER OF PARIS)**

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

### **2.1 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.

## **2.2 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.

## **2.3 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 surface 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. VITIFIED /GLAZED/CERAMIC TILE AT FLOOR/ DADO**

The samples of tiles/ slabs are to be submitted to the Architect for approval. Final decision will be based on the decision of the Architect /engineer or authorized official. For floor tiles, all edges to be sorted for straight edges before laying. Tiles will be laid after approval from the Architect. Joints for all flooring to run in a straight line and should not exceed 1.5mm for stones and 1mm for tiles and should be filled with laticrete epoxy grouting of approved shade to the full depth. Rate shall include soaking the tiles in water for at least two hours before laying. Curing, cleaning the surface. For wall tiles: 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.

## **4. WALL FINISHES**

### **4.1 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.

#### **4.2 GENERAL**

Plaster as herein specified shall be applied to all internal surfaces were 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 an 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.

#### **4.3 PLASTER WORK**

The primary requirements of the plaster work shall be to provide an absolute water tight enclosure, 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 wiremesh strips 400mm wide or as shown, installed before plastering.

#### **4.4 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.

#### **4.5 SAMPLES**

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

#### **4.6 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 up to about 6mm depth for the entire surface as approved by the Architect to endure proper key for the plaster.

#### **4.7 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 4-part clean sand. (Fine and Coarse sand in equal proportions). As approved by the Architect

#### **4.8 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 minutes of mixing.

#### **4.9 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.

#### **4.10 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.

#### **4.11 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.

#### **4.12 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.

#### **4.13 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.

#### **4.14 APPLICATION**

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

#### **4.15 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.

### **5. UPVC/ ALUMINUM WORK**

#### **5.1 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.

#### **5.2 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.

#### **5.3 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 confirmed to IS designation HE 9WP/HV 9WP alloy, with chemical composition and technical properties as per IS 733 and IS 1285.

#### **5.4 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.

#### **5.5 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 orin boiling water cold sealing process as per IS 1868/IS 6057. Polyethylene tapeprotection 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.

#### **5.6 GLAZING:**

Glazing shall comprise of reflecting bronze or approved shade tinted or heat reflectivefloat glass 6mm thick on outside and 12 mm thick toughened float glass on inside, all glass panels shall be retained within aluminum framing by used of exterior grade Ethyl Propylene Di Methylene (EPDM) gasket. No water leakage or penetration shall occur when subjected to continuous 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 whichever 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.

#### **5.7 PRECAUTIONS:**

Contractor shall ensure that aluminum curtain walls are not deformed/damaged during subsequent construction. all fittings, hinges and framework etc. shall be protected within alkathene sheets, so that these may not be damaged during executionof work.

#### **5.8 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/expansion 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 window 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 builder's 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.

#### **5.9 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.

### **6 PLYWOOD**

Plywood to be used shall be grade BWR, i.e., it shall have bonded 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 board, 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).

### **7 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. Teak wood 12 mm thick lapping all rounds had to be provide and should be included in the rates. Both the faces shall becommercial hardwood type ready for lamination or painting.

### **7.1 ADHESIVES**

Adhesive shall be Phenol Formaldehyde Synthetic resin conforming to B.W.P. (Boiling Waterproof) 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.

### **7.2 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.

### **7.3 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 besecurely nailed with the longest nails that may be used without splitting the wood. Whenever it is necessary or an adequate joint cannot be formed by nailing, themembers 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.

## **8 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 andtenoned, doweled, blocked, and glued together to avoid the use of nails as far as possible. The details shall be closely followed, molding clearly cut and miters accurately made. Free edge of shutters, Shelves, partitions, sides etc. shall be provided with first class teakwood edging pvc edge tape as mentioned in individual item, 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 mentioned. Drawerfront, sides and back shall be as mentioned in item. The drawers shall slide on Soft closer telescopic channel as shown in drawing.

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.

## **8.1 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 isolate wood from masonry wherever practicable.

All concealed wood etc. shall be treated fully and liberally with solignum before placing in position.

## **8.2 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".

## **8.3 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 woodwork that may damage during the progress of the work is left unprotected.

## **8.4 HARDWARE**

### **8.4.1 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.

#### **8.4.2 GENERAL**

All hardware 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.

#### **8.4.3 SAMPLES**

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

#### **8.4.4 QUALITY**

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

#### **8.4.5 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.

### **8.5 PAINTING**

#### **8.5.1 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.

#### **8.5.2 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

#### **8.5.3 COLOR**

All colours, as provide in the color 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.

#### **8.5.4 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.



## **8.6 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.

## **8.7 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.

## **8.8 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 sandpaper 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 sandpaper 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, dampened with methylated spirit and applied by light rubbing. The finished surface shall have a uniform texture and high gloss.

## **8.9 WAX POLISHING**

Wax polishing shall be done with readymade 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 bee's wax). The filling when dry shall be rubbed down with a carpenter's file and then the entire surface shall be rubbed down perfectly smooth and wiped clean. In no case shall sandpapers 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 glossy finish as approved by the Architect.

## **8.10 FIRE RESISTANT COATINGS ON WOODWORK**

### **8.10.1 General:**

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

### **8.10.2 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.

### **8.10.3 SPECIAL NOTES**

1. All laminate shall be 1.0mm thick. on vertical surfaces & 1.5mm thick. 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 SOQ.
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. Wherever not specified all exposed surfaces of partition and other woodwork shall be finished with three coats of synthetic enamel paint/polish in natural shade as applicable. Nothing extra shall be paid for the same.

#### 8.10.4 **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.

### **9 UPVC DOOR AND WINDOW**

#### **9.1 COMPOSITION:**

Un-plasticized PVC (Polyvinyl Chloride) meeting the requirement of ASTM D 1748 / BS 7413/ EN 12608 shall be used. No reworked material is to be used in any profile; whether used internally or externally.

**9.2 PROFILE MARKING:** The main frame profile shall be permanently marked at approximately 1-meter intervals (or same as drawing) with an identifying mark which enables the name of the profile Systems supplier, date of manufacture and extruder to be identified without extraction of the window. The profiles are hollow, multi-chambered and steel reinforced with an outer wall thickness of 2.8 mm.

#### **9.3 DURABILITY:**

The Systems shall be resistant to chemicals and be fungal and vermin proof. The profiles must be colorfast, being able to withstand weather and light resistance test of 4000 hours on xenon and weathering apparatus. COLOUR The Systems color should be uniform and consistent.

#### **9.4 FIRE RESISTANCE:**

The uPVC should be classed as self-extinguishing to prevent support or enhancement of accidental fires.

#### **9.5 QUALITY CONTROL:**

The extrusion process must be quality controlled and the appropriate standards relating to impact strength, technical performance and consistency.

#### **9.6 PROFILE CONSTRUCTION:**

The profile depth should be minimum of 58mm with a nominal wall thickness, internally and externally of 2.8mm. The profile shall have a minimum of two sealed chambers for transoms and mullions and 3 sealed chambers for frames and sashes.

#### **9.7 INTERNAL PROFILE DRAINAGE:**

The internal drainage shall be isolated from chambers into which reinforcements can be placed or through which frame fixing pass. Drainage shall be either through the base or alternatively to the face, concealed by face drainage caps.

#### **9.8 PRESSURE EQUALIZATION:**

Pressure equalization for glazing rebates and for frame rebates shall be carried out in accordance with the recommendation of the profile Systems supplier to ensure efficient drainage in adverse conditions.:

#### **9.9 WINDOW PERFORMANCE:**

Windows must meet the requirements with respect to air permeability, water tightness and wind resistance upto 2400 pa.

#### **9.10 STRENGTH AND SAFETY OF MOVING PARTS:**

The moving parts of the Windows must have sufficient strength and robustness to withstand accidental Static and Dynamic loads in use, without any permanent deflection or breakage. The overall evaluation will be based on the experience from use and subject to approval by the Design Consultant/ Client.

#### **9.11 GLAZING BEADS:**

Glazing beads shall be of the one-foot snap in design and shall be extruded U PVC mitred at the corners. All glazing beads shall be with a co-extruded gasket of a multi- fin design to maintain security and weather performance. Gasket material shall be thermo Plastic Elastomer.

#### **9.12 GLAZING GASKETS:**

All glazing gaskets as well as weather seals are to be extruded from non-migratory EPDM. Glazing gaskets shall be a continuous length. Gasket may be subjected to random testing and shall be obtained from the profile Systems supplier.

#### **9.13 WEATHER SEALS:**

Weather seals shall consist of a double sealing Systems. Seals on the sash and the frame shall be continuous length and for outward opening windows the seal on the sash shall be joined to a 50mm length of pressure relief seal at the bottom of the opening whereas the seal on the frame shall be joined on the top of opening. Weather seals and pressure relief seals, which shall be obtained from the profile Systems supplier, shall be capable of removal without disturbing the glazing Systems or removal of the frame or sash.

#### **9.14 GLAZING:**

All glazing shall be internally beaded. The windows shall be constructed in such a manner that the glazing or deglazing can take place without the removal of the sash or frame.

#### **9.15 WELDED JOINTS:**

All corner joints shall be homogeneously fusion heat welded in accordance with the instructions of the profile Systems supplier. The resulting joints shall be finished by the grooving/knifing method. Solvent welded joints shall not be allowed.

#### **9.16 REINFORCEMENT:**

All transoms and mullions shall be fully reinforced, irrespective of size, with corrosion resistant galvanized steel. All other profiles to be reinforced as per the specification of the profile Systems supplier which shall suit the proposed style application relative to exposure, elevation and height above the ground level. Reinforcing shall be secured by suitable screws in accordance with the instructions of the profile Systems supplier. All galvanized steel reinforcing profiles shall comply with BS 2989 1982 Grade G 275N / IS 4759-1996 or equivalent.

#### **9.17 MECHANICAL JOINTS:**

The mechanical jointing of mullions and transoms shall be carried out in strict accordance with the instructions/recommendations of the profile Systems supplier using only approved mechanical coupling components.

#### **9.18 HARDWARE GENERAL:**

All hardware shall be manufactured from corrosion resistant material and be approved by the profile Systems supplier. All ferrous screws, nuts, bolts and other fastening or fixing shall be of stainless grade or of a suitable coated steel recommended for use in the fabrication of UPVC windows. Metal that are in contact with each other shall be compatible so as to prevent galvanic corrosion of dissimilar metals by electrolytic action. All hardware should ideally be fixed by attachments through the UPVC to the reinforcement; alternatively, it should be fixed in purpose designed screw ports or at least two thickness of UPVC. Hardware with provision for adjustment shall be accessible for adjusting after the window has been installed. Hardware used to open and close the window shall be replaceable without removing the outer frame from the structure.

#### **9.19 FRICTION HINGES:**

Top hung and side hung opening out lights shall have two friction stays per light and be of

stainless-steel construction. The size of the friction stay will depend on size, weight, hanging and exposure of the relevant sashes. This will be determined from table provided by the hinge manufacturer. All side hung friction stays are to be incorporate a riser block to allow the sash to be supported in its closed position.

#### **9.20 BUTT HINGES:**

Where external butt hinges are used, they must be of the security pin type which do not allow removal of the hinge pin from outside.

#### **9.21 ESPAGNOLETTE HANDLES:**

All espagnolette striking plates are to be purpose designed and secured to the outer frame by approved screw fixing. The espagnolette mechanism shall be of multi locking points dependants on size. All ironmongery where possible shall be screwed into frame reinforcing, or fixing screws must penetrate a minimum of two wall thickness or an equivalent screw port, to obtain sufficient purchase.

**9.22 Touch Lock:** These are handles which lock the sliding windows on pushing the slider.

**9.23 Pop Up handle:** handle is used after approve for Sliding Windows / Doors. The handle gets flushed in the sliding sash. The handle is used along with a Transmission gear / Espagonellete.

**9.24 Sliding Handle:** This handle is used for Sliding or Inward open Windows or out opening Doors. The width of the handle is 27 mm. The handle is used along with a Transmission gear / Espagonellete

#### **9.25 Sliding Handle with Lock:**

handle is used for Sliding or Inward open Windows or out opening Doors. It has a lock & key built in the handle.

#### **9.26 D Type Handle:**

#### **9.27 Single Roller:**

The roller is made of Steel using needle bearing in the roller to ensure smooth functioning.

#### **9.28 Double Roller:**

use roller made with Zinc Alloy & copper using bearing in the roller to ensure smooth

functioning & to take heavy loads

**9.29 Door Roller:**

used Heavy Duty Door Rollers made from copper and uses Heavy Ball bearing in the center the same ensures a very smooth sliding in the windows and doors and also can take heavy loads of Double Glass

**9.30 Sliding Gear:**

used for Sliding Windows & Doors. When the handle is locked the window is locked at 2 – 3 points depending on the height of the window. This makes the window much more secure & safe. Also, this system ensures that the windows do not bend at top & bottom.

Open able Door & Window: The following hardware's are used in Openable Doors & windows

**9.31 Single Point Lock Handle:**

handle is used for Out Open Casement Window. This handle does not require a Transmission gear / Espagonellete.

**9.32 Open able Handle:**

handle used for Out Open Casement Window. The width of the handle is 17 mm and the handle is used along with a Transmission gear / Espagonellete

**9.33 Open able Handle with Lock:**

handle used for Out Open Casement Window. It has a lock & key built in the handle. The width of the handle is 17 mm and the handle is used along with a Transmission gear / Espagonellete

**9.34 Single Side Door Handle:**

handle used for Out Openable Casement Door. The width of the handle is 27 mm and the handle is used along with a Transmission gear / Espagonellete

**9.35 Single Side Door with Lock:**

handle used for Out Openable Casement Door. It has a lock & key built in the handle. The width of the handle is 27 mm and the handle is used along with a Transmission gear / Espagonellete

**9.36 Both Side Door Handle with cylinder:**

handle used for Out Open door. The hands are on both the sides of the door. This is used in conjunction with Door transmission gear. There is a provision to use a cylinder in the above handle.

**9.37 Both Side Door Handle:**

handle used for Out Open door. This is used in conjunction with Door transmission gear.

**9.38 Friction Hinges:**

used in Out Open Window friction hinges are concealed inside the windows & are not visible. These allow the window to be opened at various angles. The Friction hinges are made high-quality Stainless-Steel S S 304. The thickness of the friction hinge is 2 & 2.5 mm with height 16 mm & backset 18 mm

**9.39 75 mm Window Hinge:**

used for window hinges are used to open the window completely.

**9.40 100 mm Door Hinge:**

use for window hinges are used to open the window completely.

**9.41 Door Hinges:**

use for Out Open Window & Door. This can be used in windows when Double glass is used. This window hinge can take heavy loads as they are screwed to the frame

**9.42 3D Hinges:**

use heavy-duty hinge for door. It can be adjusted in 3 ways after being fixed to the door. This hinge can take heavy loads & ensure ease of movement

**9.43 2D Hinges:**

use hinge for door. It can be adjusted in 2 ways after being fixed to the door.

**9.44 Single plate gear:**

used in Out Open Window. And locks the window at 2 – 3 points depending on the height of the window. This makes the window much more secure & safe. This system ensures that the windows do not bend at top & bottom.

**9.45 Multi Point Door Gear:**

used in Out Open Door and locks the window at 2 – 3 points depending on the height of the window. This makes the window much more secure & safe. This system ensures that the windows do not bend at top & bottom.



**9.46 Multi Point Gear with Mortice Lock:**

used in the Out Open Door. The Door is locked at 5 points therefore making it highly safe & secure. This door gear uses a Cylinder for additional safety

**9.47 Cylinder both side key:**

required Cylinder is made of Complete Brass and is 80mm long

**9.48 Double sash door bolt:**

used to lock a False Door / Window to the frame in a French Door/ Window

**9.49 FIXING THE FRAME TO THE BUILDING:**

The gap between the structural opening and the uPVC frame shall be between 5 to 10mm all round, which should be filled by injectable PU foam after completion of fixing for best frame and wall bonding, and for sound and thermal insulation and finally applying neutral cure low modulus Silicone sealant to make joint water proof.

Fixing points shall be to all four sides of a frame, spaced 150mm to 250mm from corners and not more than 600mm apart elsewhere. Fixing shall be by direct drilling 10mm hole through U PVC frame to building wall. Each fixing shall penetrate into building structure by no less than 40mm and ultimate fixing with anti-corrosive plated anchor bolts through these holes.

All heads of all fixing screws shall be covered with appropriate plastic cover caps.

**9.50 HANDING AND TRANSPORT:**

door/Windows may be transported either glazed or unglazed. All door/windows or prefabricated units shall be transported and stacked in a vertical position and properly anchored to prevent movement in transit, door/windows shall be separated from each other by adequate packing piece during transport.

**9.51 WARRANTY:**

The window manufacturer shall issue to the client a certificate of warranty against any manufacturing or installation defect, valid for minimum of ten year for rectification of the defect.

**9.52 TECHNICAL SPECIFICATIONS**

S.NO	TECHNICAL SPECIFICATION	
I	Impact strength down to 400C	No breakage
ii	Notch impact strength	> 30 kJ/m <sup>2</sup>
iii	Ball impact hardness	100 N/mm <sup>2</sup>
iv	Tensile strength	> 40 N/mm <sup>2</sup>
v	E module	> 2500 N/mm <sup>2</sup>
Vi	Linear Thermal Expansion	Coefficient 300C to +500C 0.80 x 10 <sup>-4</sup> K <sup>-1</sup>
vii	Thermal Conductivity	0.16W/mK
viii	Specific volume resistance	10 <sup>16</sup> Ω cm
ix	Relative Permittivity	3.3 at 50GHz  2.9 at 106 Hz
x	Fire behavior	Self-extinguishing
xi	Weathering stability RAL GZ 716/1	After 8.0GJ/m <sup>2</sup> irradiation energy better than authenticity grade 4 of grey scale

## 10. POP AND FALSE CEILING ITEMS

### 10.1 Plain Gypsum board False Ceiling

False ceilings make the ceiling level look clean and defined. They are economical and improve the look of the room / area and cover up all the exposed and unpleasant looking wires, cables and pipes while providing support to lighting arrangement. They absorb sounds and generally have fire- resisting properties.

**Being lightweight they are easy & quick to install, have light reflectance, sound absorption, thermal insulation properties.**

### 10.2 Location:

**ME-lobby, Banking area and service areas. Size: 1800 mm x 1200 mm (sheet size).**

### 10.3 Material:

12.5 mm thick. Gypsum plaster boards, galvanized iron framing, cleats and steel expansion fasteners, jointing tape.

#### **10.4 GENERAL NOTES FOR FALSE CEILING WORK:**

The false ceiling design can be stepped / curved / architectural design etc however only plane / horizontal surface shall be measured for the purpose of payment. The same shall include gypsum verticals, coves etc. to be provided as per design.

Existing floor to slab height on the site shall vary from 3.00 mtrs. to 3.2mtr. Ceiling shall be hung from the existing slab through hanger's / channels. Rate quoted in the tender shall be applicable for all floor levels/ all floor height including scaffolding, etc complete. The rate of false ceiling items also includes 6 mm ply backing for supporting light fixtures in the false ceiling and shall not be charged separately.

All GI steel to be marked with "GYPSTEEL" which is a standard hologram of India gypsum.

All Board to be marked with "GYPSTEEL" which is a standard hologram of India gypsum.

#### **10.5 Gypsum False Ceiling:**

Plain gypsum board MR/FR grade ceiling: 12 mm thick Plain gypsum MR/FR grade false ceiling Suspension (considering all levels with require all fabrication work and fitting from RCC slab to false ceiling level & The rate shall be considered in sqm for all floors and at all heights, offsets whether cove light or fixed gypsum board size up to 100 mm to 1200 mm in the false ceilings including all costs) . Work complete as per the manufacturers specification of Saint Gobain or approved make- M/F Suspended Ceiling 1 hour fire rated. Providing and fixing Suspended ceiling using Gypsum or equivalent of Ultra G.

I. Perimeter Channels of size 0.55mm thick having one flange of 20mm and another flange of 30mm and web 27mm along with perimeter of ceiling, screwfixed to brick wall / partitions with the help of nylon sleeves and screws, at min.600 mm centers. Then suspending G. I. intermediate channel of size 45mm, 0.9mm thick with two flanges of 15mm each from the soffit at 1220mm centers with ceiling angle of width 25mm x 10mm x 0.55mm thick fixed to soffit with G.

I. cleat and steel expansion fasteners. Ceiling section of 0.55mm thickness having knurled web of 51.5mm and two flanges of 26mm each with lips of 10.5mm are then fixed to intermediate channel with the help of connecting clip and in direction perpendicular to the intermediate channel at 457mm centers. 12mm gypsum MR/FR grade Board (conforming to IS 2095 part 1 2011) is then screw fixed to ceiling section

with 25mm dry wall screwed at 230mm centers. Screw fixing is done mechanically either with screw driver or drilling machine with suitable attachment. Finally, the boards are to be jointed and finished so as to have a flush look which includes filling and finishing the edges of the boards with jointing compound, Joint paper tape.

**Cutouts** For light fittings, grill diffusers shall be made. Necessary cutting / providing openings in the ceiling for AC fixtures, grills, electrical fittings, or other utility services, hatch openings etc. shall be provided by the Contractor and cost of making such modifications shall be included in the price. No separate charges for cutting / providing opening will be paid. Joints between the two-gypsum board, (Board placed staggered) gypsum board and wall will have suitable tape and finishes with plaster of Paris so as to have crack free joints.

The item includes providing and fixing trap door of size 600 X 1200 mm as per approved sample of Ceiling panels comprise of a powder-coated beaded steel frame with gypsum / plywood board door. Each panel features a push-latch closing mechanism with door retaining safety cable & hook. Suspenders from ceiling to support the frame and trap door firmly along with necessary hilti fastener, cleats, screws, angles, packing, etc. complete work. Work complete including all type of tools, tackles, finishing etc. complete as per approved sample & instruction of Architect/ Client/ PMC. sample mock shall be approved from Architect/ Client.

#### **10.6 Mineral Fiber Ceiling**

Mineral fiber ceilings make the ceiling level look clean and defined. They are economical and convenient for servicing for the above false ceiling ducting, wiring etc. These ceilings are fire retardant and makes them ideal for fire hazard areas.

Being lightweight they are easy & quick to install, have light reflectance, sound absorption, thermal insulation properties and biodegradable. Armstrong Classic Lite H1892M with "Superfine Silhouette" detail.

#### **10.7 Material specifications:**

Size: 600 mm x 600 mm and 15 mm thick. Sound absorption (NRC): 0.55 Light reflectance of > 84% (WT) Thermal conductivity  $k = 0.052 - 0.057 \text{ W/M}^0\text{k}$  Humidity resistance = 99% having fire performance Class O / Class 1 (BS 476). Surface: 3 coats of white paint. Back Side: Sanded & one coat of paint.

#### **10.8 GENERAL NOTES FOR FALSE CEILING WORK**

**MODULAR CEILING:** Providing and fixing modular false ceiling tiles of 600 mm x 600 mm Centre to center and 13 mm thick square mineral fibre board to be fixed on frame work of Aluminium sections for suspended false ceiling consisting of Aluminium T 2" X 1

1/2" (50 mm X 40 mm) weighing 0.39 kg/m at 60 cms center to center and fixed with 1/2" x 1/2" (15 x 15 mm) flanges weighing

0.19 kg/m suspended on 6 mm dia. mild steel rod weighing 0.22 kg/m, fixed on wall and beams including rounding of the edges with aluminium T of 2" x 1 1/2" (50 mm x 40 mm) weighing 0.39 kg/m etc. (All aluminium sections shall be anodized/powder coated) including all labour, material, lifts etc. complete. Make - Armstrong or equivalent make

#### **10.9 EXTERNAL ACP CLADDING WORK**

Along the Front façade walls/ columns / underside of chajja projections and sides as directed by the Architect or as per site conditions.

Size: as mentioned in the drawing.

Material: 4.00 mm thick. External grade Aluminum composite paneling of approved make.

Shade: Equivalent make – Pure white -10 (100) or Silver metallic 500.

#### **10.10 SPECIFICATIONS FOR ACP CLADDING**

Providing and fixing of 4.00 mm thick. external grade Aluminium composite panelling of Alu bond /Alco bond or equivalent make with aluminium section framing 37.5mm x 50mm Aluminium sections framework at spacing not exceeding 600mm both ways (horizontal and vertical). Panelling framework to be secured to wall surface/column surface and with necessary provision for trap doors as required etc. complete in all respects as directed by the Architect. Cost shall include expenses towards required hardware, silicon sealant (Dow Corning 789) masking tape scaffolding if required and the same shall not be marked extra.

#### **11.0 LIST OF APPROVED MAKE:**

<b>S.No.</b>	<b>Item</b>	<b>Description</b>
1.	Verified Tiles	Kajaria, Nexion, AGL
2.	Engineers Marble/ Composite Marble	(16 Mm Thick Marble Stone Slab) AGL Or Equivalent.
3.	Ceramic Tiles	Kajaria, Nexion, AGL
4.	Tile Adhesive	Unitile, Pidilite , Fosroc , Eurokart

5.	Cement: Opc 53 Grade	Shall be ordinary Portland cement 53 grade manufactured by  JK Cement, A.C.C. Cement by Associated Cement Companies Ltd., Ambuja cement , Ultratech cement.
6.	White Cement	j.K., Birla ,
7.	Reinforcement Steel: Tmt-Fe-500	Tata Tmt, Tata Tiscon, Jindal, Sail, Sail, RATHI toresteel.
8.	Structural Steel	Sail, Tisco, Ispat , Tata
9.	Ready-MixConcrete	Acc, Ultratech, Ns.
8.	Screws / Nails & other accessories	GKW / Nettleford or equivalent
10.	Water Proofing Compound	Cico, Dr. Fixit, Pidilite, Fosroc.
11.	Polysulphide Sealant	Shall Be Pidiseal By M/S Pidlite Industries Ltd.
12.	Upvc Door/ Window ,windows	Fenesta , Aparna, Encraft.
13.	Hinges And Drawer Slide (Heavy duty telescopic channels)	Hettich /Ozone/ Haffle
14.	Locks, Handles	Godrej, Dorset, Harrison Or Eq. Approved By Architect.
15.	Door Closers, Floor Springs, Hardware for main Glass doors (patch fittings)	Dorma / Euro/ Ozone / Enox / Doorset or equivalent
16.	Aluminium section for partition	Jindal,Indial , Tata steel or equivalent

17.	Plain/ Toughened Glass	Saint- Gobain , Indo Asahi , Modi , Trutuf or equivalent
18.	Mirror	Saint Gobin, Jolly, Modi-Guard
19.	Silicon	G E / Dow corning / Wacer
20.	Window Hardware	Approved By Architect.
21.	Paint , polish	Shall Be of First Quality Manufactured By :(Paints And Primers)  Berger Paints, Asian Paints, Dulex Nerolac Paint
22.	POP Punning and putty	Shall Be Gold Size Putty by Gyprock / India Gypsum / Birla , Asian paint
23.	Expansion Bolts ForFixing	Shall Be Dash Fasteners Of Appropriate Size By Hilti Or M/S. Dev Ashish Trades Or Approved Eq. Hyderabad.
24.	Wooden laminated flooring	Pergo / Armstrong / Euro or equivalent
25.	Flush Doors	Green Ply, Merino, Archid, Century, or equivalent
26.	Laminates, Decorative Laminate	Marino, Sunmica, Greenlam, Archid.
27.	Plywood, Block Board, MDF	Century, Greenlam, Green Ply, Blue apple Marino or equivalent
28.	Veneer	Green , Duro , Century or equivalent
29.	Adhesive	Fevicol, Araldite, Anchor or equivalent
30	Solid Surfaces( Curion)	DUPOINT/HI-MAC/ STARON OR equivalent

31	Automated Rolling Shutter	Gandhi Automation/Toshi Automatic Systems/Akash Rolling Shutter
32.	False ceiling Gypsum Board	India Gypsum / Saint Gobin / Asia
33.	False Ceilings: Grid( As Approved )	Armstrong/ AMF With Micro Look Edges or as approved.
34.	Acoustical False Ceilings: Mineral fiber board	Armstrong, Hunter Douglas / Peritex or equivalent
35.	GI Sections	India Gypsum / Saint Gobin / Jindal or equivalent
36.	Aluminium Skirting	Jindal or equivalent
37.	Anti-Termite	Thiddan (35 E.C.), Dursban-20tc, Trishul,
38.	Rolling and vertical Blinds	Vista , Peritex , MAC or equivalent
39.	Heat Reflective Film and frosted film	Garware Or Approved Eq.
40.	CP Fittings	Jaquar /Hindware/ Kohlar or equivalent
41.	Sanitary Ware	Hindware / Cera / Parryware or equivalent
42.	Sanitary Fittings	Jaquar /Hindware
43.	Geyser	Bajaj / Sphere Hot / Crompton /Racold / Havells
44.	Stainless Steel Sink	Nirali, Nilkanth, Orient.
45.	C.I.Pipe / RWP	Bengal Iron Corporation or equivalent ISI make Rif, Sif, Bis.
46.	G.I. Pipe	Tata, Jindal,Zenith
47.	Cpvc pipe	(Ajay/ Ashirwad/Astral/Supreme)
48.	C.I Brass La Pips	Electro Steel, Kesoram Or Approved Equilent.
49.	U.P.V.C Pipe	Astral, Finolex, Prince, Supreme. Supreme Make (Is Type " B' Is 13592 Swr Range
50.	Stone Ware Pipe	Bhaskar, Anand, ISI Marked Of Approved Quality.
51.	Gun Metal Valve (Full Way Check )	Leader, Sant, Zoloto



	Gate Valve	
52.	Rcc Pipe	Isi Marked Of Approved Quality.
53.	Aluminium Composite Sheet	Alucobond, AL Strong, Eurobond.
54.	Shuttering	Shall be Indian Plywood Manufacturing Co. Bombay or Swastik by Sudershan Plywood
55.	Loft Tank	Syntax, Uniplast, Sheetal.
56.	Hardware Fittings	Ecie, Sigma, Everite.
57.	Wood Preservative	Wood Guard Or Approved Eq/lci.
58.	Furniture hardware	Central Locks Of Godrej/ Equivalent, Heavy Telescopic Channels Should Be Of Hettich or equivalent approved All Hinges Should Be "Eco Mat Clip-On Hinges" Of Hettich or equivalent approved.
59.	Hand Drier	Jaquar , Askon or equivalent
60.	Refrigerator	L.G., Bosch, Whirlpool, Godrej With Ss Finish, Or As per approval
61.	Microwave	LG, Samsung , Equivalent Make/Range.
62	Auto Sanitizer Dispenser	Puremist / Equivalent Make/Range
63	Furniture	Godrej, Featherlite, Herman Miller

## **SPECIFICATIONS – PART B**

### **ELECTRICAL**

#### **SCOPE OF WORK:**

Prior to laying of conduits, the Contractor shall prepare shop drawing, with detailing and coordinated from other tradesmen engaged at site example carpenters for Interior furnishing, HVAC design drawing, for placement and spacing of site physical installations/ items. Conduit/cable tray 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. Location of points/ power supply to the gadgets, equipment's that require power and electrical supply. Drawing shall be explained and understood by every trade man working site, through demonstration, and actual gadget tested by placing to actual position.

Drawing shall be submitted for records, and confirmation about mutual placement of items. All layout drawings shall be presented to team, joint meeting for understanding of items for installation, to the satisfaction of all personnel working at site. Layouts shall be placed for comments, to the Consultant. Any modification or suggestions recommended and commented by the Consultant shall be incorporated in the work.

Drawing shall be displayed on site at convenient location for every one on large size, such that min font size on the drawing is 3 mm.

## **1.0 CONDUITS:**

### **1.1a- FRLS PVC CONDUIT**

Conduits shall be heavy gauge rigid PVC of minimum thickness of 2mm. Conduits shall be ISI marked confirming to IS: 9537 (Part-3)-1983. All conduit and conduit accessories shall be of PVC. Conduits shall be joined together by vinyl type cement / solvents. Minimum size of conduit shall be 25mm dia. Conduit shall be fixed on ceiling or wall. Exposed visible conduits shall be concealed in wall, ceiling etc. or hidden inside cabinets, or inside ceiling conduits shall be fixed on surface of wall with clamps at regular interval as called for elsewhere. For termination of PVC conduits into switch outlet boxes, PVC female adapters shall be used. Wherever conduit run exceeds 10-meter, circular junction boxes shall be provided to facilitate pulling & inspection of wires. Inspection boxes shall be located to have access and replacement of wires in future, in co-ordination with other installation, to the satisfaction of the Consultant Engineer-in-charge. Conduits shall be bent using suitable size springs. Long radius bends shall be provided. Heating shall not be used to bend the conduits. Size of conduit shall depend upon number and size of wires to be drawn.

### **1- M.S. conduits:**

#### **1.1 MATERIAL**

**Conduits shall be black enameled mild steel (ISI marked) and be solid drawn or lap welded conduits, stove enameled inside and outside with minimum wall thickness of 1.6 mm for conduits up to 25 mm diameter and 2 mm wall thickness for conduits above 25 mm diameter. 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), The conduits shall be delivered to the site in original bundles and each length of conduit shall bear the label of the manufacturer. The number of insulated copper conductor wires that may be drawn in the conduits of various sizes are given below and the conduit fill shall not exceed 40%. The minimum size of conduits shall be 25mm diameter for lighting and outlets and conduit size shall be increased as per relevant IS code depending on the number of wires. Wires shall be PVC insulated copper**

conductor and ISI marked.

## **1.2 CONDUIT FILL**

The maximum number of 650/1100 Volts grade single core PVC insulated copper conductor wires that may be drawn in the conduits of various sizes are given below.

### **1.3 Maximum number of wires use under (M.s.) conduit:**

CONDUITS(MM)	20	25	32	40	50
Size of wire in sq. mm	(Maximum number of wires use under conduit				
1.5	5	6	18	-	
2.5	3	4	10		
4	2	4	5	10	
6	-	6	6	8	
10			3	4	
16				3	5
25				2	3
35				1	1

### **1.4 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. Check nuts 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.

### **1.5 BENDS IN CONDUITS:**

Where necessary, bends may be carried out by means of conduit 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 flushed with the finished wall/ceiling surface, so that the conductors inside the conduit are accessible. No bends shall have radius less than 2.5 times the outside diameter of the conduit. Use Special spring for bending the conduit. Heating to soften the conduit for bending is not allowed.

## **1.6 FIXING OF CONDUITS**

**Conduits and junction boxes shall be kept in position with the help of proper hold fasts while the walls, slabs and floor are under construction. Fixing of standard bends or elbows shall be avoided as far as practicable and all curves maintained by bending the conduit pipe itself with a ling radius which will permit easy drawing of conductors. All threaded joints of conduit pipes shall be treated with approved preservative compound to secure protection against rust. Conduits shall be arranged so as to facilitate easy drawing of wires through them. Adequate no. of junction boxes shall be provided. All conduits shall be installed away from steam and hot water pipes. After the conduits, junction boxes, outlet boxes and switch boxes are installed in position, their openings shall be properly plugged or covered, so that, water, mortar, insects or any other foreign matter does not enter into the conduit system. Where called for, surface conduits shall be fixed by means of spacer bar saddles at intervals not more than 500 mm from both sides of fittings or accessories. The staples or saddles of galvanised mild steel flat, properly treated, shall be secured and fixed by means. 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.

Where exposed conduits are suspended from the structure they shall be clamped firmly and rigidly (min 10 kg load fastener to stable surface, not more than 600 apart) to hangers with design calculations. Hangers 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 shall be repaired with concrete. 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. Chases shall be cut using electric cutter/blade.

#### **1.4 PROTECTION**

**To minimize condensation or sweating inside the conduit pipes, all outlets of conduit system shall be adequately ventilated. All socketed connections shall be made fully water tight by use of proper jointing compound.**

#### **1.5 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 prove shape and size to suit the cover plates of approved make for different utilities.

The cover plates shall be of, 2 mm thick, best quality Hylam sheets or ISI grade Urea Formaldehyde Thermosetting insulating material which shall be both mechanically strong and fire retardant. 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.

## **1.6 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.

## **1.7 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 300 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.

## **1.8 T.V. & COMPUTER SYSTEM**

Conduit's 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 300mm 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.

## **1.9 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.

## **1.10 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.

## **1.11 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 minimum 6.0 sq mm copper conductor wires.

Wiring for the second power outlet shall be carried with PVC insulated minimum 4.0 sq mm copper conductor wires. All power outlets shall be connected with minimum 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, or 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 minimum 1.5 sq mm PVC insulated copper conductor wires.

#### **1.12 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.

#### **1.13 MAINS AND SUB-MAINS:**

Mains and sub-mains wires were 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.

#### **1.14 LOAD BALANCING:**

Balancing of circuits in three phase installation shall be planned before the commencement of wiring, chart prepared, and submitted with drawing.

#### **1.15 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 degrees... 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 up-to 500 volts D.C. up to 12 hours immersion in water.

## **1.16 MOUNTING HEIGHT DETAILS**

**1.16.1** - The bottom of the light/fan switch board shall be at 1.0 meter above the finished floor level unless otherwise specified. Enough space for smooth usage, operations by user.

**1.16.2-** All plugs and socket outlets shall be, only Spring female contact sockets, of 5/6 pin type and the appropriate pin of socket shall be connected to the earthing system.

**1.16.3-** In case of light and fan circuit only 5 pin 5A, , only Spring female contact sockets 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, , only Spring female contact 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.

**1.16.4** 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, coordinated with interior drawings.

**1.16 .5** Unless otherwise specified, the ceiling fans shall be hung at 2.75 meters above the finished floor level.

**1.16 .6** Lamp holders in bath rooms are to be shrouded with insulating materials and fitted with protective shield.

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

## **2.0 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 manufacturer's 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 armored and unarmored cables conforming to IS: 1554 (part I&II)-1976 & IS: 694-1977(PVC Insulated cables for working voltages up to and including 1100 volts (second revision) with latest amendments. MV cables shall be suitable for underground 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 up to 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 hardener 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 affect 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 armored clamps and gland. The clamps must grip the armoring 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 armoring 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 alongside 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, sidewalks, 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 easy 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 /

## **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 99.95 % 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 up to 4.0 sq.mm 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 sq.mm 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 25mm 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. Sub main 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 galvanized equipment shall be made on vertical face and protected with paint and grease. Galvanized 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 Pipe specified in BOQ item, Indian Tube Company make or approved equal not less than 40mm dia and 4.5 meters long, (pipe wall thickness as manufacture) GI Pipe electrode shall be cut tapered at the bottom and provided with holes of 12mm dia drilled at 75mm interval up to 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 up to 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 over lapping 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 Sq.m 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, then 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 throughout, 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.

### **5.0 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 equipment's. MV danger notice plate shall be 200mm x 150mm made of mild steel at least 2mm thick vitreous enameled white on both sides and with inscriptions in signal red color on front side as required.

**(d) Fire Extinguishers**

Portable CO2 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 I: 2546-1974 shall be installed with the suitable stand for storage of water and sand.

**(f) Tool Box**

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 castle 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 phases, 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 color 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 I and suitable V.A. Burden for operation of associated metering. Current transformers shall be in accordance with IS:2705- 1964 as amended up to date and Cast Resin Type.

## **6.10. INDICATING PANEL AND METERING EQUIPMENT**

All meters and indicating instruments shall be in 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 indicators '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 earthingbar on both side of the Panel and SDBs.

#### **6.13. PAINTING**

All sheet steel work shall undergo 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 shortcircuit 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 consist 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/Rewireable 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. INTELLIGENT ADDRESSABLE FIRE ALARM SYSTEM**

The addressable and intelligent system shall be such that photoelectric /multi criterion sensors, manual call points, etc., can be identified with point address. The system shall be capable of:

- Setting smoke sensor sensitivity remotely (from the Fire Work Station) to either high sensitivity manually or on a pre-programmed sequence e.g. occupied/unoccupied period. The FAS shall be able to recognize normal and alarm conditions, below normal sensor values that reveal trouble condition, and above normal values that indicate either a pre alarm condition or the need of maintenance.
- Read-out or address an actual space temperature at thermal detector points. The operator shall also be able to adjust alarm and pre alarm thresholds and other parameters for the smoke sensors.
- Provide a maintenance/pre-alert alarm capability at smoke sensors to prevent the detectors from indicating a false alarm due to dust, dirt etc.
- Provide alarm verification of individual smoke sensors.
- Provide local numeric point address and LED display of device and current condition of the point.
- Provide outputs that are addressable. The distributed Intelligent Fire Alarm Control Panel (FACP) shall function as fully stand-alone panel as well as providing a communication interface to the central station. FACP shall have its own microprocessor, software and memory and should be listed under UL864. The memory data for panel configuration and operation shall reside in non-volatile memory (EEPROM). It shall be possible to command test, reset and alarm silence from both the FACP and the central console. FACP switches shall allow authorized personnel to accomplish the following, independent of the central console:
  - Initiate a general alarm condition.
  - Silence the local audible alarm.
  - It shall be possible to acknowledge (Silence the local FACP audible without silencing the alarm indicating devices (hooters).
  - Reset all zones (Logical Point Group) / points, after all initiating devices have returned to normal.
  - Perform a complete operational test of the microprocessor and memory with a visual indication with each board.
  - Test all panel LEDs for proper operation without causing a change in the condition of any zone

(Logical Point Group)

- Walk Test FACP shall be backed up with its built in UPS power and shall also be connected to central DG Power available in the building.
- Software zones/loops shall be circuited and protected by Fault Isolation Modules such that in the event of a zone/loop short-circuit, not more than twenty (20) devices shall be left non-functional.
- Monitor modules shall be provided to monitor and address contact-type input devices.
- The monitor module shall be supervised by FACP.
- The FACP shall have Drift Compensation facility to compensate for environment.
- FACP shall be provided with following features:
  - Charger Rate Control
  - Control-by-Time
  - Non-Alarm Module Reporting
  - Day/Night Sensitivity
  - Periodic Detector Test
  - Device Blink Control
  - Remote Page
  - Drift Compensation
  - Trouble Reminder
  - NFPA 72 Sensitivity Test
  - Verification Counters
  - System Status Reports
  - Walk Test
  - Security Monitor Points
  - Maintenance Alert
  - Alarm Verification
  - System Configuration Report
  - Printer Interface

- System Point Report
- Event Historical log
- Programmable Automatic Timed and Manual Signal Silence
- Programmable Manual Signal Silence Inhibit Timer
- Control-By-Event with Boolean Logic and Timer Control
- The FACP should truly field programmable.
- The FACP should have a degraded mode of operation.
- Power supply unit of FACP shall have following characters:
- The main power supply shall be 230 VAC $\pm$ 10%, 50 Hz $\pm$ 1% and shall in turn provide all necessary power of the FACP.
- It shall provide a battery charger for 24 hours for standby power using dual-rate charging technique for fast battery recharge.
- It shall provide a very low frequency sweep earth fault detect circuit, capable of detecting earth faults on sensitive addressable modules.
- It shall be power-limiting using Positive Temperature Coefficient (PTC) resistor.
- It shall provide indication for battery voltage and charging current.

## **DETECTORS & ADDRESSABLE DEVICES**

### **General features common to all detectors:**

- Compatibility: All automatic fire detectors shall be interchangeable without requiring different mounting bases or alterations in the signal panel.
- Sensitivity: On average 30 mgs of burned material per cu.m. (As measured in a 1 cu.m. chamber) shall release an alarm sensitivity which shall be adjustable according to the use of the space.
- Power Consumption: Each detector shall use the minimum of power, for economic circuits, so that it shall have capacity to connect at least 99 detectors, 50 modules and 20 fault isolator modules in one loop.
- Built-in-response indicator: Each detector shall incorporate indicator "LED" at the detector which shall blink during normal condition and light up on actuation of the detector to locate the detector which is operated. The detector shall not be affected by the failure of the response indicator lamp.
- 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 purposes, its components must not be damaged by static over voltage.
- Atmospheric and Thermal Disturbance: The detector shall so designed as to be practically immune to environmental criteria such as air currents, humidity, temperature fluctuations, and pressure and shall not trigger false alarm, due to the above conditions.
- Continuous Operation: An alarm release shall not effect a detector's functioning. After resetting the alarm, the detector shall resume operation without any readjustment.
- Adaptability to ambient conditions: Detectors shall be designed for adaptability to humid locations. No performance deterioration shall be acceptable.
- The monitor module shall provide address-setting and shall also store an internal identifying code which the Fire Alarm Control Panel shall use to identify the type of device.
- The control module shall provide address-setting and shall also store an internal identifying code which the control panel shall use to identify the type of device.
- All field hooters should preferably be addressable and software configurable. 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. All hooters should be UL/FM listed. All hooters shall have coupled strobe lights of 110Cd intensity.

#### **EMERGENCY VOICE EVACUATION (EVAC) & TALK BACKFIREMAN PHONE SYSTEM**

The FACP shall contain all equipment required for all audio control, telephone system control, signaling and supervisory functions. This includes speaker zone indication, telephone circuit indication and control, digital voice units, microphone and main telephone handset.

##### **Function: The EVAC system equipment shall perform following functions:**

- Operate as a supervised dual channel emergency voice communication system.
- Operate as a two-way emergency telephone system control center.
- Audibly and visually annunciate the active or trouble condition of every speaker circuit and telephone circuit.
- Audibly and visually annunciate any trouble condition of tone generators and digital voice units required for normal operation of the system.
- Provide automatic, digitally-recorded voice messages and tones which may be field-programmed through the microphone.

##### **FIRE ALARM GRAPHICS SOFTWARE (FAS)**

- The status of each detector shall be monitored by the FAS.

- Using the FAS, the operator shall be able to adjust the sensitivity of any detector.
- Using the FAS, the operator shall be able to define the entire database for the filesystem. Fire system which are not field programmable shall not be accepted.
- The FAS operator shall be able to acknowledge alarms or trouble messages at the FAS.
- It shall be necessary for all alarm or trouble conditions to be acknowledge at the fire system central panel.

#### **8.0 General Note:**

1.	All wires shall be FRLS PVC insulated copper conductor. Point wiring rates are inclusive of 3 x 2.5 sq mm insulated copper conductor wires for circuit. (from DB to switch board).
2.	Wherever the occupancy sensors and daylight sensors in the closed room and workstations, the wiring from DB to sensor and sensor to switch board shall be included in the point wiring rates.
3.	All sockets to be checked with a Check Plug socket tester for live-neutral reverse, no earth, neutral fault, live earth reverse, neutral earth reverse.
4.	The Circuit No. and DB no. label shall be provided on all UPS, RAW sockets and switchboards with label printer.
5.	Colour coding for conduits to be done for different systems. The whole length of conduits to be painted
a	Light & Power Black
b	Emergency Light -Green
c	Data Cable- White
	All circuit & point wiring shall be colour coded & shall have ferruling on both end for circuit identification complete as required etc. Labelling on all the switches and sockets to be done with respect to DB reference, phase and circuit no.
	Earth loop Impedance Test to be performed. RCD test to be done. Cable Insulation Tests to be done.

	The word UPS shall be printed on all UPS sockets.
	The word RAW shall be printed on all RAW sockets.
	Contractor is required to submit samples of all types of switches and sockets to Consultant and Architects representative for approval before ordering the material.
	<b>Cables</b>
1	All cables to be glanded and crimped with suitable sized lugs. All Cable trays to be double earthed. All raceways and cable glands to be earthed with brass round earth clips and wires.
2	Earthing ring to be included in all the cable glands.
3	Sub main cables should be labelled at both ends.
4	Joints shall be allowed only at the 2 ends of the cables and not in between.
	<b>Distribution Board &amp; Panels</b>
1	RCCB shall be Si type (Super Immunized) only for UPS DBs. The IP rating of the DB should be IP 43.
2	Provide DB charts in laminated sheets in all Distribution Boards
3	Provide insulated dedicated earth link in all UPS Panels
4	All MCCB's 250 Amps and above shall be Microprocessor based
5	All Light & Power panel, UPS and A.C. Panel incomer MCCB shall have Over current, Earth fault and short circuit protection.
6	All Incomer MCCB's in UPS Panels shall be Microprocessor based
7	The microprocessor based MCCBs shall have
	<b>Over Load (Phase)</b>
I	Current setting $I_r$ ( $I_r = X I_n$ ) OFF 0.4 to 1.0 in steps of 0.1

li	Time delay, tr(Inverse) 10 sec at 6/r
lii	Over Load (Neutral)
lv	Current setting In (Intrl =Xlr) 0.5, 0.75&1.00 Intrl
V	Inverse 10 sec at 6 Intrl/Fixed 200ms
Vi	Short Circuit setting -2- 10
Vii	Instantaneous - 1.5-1
8	All MCB's in UPS Panels shall be D Curve
9	In all Electrical panels protective acrylic sheet to be provided in cable alley and feeders.
10	The meters shall be able to monitor all major power quality parameters Voltage, current, frequency, KVAH, KWH, Power factor and individual, harmonics, ethernet ready - IEC-625-22.
11	The ATS shall be 4 poles with inbuilt manual operating switch. In case the controller of the ATS fails it should be capable of transferring the load while the ATS is in maintenance. The ATS and controller should be same make.
12	Provide On / Off and trip indicating lamp on main incomer & bus coupler only.
13	Panel construction shall be Form 3b for all Panels with MCCB outgoings and Form 2b for all Panels with MCB's outgoings.
14	The Earth fault release/relay and CBCTs shall be same make as OEM Switchgear been used in the Panels. It shall not trip on imbalance of load.
15	The breaking capacity and trip setting of the breakers shall be finalized as per the final design. The report shall be as per ETAP analysis.
16	All MCCB's Breaking Capacity shall be enhanced to 36KA due to cascading
17	All multifunctional meter shall be Schneider make with RS 485 MODBUS RTU half-duplex interface in all the Panels detailed below.



## **9.0 Fire extinguishers**

This is one of the main and most important type of fire safety gadget which needs to be positioned at strategic locations. The Fire Extinguisher including all accessories shall be delivered and should be brand new. The contractor should also guarantee that all the components supplied by the contractor are licensed and legally obtained. The fire extinguishers procured must include comprehensive on-site warranty of -1- year for all type of fire extinguishers except modular automatic fire extinguishers which shall carry a warranty of -3- years from the date of installation and commissioning of the equipment. The Service Provider shall be fully responsible for the manufacturer's warranty in respect of proper design, quality and workmanship of all equipment's, accessories, etc., covered by the offer.

The contractor must warrant all equipment's, accessories, spare parts etc., against any manufacturing defects during the warranty period. As per requirement of details all fire extinguisher with date of installation and due date of refilling shall be made available in the premise. A demonstration shall be given by the service provider after every 3-4 months to the staff with proper explanation.

Following are the general norms to be followed while positioning the Fire extinguishers at various locations in an office:

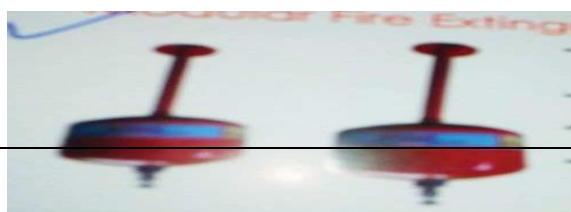
In a normal size office of 1200 sq. ft. – 1500 sq. ft. maximum of 6-8 fire extinguishers are to be installed as under:

**9.1** -CO2 gas type 4.5 kgs – Conforming to IS15683.

**9.2** -ABC Powder type / DCP type 4.0 kgs or approved kg –Conforming to IS15683.

### **9.3 Modular type at UPS and Electrical junction 2 /3 kgs or approved**

Automatic detection and suppression in one single system, no human intervention is needed for the activation purpose; no power back up needed; easy to install and automatic discharge at set pre-defined temperature. ABC powder automatic fire extinguishers for 24 x 7 protection of unmanned closed areas shall be placed 1 above the UPS and if there is a possibility above the Main Electrical DB. If the size of a office is large suitable fire extinguishers of different type shall be installed as per the recommendations of the Security Officer / Fire Officer / or norms. These directives are suggestive, in case of any modifications or additional security requirement etc. is assessed based on the geographical or local situation, concurrence for the same needs to be obtained from the client.



#### **9.4 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 aduration of 8 hours. However minimum size shall be 65 AH.

#### **9.5 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.

#### **9.6 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 shallbe provided on the selves on which the batteries are to be placed.

**Input**-240 volts AC 50 cycles, single phase with tapings 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.

#### **9.7 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

manufacturers.

All cables shall be laid with minimum one diameter gap and shall be clamped at every meter and shall be tagged for identification with aluminum 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

## **10. POINT WIRING**

### **10.1 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 up to 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 Molding 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"

## **10.2 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 Molding 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.

### **10.3 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.

#### **10.4 DISTRIBUTION BOARDS**

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.

#### **10.5 FIXING OF LIGHTING FIXTURES AND FANS**

1. Receiving the fixtures from the Owners' 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.
  8. 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.

#### **10.6 LIST OF APPROVED MAKES:**

1.	M.S. Conduits and accessories	BEC/AKG      Sharma/Steel      Craft/ Rama/Disco
2.	FRLS P.V.C. conduits and accessories	BEC (Black) / Polypack/ AKG
3.	FRLS P.V.C. insulated copper conductor wires 1100 volts grade	Polycab/ESC /Havells /Bonton
4.	MCCB, s and Accessories	Schneider/ABB /Legrand
5.	Miniature circuit breakers/ DB	Schneider/ABB /Legrand
6.	Switches, plugs, telephone	Honeywell/Crabtree/Legrand/North West/outlets (Modular Type)
7.	Gang Box & sockets	Make same as make of switch
8.	G.I Pipe	Tata/Jindal

9	Telephone wires	Polycab/ESC /Havells /Bonton
10	PVC insulated Aluminum/copper conductor armored cables of 1100 V/	Polycab/KEI/Havells /Bonton 11000-volt grade
11	PVC insulated flexible copper conductor cables of 1100 V/ 11000-volt grade	Polycab/ESC /Havells /Bonton
12	FRLS PVC insulated Twisted / shielded Copper L.V. Cable	Finolex/Excel / Skytone /Havells / Bonton/KEI
13	Cable Glands Chromium plated Brass heavy-duty glands	double compression, weatherproof with rubber washers and gaskets of Comet make
14	Cable Lugs	Dowells crimping type
15	Light fixtures	Philips /Wipro/ Havells/Divinity
16	Special light fixtures	As per BOQ
17	Day light/Occupancy Sensor	Schneider/Wipro/ Philips/Keselec
18	Indicating Lamps	L & T/Schneider/ seimens
19	Terminal Blocks	Elmex
20	Energy meter	Schneider / L & T / HPL /Socomec/Procom
21	SPD	Mersen/OBO
22	Industrial socket outlet	Legrand / Bals/Clipsal/Hensel/ ABB  socket and top
23	Earth Leakage Circuit	Legrand /ABB/ Legrand/ Schneider  Breaker
24	Maintenance Free Earthing	Alltec / Teksai /Duval Messien



25	Telephone Tag Block	Krone
26	Cable Tray	KME/ Era Control System
27	Raceway – with sheet steel	KME/ Era Control System
28	Special Cable Tray	OBO Batterman /Applicam Industries
29	Wire Mesh Tray	Legrand – Cablofil
30	Floor Access Box	M.K / Legrand
31	SDB's and Panels	Supretech Control system/EVA/ Era Control System/Application Control
32	Fire Alarm system	Morley/Edwards/Ravel
33	P A System	Bosch
34	CCTV IP Based	Hikvision/ Honeywell
35	Any other items	Sample to be approved by Client/engineer in-charge
36	Fire extinguishers	Ceasefire, Firestone, Kanex, Lifeguard, Minimax, Nitin, Omex, Safex, Safe zone, Supermax, Swastik, Zenith and Equivalent.
37	NETWORKIG	Make AMPS / D- Link

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.

## **SPECIFICATIONS – PART C**

### **HVAC**

#### **TECHNICAL SPECIFICATION AIR-CONDITIONING**

##### **Part 1:**

##### **1. GENERAL DATA**

The system design, basis of design, estimated requirements and other relevant data are outlined in this section. The detailed specifications and specific requirements are outlined in the subsequent sections (Bill of Quantity.)

The work under this tender shall be executed strictly in accordance with constructional and material requirements defined under these specifications.

##### **2. SCOPE OF WORK**

**The scope comprises supply, installation, testing commissioning of air- conditioning by VRV/VRF/MRV system. The system to facilitate the operation& control of individual room/cabins. The system shall be able to cater the partial load which can be as low as 10% of the total load.**

**The drain point of each unit shall be connected to the common drain point. Proposed AC system will be microprocessor controlled inclusive of safety factor & gadgets.**

**The condensing units should be capable of providing cooling within ambient range of - 5 degree C to 50 degree C DB & heating is the range of 0 degree C to 15 degree DB.**

**All exposed pipe to be covered with race way or heavy-duty flexible pipe for protection. Special precaution to be taken while installing of the drain piping. The contractor shall be responsible for any leakage / seepage due to poor installation of HVAC drain till the guarantee period. Drain point to be tested for 24 hours after blocking one end. Drain piping will be plugged at both ends by appropriate method after completing the drain test to avoid chocking due to foreign material.**

##### **3. 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 levels, measurements and other information concerning the existing site, 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.

##### **4. CO-ORDINATION OF DRAWINGS**

Before commencement of work, the contractor shall correlate all relevant drawings about,

- a. Existing physical civil structure, and proposed modifications in physical shapes sizes and dimensions of building elements / openings, objects on this tender, spaces required for HVAC system proposed. Dimensions of site, about beam sizes, beam- bottoms, clear height, window and opening locations, and other civil structures that make space and structure to SITC (Supplying Installation Testing and Commissioning) of HVAC.
- b. Site conditions to receives/provides water supply, and drainage of wastewater from HVAC. Intake of fresh air and exit for Air disposal.
- c. Existing/ proposed location of electrical establishment, cable tray, wiring, junction boxes, three phase and LV routes, and power sources required to SITC (Supplying Installation Testing and Commissioning) of HVAC.
- d. Interior furnishing drawing containing details about false ceiling, furniture, structural, architectural, and service drawings that make space and structure to SITC (Supplying Installation Testing and Commissioning) of HVAC.
- e. Contractor shall satisfy himself that the information available there from is complete and unambiguous. Shop drawing are coordinated, from all above installations in the site.
- f. Contractor shall prepare shop drawings, such that scope and dimensions are correct to scheme of work in progress. Drawings and dimensions are available to other working persons and teams in this site.
- g. Contractor shall mark reference levels/ colour line, with permanent marker markings such that it is readable for workman and supervisors in-charge at site, from HVAC team, also to supervisors from Electrical, and interior furnishing team supervisors. Readable and reference markings, to the supervisor's form consultant and owner representatives. Marking on walls and columns to he is using as benchmark levels for measurement installation of machinery.
- h. Contractor shall maintain open format drawing and person at site, to incorporate updates from site working conditions. Shall submit such drawing revisions as Drawing R/A Bill 1, 2, 3 and final.

**The list of shop drawings shall be as follows:**

- # Detail plans for each area.
- # Refrigerant piping routes with sections.
- # Condenser / Evaporative unit location along with the location of MCB.# Electrical panel and control scheme.
- # Mounting stand & foundation details. (to be designed by structural engineer employed by the contractor and approved by owner).
- # Any other detailed drawing required for the system.# Drain piping layout with section.

- # Control cabling detail along with sizes.
- # Power cable sizes and earthing wire sizes. # Cu pipe support details.
- # Drain line clamp details.

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.

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

Work site shall be carried out in compliance to procedure, material, procedure in compliance to standards prescribed in Bureau of Indian Standards (B.I.S.) or Indian Standards (I.S.) Code of practice, the latest version of the code of practice in usage all the time of construction.

#### **6.INSPECTION:**

Routine performance testing of equipment shall be carried out at works in the presence of the representative from owner/consultant-engineer/Architect

#### **7.SUPERVISION**

Contractor shall depute their team of engineer for the supervision of installation, testing, commissioning & handing over at site of work.

#### **8.SECURITY**

The contractor is responsible for all the equipment's, piping, wiring and all related accessories till the time of handing over to the customer.

## **9. TEST**

The contractor will perform summer or monsoon and winter test and confirm the performance of units as specified in the design data.

## **10. MAINTANENCE**

The contractor will provide sufficient no. of service/ operator team (available 12 hours) along with the service spares during the guarantee (defect) period at site. Capital project Administration / NIREH will provide necessary office space for the service team. Any defects, including drain, arising during warranty period will be attended within 24 hours.

## **11. CIVIL WORKS**

Chasing, cutting and semi-finishing with chicken wire mesh of the brick work or floor for laying the drainpipe and copper pipe to be in contractor scope. Chasing, cutting will be carried out only by chase cutting machine. Chisel and hammer shall not be allowed.

## **Part 2: TECHNICAL SPECIFICATION**

### **1.0 OUTDOOR UNIT**

The outdoor unit shall be factory assembled, weatherproof casing, constructed from heavy gauge mild steel panels and coated with baked enamel finish. The unit should be completely factory wired, tested with all necessary controls tested prior to dispatch conforming to the following specifications.

- a)** All outdoor units shall consist of inverter scroll compressors.
- b)** Outdoor units when consisting of more than 1 module (e.g. 22 HP = 10 HP +12HP), each should have one separate inverter driven compressors.
- c)** In such case, the units shall be provided with duty cycling arrangement for multiple inverter compressors.
- d)** The outdoor unit shall be modular in design to facilitate installation one after another close to each other. Preference would be given to compact units having smaller footprint.
- e)** Outdoor units should be rugged of anti-corrosion design and should have strong base plate for easy mounting of unit. All interconnecting piping, joints and U bends

within the condensing unit shall be painted with two coats of clear transparent polymer coating for protection against corrosion from ambient air pollution.

**f)** The outdoor unit shall comprise of sub-cooling feature to effectively use the entire coil surface through proper circuit/bridge in order to prevent flushing of refrigerant owing to large length of piping.

**g)** The condensing unit shall be provided with state-of-the-art microprocessor-based control panel.

**h)** The outdoor unit shall be provided with provided with Aero spiral design fan exhibiting low noise level characteristics complete with aero fitting grille to facilitate spiral discharge of airflow to effect reduction in pressure losses. The fan should be capable to respond to external static pressure of 5mm.

**i)** Motor shall be speed controlled to ensure a stable operation for varying ambient, by a factory fitted direct acting head pressure activated variable speed drive for at least

15 steps to give precise discharge pressure and minimum power consumption of condenser fan motor.

**j)** The condenser shall be complete with provisions for refrigerant piping connections, shut off valves and any other standard accessories necessary with the equipment supplied. The condensing unit shall be designed to facilitate fail safe operation when connected to multiple indoor units. If possible, the system should work on standard operating parameters like discharge pressures of not more than 300 PSI as the ref. Piping will be moving around within a habitable space, protection from any misfortune of any leakage, (leakage is like a bullet on higher pressures). Vendor to comply with all safety codes of high-pressure safety & testing and give 2 sets of special tools to handle such equipment at site. All brazing should be done by only qualified trained person who had training on HIGH PRESSURE brazing, special tools & procedures.

**(k)** The outdoor unit should be fitted with low noise level and should not be more than 67db (A) at normal operation when measured at 1.5m distance from floor/ground level.

**(L)** Indoor supplied shall belong to compatible models across the system, from same generation of technology, from same manufacturer.

## **2.0 REFRIGERANT CIRCUIT**

The refrigerant circuit shall include liquid and gas shut-off valves and a solenoid valve at condenser end. The equipment must have inbuilt refrigerant stabilization control for proper refrigerant distribution. All necessary safety devices shall be provided to ensure the safe operation of the system.

### **3.0 HEAT EXCHANGER**

The heat exchanger shall be constructed with copper tubes mechanically bonded to aluminum fins to form a cross fin coil. The aluminum fins shall be covered by anti-corrosion resin film/paint/treatment. The unit should be with bye-pass/ e-pass heat exchanger to optimize the path of heat exchanger and for better efficiency of condenser.

The unit shall be provided with necessary number of direct driven low noise level propeller type fans arranged for vertical discharge. Each fan shall have a safety guard.

### **4.0 SAFETY DEVICES**

All necessary safety devices shall be provided to ensure safe operation of the system. Following safety devices shall be part of outdoor unit: - high pressure switch, fuse, fan drive overload protector, fusible plug, crankcase heater, over load relay, overload protection for inverter. The outdoor roof mounted units shall be provided in such a fashion that these do not affect the overall aesthetics and ambience of the building. If required these units shall be suitably camouflaged to give good aesthetic look. These provisions, however, shall be discussed, if required, at a later date and the prices for the same shall be worked out separately as extra item. Noise levels for outdoor units shall not be more than 67 db (measured at a point 1 meter in front of the unit at a height of 1.5 meters).

### **5.0 INDOOR UNITS**

All indoor units as specified shall have in general; noise levels less than 46 db. For critical applications noise levels below these limits may, however, be specified during design stage.

- i.) Each unit shall have electronic control valve to control refrigerant flow rate respond to load variation of the room.
- ii.) The address of the indoor unit shall be set automatically in case of individual and group control.
- iii.) In case of centralized control system, it shall be possible to set the address of

individual indoor unit through a liquid crystal remote controller.

iv.) The fan shall be dual suction, aerodynamically designed, Turbo, multi blade type, statically & dynamically balanced to ensure low noise and vibration free operation of the system. The fan shall be direct driven type, mounted directly on motor shaft having support from housing.

v.) The cooling coil shall be made out of seamless copper tubes and have continuous aluminium fins. The fins shall be spaced by collars forming an integral part. The tubes shall be staggered in the direction of airflow. The tubes shall be hydraulically/mechanically expanded for minimum thermal contact resistance with fins. Each coil shall be factory tested at 21 kg/sq.m air pressure under water.

vi.) Indoor unit shall have cleanable type filter fixed to an integrally moulded/moulded plastic frame. The filter shall be slide in and neatly insertable type. It shall be possible to clean the filters either with compressed air or water.

vii.) Each unit shall have computerized PID control for maintaining designed room temperature. Each unit shall be provided with microprocessor thermostat for cooling/heating.

viii.) Each indoor high wall unit shall be with corded/ cordless remote controller as standard features. Corded/ cordless remote shall have standard features as per standard design of manufacturers.

ix.) The power supply of each indoor unit shall be provided by department.

## **6.0 HIGH WALL INDOOR TYPE UNIT**

The unit shall be high wall mounted type. The unit shall include pre-filters, fan section and DX- coil section. The housing of the unit shall be powder coated/ heat treated galvanized steel. The body shall be light in weight and shall be able to suspend from four comers. The fan shall be aerodynamically designed diffuser turbo fan type. Unit shall have an external attractive panel for supply and return air.

## **7.0 CENTRALIZED TYPE REMOTE CONTROLLER:**

A multifunctional compact centralized controller shall be provided with the system. These controllers shall be capable of controlling all the indoor and outdoor units and should be capable of integration with the PC based building management system of HVAC. It shall be able to control the indoor units with the following functions:



- i) Starting/ stopping of Air Conditioners as a zone or group or individual unit.
- ii) Temperature setting for each indoor unit or zone.
- iii) Switching between temperature control modes, switching of fan speed and direction of airflow, enabling/disabling of individual remote controller operation.
- iv) Monitoring of operation status such as operation mode and temperature setting of individual indoor units, maintenance information and troubleshooting information.
- v) Display of air conditioner operation history.
- vi) Daily management automation through yearly schedule function with possibility of various schedules. The controller shall have wide screen user friendly and can be wired by a non-polar 2-wire transmission cable to a distance of 1 K.M away from indoor unit. The cables shall be as per prevailing practice adopted by the manufacturers but shall have minimum rating of 2 core, 1.5 sq. mm shielded cables suitable for outdoor application. Cordless/corded remote having star and feature as per standard design of manufacturer IS acceptable to the Department.

## **8.0 REFERIGERANT PIPING**

All refrigerant piping for the air-conditioning system shall be constructed from soft seamless up to 19.1mm and hard drawn copper refrigerant pipes for above 19.1mm with copper fittings and silver soldered joints. The refrigerant piping arrangements shall be in accordance with good practices within the air conditioning industry, and are to include charging connections, suction line insulation and all other items normally forming part of proper refrigerant circuits.

All joints in copper piping shall be sweat joints using low temperature brazing and or silver solder. Before jointing any copper pipe or fitting, its interiors shall be thoroughly cleaned by passing a clean cloth via wire or cable through its entire length. The piping shall be continuously kept clean of dirt etc. while constructing the joints. Subsequently, it shall be thoroughly blown out using nitrogen.

After the refrigerant piping installation has been completed, the refrigerant piping shall be pressure tested using nitrogen at 32 Kg per sq.cm. Pressure shall be maintained in the system for 24 hours. The system shall then be evacuated to minimum vacuum if 700 mm Hg and held for 24 hours. The air-conditioning supplier shall be design sizes and erect proper interconnections of the complete refrigerant circuit.

The suction line pipe size and the liquid line pipe sizes shall be selected

according to the manufacturers specified outside diameter. All refrigerant pipe shall be properly supported and anchored to the building structure using steel hangers, anchors, brackets, and supports which shall be fixed to the building structure by means of inserts or expansion shields of adequate size and number to support the load imposed thereon.

## **9.0 DRAIN PIPING**

Shall be UPVC.

The IDU shall be connected to the drainpipe made of rigid heavy duty UPVC, density 10 KG/sq cm min 20 MM dia meter. The pipe under floor should be 20 Kg/sq.cm

The pipe shall be laid in proper slope for efficient draining of the condensate water.

## **10.PIPE INSULATION**

Refrigerant Pipe Insulation:

The whole of the suction and liquid line including all fitting, valves and strainers bodies etc. shall be insulated with 19 MM respectively thick class 'o' Electrometric Nitrile Rubber sleeve, as per BOQ.

The joint shall be properly sealed with R242 adhesive of polychloroprene to ensure proper bonding at the ends.

Insulation of cold lines shall be carried out with Armaflex/K-flex insulation sheets and tubes of appropriate thickness so that condensation does not occur.

Drain Pipe Insulation

Drainpipe carrying condensate water shall be insulated with 6 MM thick Kinifoam.

The joint shall be properly sealed with R242 adhesive of polychloroprene to ensure proper bonding at the ends.

For proper drainage of condensate U-trap shall be provided in the drain piping (wherever required).

All pipe supports shall be of pre-fabricated and pre-painted slotted angle supports properly installed with clamps.

## **Part 3: TECHNICAL SPECIFICATION AIR DISTRIBUTION SYSTEM)**

### **1.0 Scope**

The scope of this section comprises supply fabrication, installation and testing of all sheet metal / aluminium ducts, supply, and installation, testing and balancing of all grilles, registers and diffusers. All are to be in accordance with these specifications and the general arrangement is shown on the Drawings.

Duct work shall mean all duct, casing, dampers access doors, joints, vanes, stiffeners, hangers and support etc.

## **2.0 Duct Materials**

### **RAW MATERIALS**

Galvanizing shall be Class VII – light coating of zinc, nominal 180gm/sq. m surface area and Lock Forming Quality prime material along with mill test certificates. In addition, if deemed necessary, samples of raw material, selected at random by owner's site representative shall be subject to approval and tested for thickness and zinc coating at contractor's expense.

## **3.0 GAUGES, BRACING BY SIZE OF DUCTS**

All ducts shall be fabricated from galvanized steel / aluminium of the following thickness, as indicated in schedule of quantities & as described in the IS: 655 with latest.

### **4.0 RECTANGULAR DUCT:**

<b>Dimension of duct</b>	<b>Gauge G. I</b>	<b>Aluminium</b>	<b>Type of joints</b>	<b>Type of Bracings</b>
Up to 600	24	22	G.I flange at 2.5 Centre	Cross Bracing
601 to 750	24	22	25 x 25 x 5 mm angle iron frame with 6 mm dia nuts and bolts.	25 x 25 x 5mm MS angles bracing at 1500 mm from joints.

751 to 1000	22	20	25 x 25 x 5 mm angle iron framewith 6 mm dia nuts and bolts.	25 x 25 x 5 mm MS angles bracing at 1500 mm from joints.
1001 to 1500	22	20	40 x 40 x 5 mm angle iron framewith 8 mm dia nuts and bolts.	40 x40 x 5 mm MS angles bracing at 1500 mm from joints.
1501 to 2250	20	16	50 x 50 x 5 mm angle iron to be cross braced diagonally with 10 mm dia nuts& bolts at 125 centers.	40 x40 x 5 mm MS angles bracing at 1200mm from joints.Or 40 x 40 x 5mm MS. Angle diagonal bracing.
2250 andabove	18	14	50 x 50 x 6 mm angle iron frame with 10 mm dia	50 x50 x 5 mm MS angles bracing at 1200 mm from joints.
			nuts and bolts at 125 mm centre.	Or 50 x 50 x 5mm 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 Hotdip process and galvanizing shall be Class VII- Minimum Average Coating 180 gm/sq.m as per

BIS 277: 1992.

#### 5.0 HANGERS FOR DUCT:

Duct Size (mm)	Spacing(M)	Size of MS angle	Size of rod dia

		(mm x mm)	(mm)
Upto 750	2.5	40 x 40X5	10
751 to 1500	2.0	40 x40X 5	12
1501 to 2250	2.0	50 x50X5	15
2251 to above	2.0	50 50X5	15

#### **6.0 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 airtight.

**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 center 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 x 25mm x 5mm 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.

## **7.0 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 red oxide 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 then duct should be supported by wall mounted brackets of 40 x 40 x 5 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 woodwork, 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 canvas 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.

#### **8.0 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 gauge 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.

## **9.0 Fire & Smoke Dampers**

All supply and return air ducts at AHU room crossings and at all floor crossings shall be provided with Motor operated Fire & smoke damper of at least 90 minutes rating as per UL555/1995 tested by CBRI. These shall be of multi-leaf type and provided with Spring Return electrical actuator having its own thermal trip for ambient air temperature outside the duct and air temperature inside the duct. Actuator shall have Form fit type of mounting, metal enclosure and guaranteed long life span.

Fire damper blades and outer frames shall be of 16G galvanized steel construction fitted with 18 gage extended sleeves on both sides. The damper blade shall be pivoted on both ends using chrome plated spindles in self lubricated bronze bushes. Stop seals shall be provided on top and bottom of the damper housing made of 16G galvanized sheet steel. For preventing smoke leakage metallic compression seals will be provided.

The electric actuator shall be energized either upon receiving a signal from smoke detector installed in AHU room supply air duct / return air duct or temperature sensor. The fire damper shall also close upon sensing temperature rise in supply air ducts thru the electronic temperature sensor.

Each damper shall be provided with its own control panel, mounted on the wall and suitable for 240 VAC supply. This control panel shall be suitable for spring return actuator and shall have at least the following features:

Potential free contacts for AHU fan ON/ Off and remote alarm indication.

Accept signal from external smoke / fire detection system for tripping the electrical actuator.

Test and reset facility. Indicating lights / contacts to indicate the following status:



Power Supply On Alarm

Damper open and close position

Actuators shall be mounted on the sleeve by the damper supplier in his shop and shall furnish test certificate for satisfactory operation of each Motor Operated Damper in conjunction with its control panel. Control panel shall be wall mounted type. It shall be HVAC Contractor's responsibility to co-ordinate with the Fire Alarm System Contractor for correctly hooking up the Motor Operated Damper to Fire Detection / Fire Management System. All necessary materials for hooking up shall be supplied and installed by HVAC Contractor under close co-ordination with the fire protection system contractor.

HVAC Contractor shall demonstrate the testing of all Dampers and its control panel after necessary hook up with the fire protection / fire management system is carried out by energizing all the smoke detectors with the help of smoke.

HVAC Contractor shall provide Fire retardant cables wherever required for satisfactory operation and control of the Damper.

HVAC Contractor shall strictly follow the instructions of the Damper Supplier or avail his services at site before carrying out testing at site.

Fire/smoke damper shall be provided with factory fitted sleeves; however, access doors shall be provided in the ducts within AHU room in accordance with the manufacturer's recommendations.

The Contractor shall also furnish to the Owner, the necessary additional spare actuators and temperature sensor (a minimum of 5% of the total number installed) at the time of commissioning of the installation.

#### **10.0 FIRE DAMPER:**

Whenever a supply/return duct crosses from one fire zone to another, it shall be provided with approved fire damper of at least 1½ hour fire rating as per UL555/1995 tested by CBRI. This shall be curtain type fire damper.

Fire damper blades shall be one piece folded high strength 16 gage galvanized steel construction. In normal position, these blades shall be gathered and stacked at the frame head providing maximum air passage and preventing passing air currents from creating noise or chatter. The blades shall be held in position through fusible link

of temp 70o C. In case of fire, the intrinsic energy of the folded blades shall be utilized to close the opening. The thrust of the suddenly released tension shall instantly drive the blades down and keep it down without the use of springs, weights or other devices subject to failure.

Fire damper sleeves and access doors shall be provided within the duct in accordance with the manufacturer's recommendation.

The contractor shall also furnish to the Owner, the necessary additional fusible links (spares), as recommended by the manufacturer, at the time of commissioning of the installation.

#### **11.0 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. Aluminum supply and return grilles shall be powder coated and to have colour of client's choice or extruded aluminum 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- r e t a r d a n t paint. Nothing extra shall be paid on this account.

#### **12.0 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.

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

**i. Round or Rectangular Diffusers:**

Supply/return air linear diffuser shall be M.S. or Extruded aluminum 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 air distribution

grids, removable key-operated volume control dampers, and anti-smudge rings as per requirements of schedule of quantities.

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

This shall be M.S. or extruded aluminum construction with fixed horizontal bars at 15 deg inclination and flange on both sides. 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. Aluminum construction with black anodized finished shall be provided in SA duct collars.

**13.0 LINEAR DIFFUSER:**

Liner diffuser shall be extruded aluminum 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 ecoregional and pressure. Extruded aluminum 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>Aluminum</b>
a) Frame	20-gauge	18 gauge

b) Louvers	20-gauge	18 gauge
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**Grills:**

a) Frame	20-gauge	18 gauge
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b) Louvers	26-gauge	24 gauge
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**V.C. Damper:**

a) Frame	20-gauge	18 gauge
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b) Louver	26-gauge	24 gauge
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**v. Fresh air intake and extract louvers:**

All the louvers shall be rain protection type and shall be fabricated from extruded aluminum section. The louvers shall additionally be provided with heavy duty expanded metal (aluminium –alloy) bird screed. 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.

**Part 4: TECHNICAL SPECIFICATION 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:**

Scope: The Scope of this section comprises supply and fixing of insulation as specified.

All insulating materials in the form in which it is used and under the condition anticipated shall not ignite, burn, support combustion or release toxic gases when

subject to fire or heat.

All adhesives used to stick insulation shall also be non-flammable.

All materials used for thermal and acoustical insulation shall be resin bonded fibre glass of density and thickness as specified or indicated on the drawing.

All sun exposed roof shall have Phenotherm under deck insulation of the density and thickness specified.

Manufacturers' recommendation for application & safety shall be strictly adhered to.

## **2.0 Fibre Glass 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/m<sup>3</sup>.

### **Thickness of Insulation:**

Type	Location	Insulation
Supply Duct	Conditioned	25 mm
	Space	
Supply Duct	Unconditioned	50 mm
	Space	
Return Duct	ConditionedSpace	25 mm
Return Duct	Unconditioned	50 mm
	Space	

**When specified / indicated the insulation shall be applied as follows:**

## **3.0 Duct Insulation Thermal Fibre Glass**

- Clean all duct surfaces thoroughly
- Install self-adhesive pins spaced along the duct at no greater than 300 mm centres at the bottom of duct. The pin should be located no less than 75 mm from each edge or corner.
- Apply a coat of Foster Duct as Adhesive 81-22 on the duct surfaces as per manufacturer's recommendations.
- Impale insulation through the pins and ensure insulation is stuck to the

adhesive.

- E. Fix self-retaining washers on to the pins to hold the insulation. Do not compress insulation more than 3 mm.
- F. Bend the pins so as to prevent protrusions or tears.
- G. Apply vapour seal pressure sensitive sealing tape to all joints and protrusions. The sealing tape should be minimum 75 mm wide.
- H. Provide nylon strapping at 600 mm centres to prevent sag. Strapping to be applied to widths of all ducts. Ensure strapping do not tear the aluminium foil.
- I. Wrap 24G x 3/4" G I chicken wire mesh around the insulation. Prevent any damage or tear to the insulation facing.

#### **4.0 Application: (For exposed duct)**

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

#### **1 5.0 Nitrile rubber class 'O'**

Insulation material for ducts shall be close cell elastomeric nitrile rubber class 'O'.

Thermal conductivity of nitrile rubber shall not exceed 0.036 w / m 0 C. Density of material shall not be less than 0.04 gm / cm<sup>3</sup>.

#### **2 6.0 The insulation shall be applied as follows:**

##### Duct Insulation – Thermal

- A. Clean all duct surfaces thoroughly to remove grease, dirt etc.
- B. The measurement of surface dimension shall have to be taken properly to cut nitrile rubber sheets
- C. The rubber sheets size to cut with sufficient allowance in dimension. A single sheet should be cut, so as to provide only one seam at the top of the duct. No small patches shall be allowed.

- D. Apply a thin coat of non-flammable adhesive recommended by manufacturer on ducts and on the insulation material
- E. When adhesive is tack dry, insulation shall be placed in position with compression and no stretching of insulation shall be permitted to achieve a good bond.
- F. All longitudinal and transverse joints shall be sealed with 3mm thick and 25mm width self-adhesive Arm flex class 'O' tape.

### **3 7.0 Acoustical Insulation**

#### **Acoustical Insulation for Ducts**

All connecting ducts to Package Units / AHUs shall be sound insulated to a distance of 6 m or as specified or as shown on the design.

Acoustical insulation shall be 50 mm thick 32 Kg/cum Fiber Glass Insulation finished with dimensionally stable Black Glass Tissue (BGT) facing & 24 G perforated aluminum sheets as specified or shown on the drawings.

Application:

Clean all internal duct surfaces

Pre-cut the insulation to the size desired, allowing 50 mm excess at downstream joints.

Install self-adhesive pins spaced along the inner face of duct. The pins should start within 75 mm of upstream transverse edges of the liner and 75 mm from longitudinal joints and should be placed at a maximum of 300 mm on centres around the perimeter of the duct, except that there may be a maximum of 300 mm from a corner break.

Apply coat of Foster Duct Fas Adhesive 81 - 22 on the duct surfaces as per manufacturer's recommendations.

Impale insulation through the pins and assure insulation is stuck to the adhesive. Fix self-retaining washers on to the pins. Do not compress insulation more than 3 mm.

Bend the pins so as to prevent protrusions or tears

It is recommended that all exposed leading edges & joints be coated with Foster Duct fast Adhesive 81 -22.

### **8.0 Acoustical Insulation for AHU / Package Unit Rooms**

Acoustical insulation shall be 50 mm thick 32 Kg/cum Fiber Glass Insulation finished with dimensionally stable Black Glass Tissue (BGT) facing & 24 G perforated aluminum sheets as specified or shown on the drawings.

Application:

Fix 50 mm x 50 mm GI / Al. angle frame at 600 mm centres.

Fix insulation + BGT & finish with 24G perforated aluminum sheets.

### **9.0 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 framework 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 nonflammable 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 aluminum 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.

## **Part 5: TECHNICAL SPECIFICATION**

### **4 1.0 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" in case 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>Description of Item</b>	<b>Approved Makes</b>
1.	<b><u>High side Equipment</u></b>	
1.1	VRV/VRF/MRV System using compressor of following make only.	Eta Gree /Haier/ Mitsubishi/Daikin
1.2	Y-Joints VRV/ VRF system	Toshiba/Hitachi/ Mitsubishi or equivalent
3.	<b>Fans</b>	



3.1	Propeller Fan	Caryaire/ Kruger/ Nuair (UK)/ Nicotra
4.	<b>Cables &amp; Accessories</b>	
4.1	Control Cables	Sky tone/ Universal/ Delton/Finolex
4.2	XLPE / PVC Insulated Aluminium Conductor Armored Power Cables	Sky tone/havells/ Universal/RPG Asian/INCAB
4.3	Communication Cable	Fusion/ CommScope / Contempt/Finolex
4.4	Cable Gland Double Compression with Earthing Links	Power/Grip well /Baliga Lighting Ltd.
4.5	PVC Insulated Copper Conductor Stranded Flexible Wires	Finolex/ National Cables – NC/ polycab/ Sky toneHavells
4.6	PVC Conduit & Accessories (ISI Approved)	BEC/ Precision/ D Plast/ Polypack
4.7	MS/ GI Conduit (ISI Approved)	BEC/ AKG/ STEEL KRAFT
4.8	Accessories for MS/GI Conduit (ISI Approved)	Sharma Sales Corporation/ Super Sales Corporation
4.9	Bimetallic Cable Lugs	Hax (Brass copper Alloy India Ltd)/ Dowell's (Biller India Pvt. Ltd.)
4.10	Lugs (Tinned Copper)	Dowell
4.11.	Slotted/Tray	Kelp/Fletco/MM Enterprises.
5.	<b>Ducting &amp; Grilles</b>	
5.1	Grilles/ Diffusers	Caryaire / Ravi star/ Mapro/ Tristar
5.2	Fire Dampers	Caryaire/ Conaire
5.3	G.I. Sheet Metal Duct	Jindal/National/ Tata
5.4	Fire Dampers motors	Belimo/Siemens
5.5	Self-Adhesive Sealing Gasket for Ducts	Prima Seal/ Air Flow/ Trocellen
5.6	Hessian (Fire treated)	Nav air/ Pyro guard
5.7	Stick Pins	Prima Seal/ Air Flow
	VCD/ Gravity louvers/ Exhaust & fresh air louvers	Caryaire /Ravistar/Mapro/ Tristar
5.8	Overload Relays with built-in single-phase preventer	L&T/ Minlec/Siemens/ Group Schneider (MG)France
6.	<b>Pipes &amp; Fittings</b>	
6.1	UPVC pipe for Drain	AKG/Polypack/supreme
6.2		


	Cu- Pipes	Totaling /Rajco /Mazflow
<b>7.</b>	<b>Insulation</b>	
7.1	Expanded Polystyrene (TF Quality) (Pre-moulded pipe section/slab)	Thermolloyd/ Beard Sell/ Styrene Pakagings/DEBSProducts/ P R Pakaging/ Coolite/ Indian Pakaging Services
7.2	Cross Linked Polyethylene	Trocellen/Supreme
7.3	Glass Wool	Owens Corning/ U.P. Twinga
7.4	Closed Cell ElastomericInsulation	Armacell/K-flex/A-flex
7.5	Aluminum Tape	Johnson/ Birla 3M
7.6	Acoustic Lining	UP Twiga/ Lloyd Insulation
7.7	Non-Woven Polyster (Mikron)	Mikron
<b>8.</b>	<b>Electrical Equipment</b>	
8.1	Electrical Panel Board/ Motor Control Centre (Power Coated)	Tricolite/ Adlec Systems pvt Ltd./Triton/ System PowerControl
8.2	Electric Motor (TEFC)	Siemens/ Crompton/ Kirloskar/ ABB
8.3	Starters/ Switch gear	Siemens/ L&T/ Group Schneider (MG) France
8.4	Miniature Circuit Breaker (MCB)	Siemens/ MDS Legrand/ Hager (L&T)
8.5	Moulded Case Circuit breaker (MCCB)	Siemens/ L&T/ GE Power/ Group Schneider(MG)NS
8.6	Air Circuit Breaker (ACB)	Siemens/ L&T/ GE Power/ Group Schneider (MG)NW
8.7	Earth leakage circuit Breaker (ELCB)	MDS Legrand/ Hager (Larsen & Toubro)
8.8	Push Button Starter	Siemens/ L&T/Group Schneider (MG)
8.9	Auxiliary Relays/ Contactors	Siemens/ L&T/ Group Schneider (MG) France
8.10	Line Type Fuse	Siemens/ L&T/GE
8.11	Timer	Siemens/ L&T/GE
8.12	Terminal Block	Elmax
8.13	Voltmeter/ Ammeter (Digital)	Automatic Electric/ L&T/ Siemens / Enercon


8.14	Indicating Lamps (LED Type)/ Push Button	Siemens/ L&T/ Vashnio
8.15	Single Phase Preventer (Current Base)	L&T/ Minlec
8.16	Electronic Digital Meters (A/V/PF/Hz/KW/KWA) With Led Display	Enercon System Pvt. Ltd/ L&T
8.18	Selector Switches/ Toggle Switch	Siemens/ L&T/ Kaycee
8.19	Change over switch	Siemens/ L&T/ HH Elcon/ HPL-Socomech
8.20	Protection Relay	Alstom/ L&T/ Siemens
8.21	Control Transformer/ Potential Transformers	Precise/ Gilbert & Maxwell/AE
8.22	Current Transformer (Epoxy CastResin)	Precise/ Gilbert & Maxwell/ AE
8.23	Rubber Mats 1199 V, 6 mm thick(ISI approved)	Jyoti
8.24	Weatherproof Boxes (IP55)	Advance/ Adlec/ Milestone
8.25	MS Painted Cable Trays	Ricco/ Slotco/ M. M Enterprises

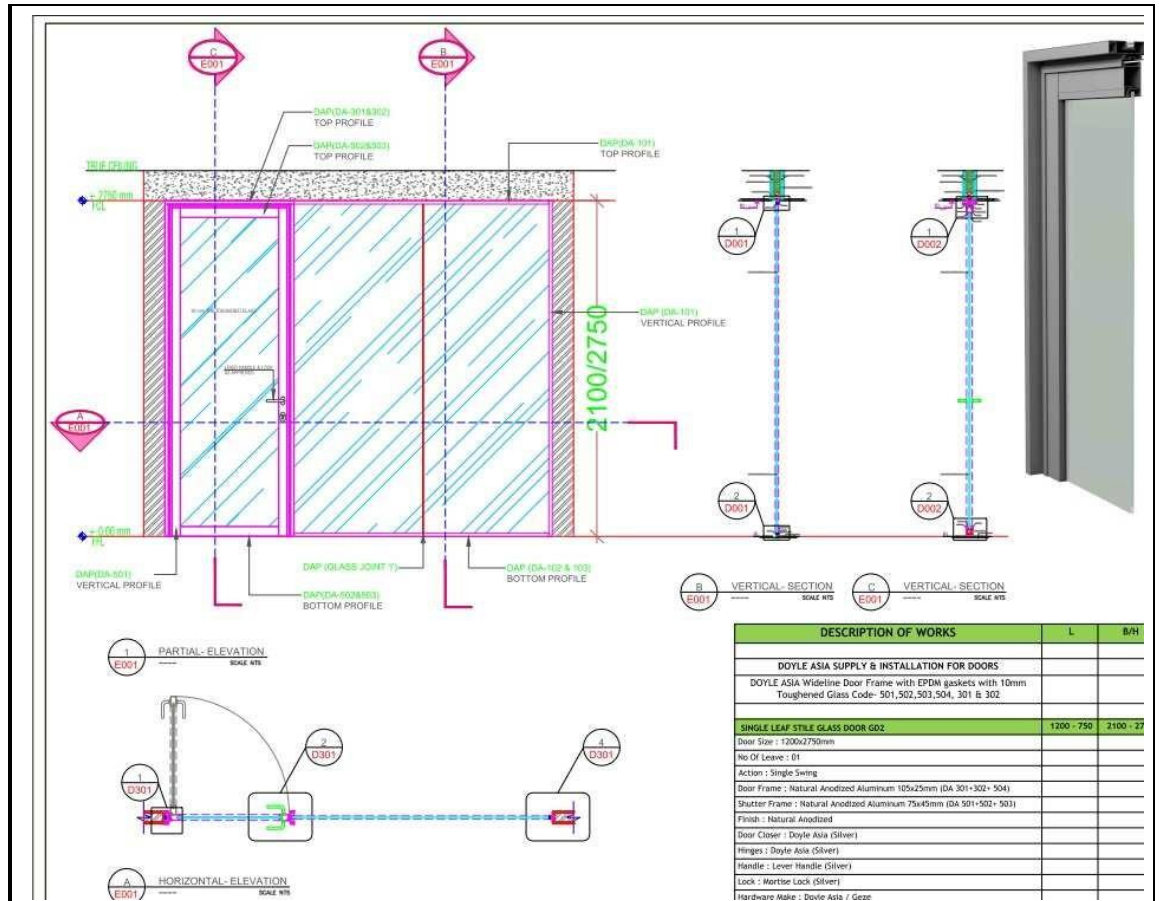
#### INTERIOR WORKS

S.NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
1	GYPSUM FALSE CEILING	Sft	596		

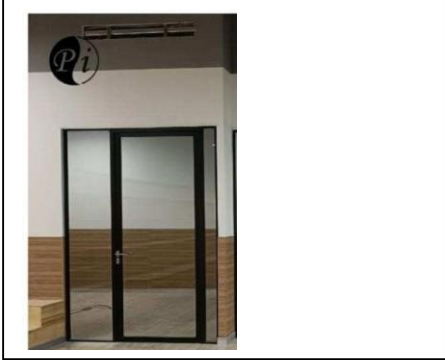
	<p>Providing and fixing ½" thk. Gypsum India board false ceiling at levels as shown in the drg. From FFL. Rate shall be inclusive of all Gypsum India components contained G.I. perimeter channels of size 0.55 thick having one flange of 20mm and another flange of 30mm and a web of 27mm alongwith perimeter of ceiling, screw fixed to brickwall/partition with the help of nylon sleeves and screws, at 610mm centres. The suspending G.I.intermediate channels of size 45mm, 0.9mm thick with two flanges of 15mm each from the soffit at 1220mm centres with ceiling angle of width 25mm x 10mm x 0.55 thick fixed to soffit with G.I. cleat and steel expansion fastners at every 610mm c/c. Ceiling sections of 0.55mm thickness having knurled web of 51.5mm and two flanges of 26mm each with lips of 10.5mm are then fixed to intermediate channel with the help of connecting clip and in direction perpendicular to the intermediate channel at 457mm centres. 12.5mm tapered edge Gypboard is then screw fixed to ceiling section with 25mm drywall screws driver or drilling machine with suitable attachment.</p>				
	<p>The boards are to be jointed and finished so as to have a flush look which includes filling and finishing the tapered and square edge of the boards with jointing compound &amp; joint paper tape. Rate shall be inclusive of Cut outs for A/c machiness, spot lights, light fixtures, A/C. Grills, fire and security systems cut outs, All Sections should adhere to the manufacturers guidelines. Vertical sides visible will be measured.</p>				
	<p>Cleaning the old surface of the ceiling and then applying &amp; painting walls with plastic emulsion White paint matt finish with two coats of approved make shade and colour over a base coat of appropriate paint of approved make (total 3 coats) including cost and conveyance of materials like paint to site including lift and labour charges such as preparing the wall,applyingluppum,applying primary coat, curing for primary coat, applying paint with matt finish two coats etc., complete for the finished item of work.</p>				
<b>2</b>	<b>ARMSTRONG GRID CEILING</b>	Sft	1135		
	<p>Providing &amp; Fixing of Mineral Fibre Acoustical Suspended Ceiling System with 15mm Tiles and Silhouette GRID. The tiles should have Humidity Resistance (RH) of 90% - 99%, NRC 0.5, Light Reflectance ≥87%, Thermal Conductivity k = 0.052 - 0.057 w/m K, Colour White, Fire Performance UK Class 0 / Class 1 (BS 476 pt - 6 &amp; 7) in module size of 600 x 600 x 16mm , suitable for Green Building application, with Recycled content of 30% - 45% .</p>				
	<p>The tile shall be laid on Microline / Silhouette profile grid system with 15mm - 16mm white flanges incorporating a 6mm central reveal in white/black colour and with a web height of 38mm and a load carrying capacity of minimum 8 Kgs/M2 &amp; minimum pull out strength of 100 Kgs. Microline / Silhouette, Main Runners &amp; Cross Tees to have mitred ends &amp; "birdsmouth" notches to provide mitred cruciform junctions. The T Sections have a Galvanizing of 90 grams per M2 and need to be installed with Suspension system as per manufacturers details.</p>				

	The Instalation to comprise main runner spaced at 1200mm centres securely fixed to the structural soffit using US Boral / Gyproc / Armstrong suspension system (specifications below) at 1200mm maximum centre. The First/Last suspension system at the end of each main runner should not be greater than 450mm from the adjacent wall.				
	Flush fitting 1200mm long cross tees to be interlocked between main runners at 600mm centre to form 1200 x 600 mm module. Cut cross tees longer than 600mm require independent support. 600 x 600mm module to be formed by fitting 600mm long flush fitting cross tees centrally between the 1200 mm cross tees. Perimeter trim to be Wall angles of size 3000mm x 19mm x 19mm, secured to walls at 450 mm maximum centres.				
3	BAFFLE CEILING	Sft	204		
	Providing AND FIXING 25MM X 100MM aluminium rafters finished polyster powder coat and in black with special colurs upon application. It shall consist of 'U' shaped pre-painted GI of 0.4mm folded sections, centre to centre distance between baffle is 125mm & baffle to baffle distance is 100mm Rate to includes necessary supports as per manufacturer specification like 5mm rod and suspension clips at 1200x1200mm centres. Basic rate 1000/-.				
					
4	FLUTED PANEL CEILING	Sft	174		
	Supply and Providing of WPC Louvers of size 14mm*195mm *2900mm (1 Panel =6.1 sft) withnessasasary clip and Installation chgs.The Pattern /Design is approved by Architect. Approved Brand:Leben / Sul Wood/SPLINE. Basic rate 350/-.				


					
<b>5</b>	<b>FULL HEIGHT PARTITIONS - SOLID</b>	Sft	534		
	Providing and fixing partition framing shall consist of Heavy duty Aluminium Box Sections 50mm 50mm @ 600mm c/c both ways Horizontally and Vertically. The ertical alternate frames to be fixed to the ceiling with necessary fixtures. The framing shall be finished with 8 mm thk. Commercial ply on both side and finished with 1.00 mm thk. Laminate finished with melamine polish. The shade of laminate and polishing finish to be got approved from Architect. The skirting should be as per approved laminate as per drawing and direction. Rate shall be inclusive of necessary hardware items, etc. Complete. The edge beadings with steam beach wood should be finished ith melamine. <b>HILUX Calcium Silicate Board</b> of 9 mm tk. for UPS room.				
<b>6</b>	<b>ANODIZED ALUMINIUM FULL HEIGHT PARTITION</b>	Sft	478		
	Providing & Fixing Full height partition with 25mm x 45mm fixed anodized aluminium frame, 25mm x 45mm folding anodized aluminium frame 10mm clear to ghened glass with CEP edge polish, installation charges (Alu inium material fabrication, hardware & glass installation). and complete for the finished item of work. (Refer drawing for details.) Basic rate 450/-.				




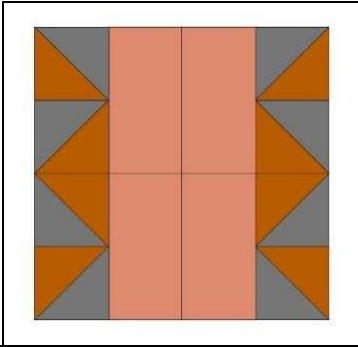
7	<b>ANODIZED ALUMINIUM LOW HEIGHT PARTITION</b>	Sft	414		
	Providing & Fixing low height partition with 25mm x 45mm fixed anodized aluminium frame, 25mm x 45mm folding anodized aluminium frame 10mm clear toughened glass with CEP edge polish, installation charges (Aluminium material fabrication, hardware & glass installation) and complete for the finished item of work. (Refer drawing for details.) Basic rate 450/-.				
8	<b>STORAGE</b>	Sft	219		
	Providing & Fixing storage of size 1'-6" deep with various lengths & heights with 19mm thk. plywood for sides, front shutter and in between planks. 8mm thk. ply use for rear side of the storage unit. All the exposed surfaces will be laminated with 1mm thk. laminate of approved shade & brand. All the inner surfaces are to be laminated with 1mm thk laminate. Rate to include cost of necessary hardware like brass hinges, aldrops, magnetic stopper, handles etc., complete for the finished item of work.				
9	<b>ALUMINIUM FRAMED STILE DOOR</b>	No.s	4		
	Providing & Fixing Glass Door of 9'0" height & choucath frame anodized finish 10mm clear toughened glass with CEP edge polish. Hardware accessories: top door closer, Hinges, off set design handle, centre cylindrical lock, dead lock body. installation includes Aluminium material, fabrication, hardware & glass installation. complete for the finished item of work.				

	(Refer drawing for details.) Basic rate 38000/-.				
	Refer item no. 6 for details.				
					
<b>10</b>	<b>FLUSH DOORS</b>	Sft	194		
	Providing and fixing 50mm thick solid core flush shutter of 9'0" height with 85mm x 15mm beech wood jamb all round and 12mm x 12mm button beading fixed 1mm laminate as specified on both sides and 8mm clear float glass with 3M privacy film fixed as per drawing with 65mm x 15mm beech wood jamb around the glass opening and 12mm x 12mm beech wood beading for fixing of glass on both sides.				
	The rate to include necessary hardware viz., door stopper, door buffer, pair of " H " type handles, Mortise Dead Lock and Euro Profile Cylinder - Key and Knob 70mm SS, SS 2 ball-bearing hinges - (127mm x 76mm x 2.5mm), concealed door closer (all of approved make and quality), ZERO VOC or NO VOC duco paint finish for all beech wood members, etc., complete as directed.				
<b>11</b>	<b>ROLLER BLINDS</b>				
	Providing and fixing removable type room darkening fabric / zebra blinds in approved shade with EOS 500 operating system and spring assisted HD 47 along with commonly used SF38 lifting system having chain drive clutch that allows precise control held in position with necessary accessories from the adjoining wall as per the detail drawings. provided with all standard fittings, accessories etc., as per the manufacturers specifications complete for the finished item of work. (MAKE:Hunter Douglas/ equivalent) Basic rate 180/-.	Sft	682		
<b>12</b>	<b>DISPLAY BOARD</b>				
	Providing and fixing 12mm Soft Board display covered with felt and teak wood border of size 6'-0" x 3'-0".	Sft	18		
<b>13</b>	<b>SHUTTER BOX IN ACP</b>				
	Providing & fixing in position Aluminium Composite Panel (ACP) with framing of Aluminium Tube sections of min 1.5" x 1" and 20 gauges 2'-0" C/C both ways. Joints to be finished with Silicon based sealant. ACP thickness of 3 mm minimum. Aluminium foil thickness to be min 0.20 mm, 2'-0" C/C both ways. ACP to be in 2' width panels or distributed equally. Alubond, Eurobond, Fujibond, Alcobond or equivalent ISO certified brands to be used. Trap door to be finished with ACP.	Sft	122		
<b>14</b>	<b>FLUTED PANELLING</b>				
	Supply and Providing of WPC Louvers of size 14mm*195mm				





	<b>*2900mm (1 Panel =6.1 sft) withnessasary clip and Installation chgs.The Pattern /Design is approved by Architect. Approved Brand:Leben / Sul Wood/SPLINE. Basic rate 350/-.</b>	Sft	900		
					
<b>15</b>	<b>ANTI TERMITE TREATMENT</b>				
	Chlorphriphosemulsifiable concentrate of 20% or Bayer Anti Termite chemical to be used to treat all the surfaces of the plywood, slabs, beams and all infected areas two times with 1 hour drying time before starting the work.	Ls	1		
<b>16</b>	<b>PAINTING</b>				
	Cleaning the old surface of the wall and then applying & painting walls with plastic emulsion White paint matt finish with two coats of approved make shade and colour over a base coat of appropriate paint of approved make (total 3 coats) including cost and conveyance of materials like paint to site including lift and labour charges such as preparing the wall,applyingluppum,applying primary coat, curing for primary coat, applying paint with matt finish two coats etc., complete for the finished item of work.	Sft	715		
<b>17</b>	<b>UPS &amp; RECORDS, etc., (INCLU. CEILING)</b>				
	Cleaning the old surface of the wall and then applying & painting walls with OBD White paint matt finish with two coats of approved make shade and colour over a base coat of appropriate paint of approved make (total 3 coats) including cost and conveyance of materials like paint to site including lift and labour charges such as preparing the wall,applyingluppum,applying primary coat, curing for primary coat, applying paint with matt finish two coats etc., complete for the finished item of work.	Sft	3212		
<b>18</b>	<b>SYNTHETIC ENAMEL PAINT FOR WINDOW GRILL, ROLLING SHUTTER &amp; COLLAPSABLE GATE</b>				
	Providing and applying 2 coats synthetic enamel paint on window grill,rolling shutter and collapsablegate.Before putting final paint scrapping, leveling, preparing the surface and 2 coats primer to be done.The wall to be completed as per the direction of architect.	Sft	307		
<b>19</b>	<b>PANTRY</b>				
	Supply & Fabrication of counter below for pantry by using marine ply of Century/ Green/ equivalent duly finished with the 1mm glossy finish laminate for exterior and 1mm laminate for inner side duly finished with the edge beading. Hardware to be used soft closure hinges telescopic channels of Ebco / Hettich/Hafele. The shutters of the cabinet duly finished with high gloss laminate of specified shade as per the directions of the Architect.	Sft	24		
<b>20</b>	<b>PANTRY BASKETS</b>	Nos	6		
	Supply and Fixing of stainless steel 304 grade baskets of 3ft and 2ft size. Basic rate 3500/-.				



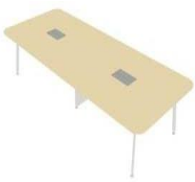
21	SOLID WOOD STOOL	Nos	1		
	Stand alone table of 450mm dia. Made of solid wood duly polished to keep IDOL with a telescopic sliding drawer. Basic rate 7500/-.				
22	GANESH IDOL	Nos	1		
	Supply and fixing Ganesh Idol of height 1'-0" near the reception table as specified by the Architect of basic cost 9000/-				
23	VANITY MIRROR	Nos	1		
	Providing and fixing designer mirror of size 24"x24" with a LED light strip display on the edges with touch control sensor and warm white color temperature. Basic rate 5500/-.				
					
24	DISPLAY UNIT	Sft	20		
	Providing and fixing display unit of size 11'6"x1'6" with Veneer finish on all the sides duly melamine polished as per the Architect. The unit to be provided with frameless glass shutters. The rate is inclusive of necessary hardware to complete.				
25	NEW ROLLING SHUTTER				
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.				
	80x1.25 mm M.S. laths with 1.25 mm thick top cover	Sft	60		
26	Providing and fixing ball bearing for rolling shutters.	Sft	2		
27	ACRYLIC SIGN BOARD				
	Acrylic Sanwiching with 3mm & 3mm fixed with stud screws for elegant looks	Sft	15		
	Digital Printing Signage on 3M Media	Sft	15		
28	LED BACKLIT SIGN BOARD				
	LED Backlit Signage with 3M Vinyl & flex & Osram Leds	Sft	15		
	Digital Printing Signage on 3M Media	Sft	15		
29	VINYL FILMED WRITING BOARD GLASS				

	Providing & Fixing of Vinyl film writing board glass of Saint Gobain make 5mm clear float glass having one side layered extra white vinyl film fixng. All float glass edges with CEP edge polish for smooth finishing & having required holes for glass installation(if required). While fixing the glass vinyl filmed surface keep as surface-1 prevent from external damages.Extra white Vinyl Make: 3M/ Garware.All Vinyl filmed glass fixing with struds/ mirror caps/ Screws & without silicon sealeant per site condition/ approved by architect. Basic rate 200/-.	Sft	50		
30	<b>SYNTH SLIM POLYFIBRE PANELLING</b>				
	Supply and installation of Anutone Synth Slim, polyfibre panels, core-pigmented, high-density, SynthPF rigid panels of size 1200x2400x9mm thk, volume density 210 - 230kg/m3, weight 1.9 - 2.1kg/m2. Prior to installation, ensure wall or surface behind are flat, dry and free from dust or other contaminants and leveled.Panels are then adhered to Perforated MDF panels of min 10 mm thickness as per design or surface behind with stick S7 adhesive.Suitable GI framing shall be installed behind MDF sheets to ensure necessary Rigidity as per Manufacturer recommendations. Basic rate 300/-.	Sft	50		
	Technical Parameters of system				
	<ul style="list-style-type: none"> <li>• Fire (Class) – B</li> <li>• Acoustics – NRC 0.4 (For A mounting)</li> <li>• Thermal conductivity (W/mk)– na</li> <li>• Climate (°C, RH) – 50, 99</li> <li>• Light reflectance (%) – ColourDependant</li> <li>• Green (VoC, RC %) – Nil, 30</li> </ul>				
					
<b>31</b>	<b>LACQUERED GLASS PANELLING</b>				
	Providing and fixing of Ultra White lacquered glass (Toughened glass) of 8mm thknss over plywood frame of 19mm thk fixed with silicon sealent with polished edges. The rate is inclusive of plywood paneling with frame. Basic rate 750/-.	Sft	200		
<b>32</b>	<b>CARPET TILE FLOORING</b>				
	Providing and fixing 7mm thk. Tufted fibre tiles of size 50mm x 50mm backed up with PVC glass fibre reinforcement layer as per the detaildrawing duly attached to the floor with manufacturers recommended adhesives. Basic rate of tile is 200/- per Sft	Sft	317		
	<b>TOTAL</b>				



## FURNITURE WORKS

(Godrej, Featherlite, Herman Miller)

S N O	ITEM NAME	ITEM DISCRIPTION	IMAGE	UNI T	RATE	QT Y	AMOUNT
1	Wish Syste m	<p><b>PENTA WORKSTATIONS - 1500 X 1350 X 600</b>  Providing and placing WISH panel &amp; tile based modular workstation, with partition thickness as 52.4 mm thk and ht - 1200mm including powder coated aluminium trims. Tiles: Combination of top tiles are fabric magneitc/white board. Bottom tiles - Plain metal.  <b>INTERMEDIATE BLOCKS</b> Intermediate blocks are given in fabric finsh.  <b>Wire Management</b> - Wires shall be taken into the system through cable ducts from the junction boxes and it is carried upto the panels through concealed conduits inside the blocks.  <b>legs</b> - Metal powder coated legs at the end and shared condition. System shall also have 120 mm high powder coated standalone panel legs to give the system an elevated look.  <b>Worksurface</b> - out of 25 mm thkprelam particle board with flat pvc lipping edge banding of size 1500 mm w1 X 1350 MM w2 x 600 mm d.  <b>Pedestal</b> - Nova pedestal flat metal front, full ht free standing central locking of size 390 mm w x 435 mm d x 646 mm ht 3dr = 2box+1file.  <b>CPU trolley</b> - with castors,  <b>Note:</b> All partitions and side panels have levelling screws for adjustment in case of Uneven floor to take care of +/- 40 mm of uneven flooring.</p>		NOS		12	
2	Wish syste m	<p><b>PENTA WORKSTATIONS - 1500 X 1350 X 600</b>  Providing and placing WISH panel &amp; tile based modular workstation, with partition thickness as 52.4 mm thk and ht - 1200mm including powder coated aluminium trims. Tiles: Combination of top tiles are fabric magneitc/white board. Bottom tiles - Plain metal.  <b>INTERMEDIATE BLOCKS</b> Intermediate blocks are given in fabric finsh.  <b>Wire Management</b> - Wires shall be taken into the system through cable ducts from the junction boxes and it is carried upto the panels through concealed conduits inside the blocks.  <b>legs</b> - Metal powder coated legs at the end and shared condition. System shall also have 120 mm high powder coated standalone panel legs to give the system an elevated look.  <b>Worksurface</b> - out of 25 mm thkprelam particle board with flat pvc lipping edge banding of size 1500 mm w x 600 mm d.  <b>Pedestal</b> - Nova pedestal flat metal front, full  <b>ht free standing central locking of size 390 mm w x 435 mm d x 646 mm ht 3dr = 2box+1file. CPU trolley</b> - with castors,  <b>Note:</b> All partitions and side panels have levelling screws for adjustment in case of Uneven floor to take care of +/- 40 mm of uneven flooring.</p>		NOS		4	

3	Wish System	<p>CUBICLE WORKSTATIONS - 2550 X 1500</p> <p>Providing and placing <b>WISH</b> panel &amp; tile based modular workstation, with partition thickness as <b>52.4 mm</b> thk and ht - <b>1200mm</b> including powder coated aluminium trims.</p> <p><b>Tiles</b>: Combination of top tiles are fabric magnet/white board. Bottom tiles - Plain metal.</p> <p><b>INTERMEDIATE BLOCKS</b> Intermediate blocks are given in fabric finish.</p> <p><b>Wire Management</b> - Wires shall be taken into the system through cable ducts from the junction boxes and it is carried upto the panels through concealed conduits inside the blocks.</p> <p><b>legs</b> - Metal powder coated legs at the end and shared condition. System shall also have <b>120 mm</b> high powder coated standalone panel legs to give the system an elevated look.</p> <p><b>MODESTY PANELS WITH ASSEMBLY LEG</b> - 25 MM THKPLB modesty has been given on the front of the main worktop which is attached to the partition on one end with gable end bkts and on the other end with metal powder coated frontier leg.</p> <p><b>Worksurface</b> - Main table recta out of 25 mm thkprelam particle board with flat pvc lipping edge banding of size <b>1500 mm w x 750 mm d</b> and ERU table recta of size <b>900 mm w x 450 mm d</b>.</p> <p><b>Pedestal</b> - Nova pedestal flat metal front, full ht free standing central locking of size 390 mm w x 435 mm d x 646 mm ht 3dr = 2box+1file.</p> <p><b>CPU trolley</b> - with castors,</p> <p><b>Note</b>: All partitions and side panels have levelling screws for adjustment in case of Uneven floor to take care of +/- 40 mm of uneven flooring.</p>		NOS		3		
4	IMPRESS	<p><b>AGM Table</b></p> <p><b>Impress Main Table</b> Comprises of Main Desk ,ERU and Pedestal</p>		NOS		1		
5	Meeting Table	<p><b>Up Beat Meeting Table</b></p> <p><b>Worktop</b> - 25 mm thk . Prelaminated particle board with PVC lipping , at 750MM ht. - Main RECTA - 1800 mm w x 750 mm h- 1 nos</p> <p><b>Lag</b> - DfineLeg,Worktop with access flap(Return side), Metal Modesty,Power box with wire riser</p>		NOS		1		

6	MARV E L	Work station Chair and Conference Chair MID BACK Leatherette, Active Bio-Synchro, Die cast polished Aluminum Pedestal, Adj Arms, 5 Position Tilt Limiter, Bk HtAdj,Seat Slide Mech		NOS		23	
7	MARV E L	Manager Module Chair HIGH BACK Leatherette, Active Bio-Synchro, Die cast polished Aluminum Pedestal, Adj Arms, 5 Position Tilt Limiter, Bk HtAdj,Seat Slide Mech		NOS		3	
8	Visitor Chair	SS frame with PU form with leatherette with fabric upholstery		NOS		8	
1 1	CUE	3 STR Sofa CUE 3 Seater 700mm FS04 FB03		NOS		1	
1 2	CUE	2 STR Sofa CUE 3 Seater 700mm FS04 FB03		NOS		2	
1 3	Sliding Storage Unit	VSDU-12 1192.5*1200*4 50		N O S		7	

1 4	OPTI MI ZER	2 BAY DRIVE UNIT As per layout		N O S		1	
1 5	Table	Trident Junior 1 Main Desk1200 x 600 x 743		N O S		1	
1 6	FR FC 4D R	Fire resistance fillingcabinet 1608H X 560W X835D Weight-450 kg		N O S		1	
1 7	FR FC 2D R	Fire resistance fillingcabinet 844H X 560W X835D Weight-300 kg		N O S		1	
				TOT AL			

## ELECTRICAL WORKS

Sr. No.	DESCRIPTION	QNTY	UNIT	RATE	AMOUNT
1	<b><u>DISTRIBUTION BOARDS</u></b>				
	Supply and installation of following size MCB distribution boards with following combination of MCBs as required				
a	Supply, installation Testing and Commissioning of main LT panel, floor mounted front operated totally enclosed vermin proof, indoor non-drawout-cubicle type power panel fabricated out of 2mm thkCRCA sheet having gasketed hinged cover on each cubicle fully powder coated after 7 Tank treatment, incorporating horizontal and vertical sleeved copper busbars, complete with all internal wiring, dangerboard, 2 earthing legs, cable chamber etc as required, housing below mentioned switch gears / meter including following switchgear as per single line diagram and technical specifications (GA drawing of the panel got to be approved by Consultant)	1	no		
	Incomer: a) Incoming EB : 160A, 25kA 4 Pole MCCB c) Phases Indicating lamps LED type with fuse control -1Set d) On, off, trip, indication lamps - 1Set e) 0 to 160 Amps Ampere meter with selector switch -1 job f) 0 to 500volts voltage meter- 1 job BUS BAR : 160A TPNAluminium bus bar Out Goings: 1) 63A, 4P, MCB -4 Nos 2) 40A, 4P, MCB -4 No 3) 32A, 2P, MCB-4No				
b	6 way Three Phase Vertical DB (with Double door) for AC distribution board i)Incomer: 63A 4P 10KA MCB ii)Outgoing: a) 40A TP MCB 3Nos, b) 16A SP MCB 6 no's	1	no		
c	3PHASE 8 way ETPN DB - i)Incomer: 63A TPNMCB, 25A DP RCCB -3Nos ii)Outgoing: 10/16A SP MCB 18 Nos for Power db .	1	no		
d	3PHASE 6 way ETPN DB - i)Incomer: 40A TPNMCB,, 25A DP RCCB -3Nos ii)Outgoing: 10/16A SP MCB 12 Nos for Lighting db .	1	no		
e	1PHASE 12 way SPN DB - i)Incomer: 32A DP RCCB, ii)Outgoing: 10/16A SP MCB 10 Nos for UPS db .	1	no		
2	<b><u>ENCLOUSERS</u></b>				
i)	25A TP MCB with weather proof enclosure for VRV Units	2	no		
ii)	32A 2P MCB with weather proof enclosure for UPS Input & OUTPUT	5	no		
iii)	16/20A SP MCB with weather proof enclosure for Ac Units	7	no		
3	<b><u>MCCB</u></b>				



i)	100A TP MCCB with encloser	3	Nos.		
<b>4</b>	<b>CABLES</b>				
i)	<b>SUBMAINS</b>				
a	Supply and laying following size 1.1KV grade PVC insulated armouredaluminium/Cu. FRLS conductor under ground cable on the surface of wall, above false ceiling along with 2runs of 12swg GI wire with all installation materials.The cable shall conform to IS 1554 Part- I.scope also includes termination of the cable as required with suitable glands and lugs				
	1) 3.5C X 35 Sq.mm AL. Arm cable for MAIN INCOMING	210	mtr		
	2) 4C X 16 Sq.mm Cu. Arm cable	65	mtr		
	3) 4C X 6 Sq.mm Cu. Arm cable	95	mtr		
	4) 3C X 6 Sq.mm Cu. Flx cable	60	mtr		
	5) 1C X 10 Sq.mm Cu. Flx cable	120	mtr		
b	Providing end terminations for following size cables including supply of Compression type cable gland, lugs, insulation tape and identification tags complete with end termination and earthing of gland.				
	1) 3.5C X 35 Sq.mm AL. Arm cable for MAIN INCOMING	2	Nos		
	2) 4C X 16 Sq.mm Cu. Arm cable	4	Nos		
	3) 4C X 6 Sq.mm Cu. Arm cable	8	Nos		
	4) 3C X 6 Sq.mm Cu. Flx cable	6	Nos		
	5) 1C X 10 Sq.mm Cu. Flx cable	10	Nos		
c	3core 2.5sqmm Copper Conductor Cable for Glow Sign Board & Indoor ac's	298	mtr		
ii)	<b>POINT WIRING - LIGHTS &amp; CEILING FANS</b>				
a	Point wiring with 1.5sqmm FRLS 650V grade multistranded PVC insulated copper wire in 2mm thick 25mm dia PVC pipe for lights, fans including supply & fixing of 5 amp modular switch in concealed MS switch box,front plate, 3 plate ceiling rose, and concealed circuit wiring with 3 Nos (P,N,E) 2.5sqmm (DB's to switchboards & switch board to switch boards loopings). and all interconnections as required.	65	pts		
b	Same as above but for secondary points looped from the above	53	pts		
c	Same as point wiring but for the call bell points for the cabins including supply of call bell as required	1	pts		
d	Supply and fixing of 1nos. 6A sockets fixed the switch board with 1 no 6A switch including all interconnections as required for raw power (New Sockets) In Public area	10	no		
iii)	<b>POINT WIRING- WALL MOUNTING FANS :</b>				
	Wiring for the wall mounting fans from the nearest switch board with 1.5sqmm FRLS 650V grade multistranded PVC insulated copper wire in 20mm dia 2mm thick PVC pipe and all interconnections as required including the supply and fixing of 6A modular socket 3" below the false ceiling and 6A switch in the switchboard as required.	11	nos		
iv)	<b>WIRING FOR AIRCONDITIONERS :</b>				

	Wiring with 1100V grade PVC insulated Copper conductor multistrand wires along with 2Runs of 2.5mm +1Run of 1.0mm FRLS copper wire run in suitable size 2 mm thick 25mm dia PVC conduit run concealed on wall/ Ceiling etc asrequired for Single phase ACs	10	nos		
<b>5</b>	<b><u>SOCKETS - RAW :</u></b>				
<b>a</b>	<b>RAW Socket - 1 x 6A</b>				
i)	Supply and fixing of 1nos. 6A socket fixed Above the table with 1 no 6A switch fixed above the table on 3 module metal box and white front plate (Modular type)with 2runs of 2.5 sq.mm FRLS and 1 run of 2.5sqmm FRLS 1100 V grade PVC insulated multi strand copper conductor wires conforming to IS 694 (with latest amendments) in 25mm dia PVC conduit of 2mm thick concealed in wall/floor and supply of all fixing materials and accessories,interconnections complete as required for the raw power primary sockets (DB to work stations Primary point)	16	no		
ii)	same as above but looped from nearest Raw Power point (Primary point to Secondary point)	8	no		
<b>b</b>	<b>RAW Socket - 1 x 5/15A</b>				
i)	Supply and fixing of 1nos. 6/16A sockets with 1 no16A switch fixed on a suitable module metal box and white front plate (Modular type) wiring with 2runs of 4.0 sq.mm FRLS and 1 run of 2.5sqmm FRLS 1100 V grade PVC insulated multi strand copper conductor wires conforming to IS 694 (with latest amendments) in suitable size PVC conduit of 2mm thick concealed in wall/floor and supply of all fixing materials and accessories,interconnections complete as required for the raw power primary sockets (DB to Primary point)	7	no		
ii)	same as above but looped from nearest Raw Power point(Primary point to Secondary point)	7	no		
	<b><u>SOCKETS - UPS:</u></b>				
<b>a</b>	<b>UPS Sockets - 3 x 6A</b>				
i)	Supply and fixing of 3nos. 6A sockets with 1 no 16A switch fixed on a suitable module metal box and white front plate (Modular type) including all interconnections as required(switch shall be fixed above the table with suitable modular front plate /box and sockets shall be fixed below the counters) with 3runs of 2.5 sq.mm FRLS grade 1100 V PVC insulated multi strand copper conductor wires conforming to IS 694 (with latest amendments) in suitable size PVC conduit of 2mm thick concealed in the above ducts in the floor and supply of all fixing materials and accessories,interconnections complete as required for the UPS power sockets. (DB to work stations Primary point)	14	no		
ii)	same as above but looped from nearest UPS Power point (Primary point to Secondary point)	12	no		
<b>b</b>	<b>UPS Sockets - 2 x 16A</b>				

	Supply and fixing of 2nos. 6/16A sockets with 1 no16A switch fixed on a suitable module metal box and white front plate (Modular type)with 2runs of 4.0 sq.mm FRLS and 1 run of 2.5sqmm FRLS 1100 V grade PVC insulated multi strand copper conductor wires conforming to IS 694 (with latest amendments) in suitable size PVC conduit of 2mm thick concealed in wall/floor and supply of all fixing materials and accessories,interconnections complete as required for the UPS power primary sockets (DB to Primary point)	6	no		
	<b><u>TELEPHONE &amp; DATA :</u></b>				
a	Supply and fixing of RJ 11 Telephone socket with 2 Pair (0.5mm) Telephone Cable From Each Table to Krone Box, this include suitable Surface/concealed box and all required materials this Includes Wiring. Supply and fixing of Suitable PVC Conduits and Cable Numbers to provided.	18	nos.		
b	Supplying and fixing a 20 pair krone connector in a suitable box as required. AGM antiroom and Mintanance room	2	nos.		
c	Supply and Laying of 4Pair, UTP(Unshielded Twisted Pair) cat6 Lan Cable with Information outlet and Suitable 2mm Thick PVC Pipe Laying Below Flooring/Wall/Slab etc MS Junction Boxes to All Tables, Including all Related Civil Works etc All Cable Numbers to be Provided at both ends	38	nos.		
d	supply & fixing of 7 feet Patch Cords.	38	nos.		
e	supply & fixing of 3 feet Patch Cords.	38	nos.		
f	Supply & Fixing of 24 Port Jack Panel & switch	2	nos.		
g	Supply & Fixing of 9U Rack with Acceries(Self, Power Manager, Cable Manager, Fan etc)	1	nos.		
<b>6</b>	<b><u>SUPPLY AND INSTALLATION OF LIGHTING FIXTURES</u></b>				
	Supply & Installation of following type Fluorescent / Compact fluorescent / Incandescent light fixtures. The fixtures shall be installed including supply and wiring between Ceiling rose to fixture with supply and laying of 3core 1.5Sq.mm copper flexible cable and fixing of Lamp with all required accessories, support chains & interconnections etc.				
a	Supply & Installation of 30W Back Lit Polar Panel Light fixture. (Havells:- ENDURANEODLR30WLED840S or Equ) including cost and conveyance of all materials, taxes and all labor charges etc., complete.	17	Nos		
b	Supply & Installation of 15W Led down light fixture. (Havells:- ENDURANEODLR15WLED840S or Equ) including cost and conveyance of all materials, taxes and all labor charges etc., complete.	36	Nos		
c	Supply & Installation of 25W 4' Led Linear Light fixtures (Havells or Equ) including cost and conveyance of all materials, taxes and all labor charges etc., complete.	8	Nos		

d	Supply & Installation of 20 W T5 led Light fixtures 1200MM Length and giving connections and all labour charges etc., complete for erection. (LUMILINEBS18WLED830SPCWH - Havells or Equ)	5	Nos		
e	Supply & Installation of 20 W T5 led Light fixtures 600MM Length and giving connections and all labour charges etc., complete for erection. (LUMILINEBS18WLED830SPCWH - Havells or Equ)	5	Nos		
f	Supply & Installation of 10W Led Mirror light fixture. (Havells:- ENDURANEODLR10WLED840S or Equ) including cost and conveyance of all materials, taxes and all labor charges etc., complete.	3	Nos		
g	Supply & Installation of 6W Led down light fixture. (Havells:- ENDURANEODLR6WLED840S or Equ) including cost and conveyance of all materials, taxes and all labor charges etc., complete.	6	Nos		
h	Supply & Installation of 30W Led Pendant light fixture. (Havells or Equ) including cost and conveyance of all materials, taxes and all labor charges etc., complete.	3	Nos		
i	Supply & Installation of LED Spot Linear Light for Ceiling Fixing (as per drawings) . including cost and conveyance of all materials, taxes and all labor charges etc., complete.	15	Nos		
j	Supply & Installation of 20W Led holder light fixture. including cost and conveyance of all materials, taxes and all labor charges etc., complete.	5	Nos		
k	Supply & Installation of Under Flooring led Strip light per Mtr- 3 Watts. including cost and conveyance of all materials, taxes and all labor charges etc., complete.	25	mtr		
m	<b>Wall Mounting Fans</b>				
	Supply and Fixing of wall mounted fans of approved make 400mm Hi flow model.	11	Nos		
n	<b>Ceiling Mounting Fans</b>				
	Supply and fixing of 600mm (48") size ceiling fan hi speed Crompton Greaves Rivera model with 120W step type regulator (Including 2F lenth down road and Hooks) of approved makewith all connections and anchor fasteners ,fan hooks, down rods etc as required	1	Nos		
l	<b>Exhaust Fans</b>				
	Supply & Installation of 300mm (12") size fresh air exhaust fan light duty , Metallic body plastic blades, wire mesh, bird louvers etc. including cost and conveyance of all materials, taxes and all labor charges etc., complete for erection	3	Nos		
<b>7</b>	<b><u>EARTHING</u></b>				
a	Providing standard copper plate earth station ,with 600x600x3.15mm thick copper plate, 40mm dia, 2.5 mtr GI pipe with 25X3 copper strips runs on both sides up to top of the earth pit including excavation and construction of brick pedestal providing meshed funnel, CI cover and other Civil works, spreading a homogeneous mixture of salt, charcoal around the plate etc completely as per IS 3043,1987 or latest revision	4	nos		

b	Providing G.I earth station, with 40mm dia, 2500mm long galvanized iron pipe including construction of brick pedestal providing meshed funnel CI cover and other Civil works, spreading a homogenous mixture of salt charcoal around the pipe etc., Completely as per IS 3043,1987 or latest revision.	4	nos		
c	Supply & Laying of 100mmX 25mmX 5mm Copper strip with supporting insulator and holes	3	nos		
d	Supply and laying of 8SWG CU Wire in 20mm dia rigid pvc conduit for ups DB earthing from the existing earth pits in PVC conduit of suitable size.	40	mtr		
e	Supply and laying of 8SWG GI Wire in 20mm dia rigid pvc conduit for Raw power & Lighting DB earthing from the existing earth pits as required in PVC conduit of suitable size.	40	mtr		
f	Supply & Laying of 25mmX 5mm Copper strip with supporting insulator	30	mtr		
g	Supply & Laying of 25mmX 3mm Copper strip with supporting insulator	60	mtr		
h	Supply & Laying of 25mmX 6mm GI strip with supporting insulator	30	mtr		
i	Supply & Laying of 25mmX 3mm GI strip with supporting insulator	60	mtr		
<b>8</b>	<b>PROJECTOR</b>				
<b>a</b>	Installation of Panasonic EIKI XBL26 including all accessories / Installation materials required.	1	nos		
<b>b</b>	Installation of Ceiling Mount Kit 3ft including all accessories / Installation materials required.	1	nos		
<b>c</b>	Installation of VGA Cable 10Mtrs including all accessories / Installation materials required.	1	nos		
<b>d</b>	Supply and Installation of RC/AV Cable 10Mtrs including all accessories / Installation materials required.	1	nos		
<b>e</b>	Installation of Pull Down Screen including all accessories / Installation materials required.	1	nos		
<b>f</b>	Supply and Installation of VGA Splitter 1 In and 2 out including all accessories / Installation materials required.	1	nos		
<b>g</b>	Installation of TV including all accessories / Installation materials required.	1	nos		
<b>h</b>	S & I of TV socket point flush mounted on wall / partition including cabling till outside the building with connector	2	Nos.		
<b>i</b>	Supply, Installation, Testing and Commissioning of BULLET CAMERA/2 Mega Pixel/4 or 6mm Lens/Multiple Streaming/CMOS/On VIF/POE/H 2.64/30 Mtrs	3	No.		
<b>j</b>	Supply, Installation, Testing and Commissioning of 8 channel 2U standalone Network Video Recorder, Oct core CPU presents the powerful preview, recording, playback and network performance, Up to 4 channel 1080P cameras realtime live view	1	No.		
<b>k</b>	Supply, Installation, Testing and Commissioning of satta HDD 6 TB sea gate ( 15 days to 20 Days)	1	No.		

l	Supply, Installation, Testing and Commissioning of Switch 8 Port	1	No.		
m	Supply & Laying of CAT 6 Cable	60	Rmt		
n	2C x 1.0 Sq.mm	50	Rmt		
o	BNC Connectors,Pins	4	No.		
p	PVC Conduit with accessories	50	No.		
q	<b>Wall mount 6 U Rack with all accessories</b>	1	No.		
9	<b>FIRE ALARM</b>				
a	Supply, Installation, testing and commissioning of wall mounting 2 zone conventional fire alarm control panel Makes: Pinnacle / GST / Ravel.	1	Nos.		
b	Supply and installation of duel tone electronic hooter of 85dB including the cost of mounting accessories complete as per specifications and as required. Makes: Pinnacle / GST / Ravel.	2	Nos.		
c	Supply and installation of dust and vermin proof manual call point to initiate audio visual alarm including the cost of mounting accessories complete as per specifications and as required. Makes: Pinnacle / GST / Ravel.	2	Nos.		
d	Supply and installation of plug -in type photo electric smoke detectors including the cost of base plate. 75mm dia MS outlet box for fixing of the detector base. Mounting accessories etc complete and as per specifications and as required. Makes: System Censor / Ravel	13	Nos.		
e	Supply and installation of plug -in type rate of rise cum fixed temperature heat detectors including the cost of base plate. 75mm dia MS outlet box for fixing of the detector base, mounting accessories etc., complete as per specifications and as required. Makes: System Censor / Ravel	2	Nos.		
f	Supply, Installation, Testing and commissioning of Fault Isolator Modules for 20 no's of devices with MS Powdercoated Housing and mounting accessories	2	Nos.		
g	<b>Supply and fixing of Co2 type Fire Extinguishers 4.5 Kg capacity confirming to IS 2878 made from ISI marked steam less cylinder confirming to IS:7285 &amp; CE certified and fitted with ISI marked controlled valve confirming to IS:3224, high pressure 1 Mtr discharge hose &amp; horn complete with initial gas charged with carrying handle with wheels and wall mounting bracket. Squeeze lever discharge, used un-used indicator, Aphoxy coated paint (Red) with 93% gloss with 2 years warranty Including transportation, all taxes and all labour charges etc complete.Makes : Safex / Kenex / Bharat / Reliance/NewTech</b>	5	Nos.		

10	MISCELLENEOUS WORK				
a	AS BUILT DRAWING Soft copies and 1 sets of A3 colour prints with laminations	2	sets		
b	Supply & Installation of rubber mats of 2000 mm x 600mm & thickness of 10mm 1.1 KV Voltage grade.	2	no.s		
c	Supply , Erection ,testing and Commisioning of 10KVA Microprocessor based double conversion on line UPS System with 3 phase input and 1ph output as per the requirement/ Technical Specifications IGBT INVERTER Excluding Batteries	1	no		
d	Supply , Erection ,testing and Commisioning of startlingly clear images in a more eco-friendly way. High on performance and reliability, yet low on power consumption, it is ideal for projects where there is no room for compromise. 55", Full HD, 350 Cd/M2, HDMI, VGA, USB, DVI-D, RJ-45	1	no		
11	<b>DG SET</b>				
11.1	Supply installation testing and commissioning of 415V, 3phase 50HZ, 4 wire Radiator cooled 62.5KVA DG set with Acoustic Enclosure with 160A TPNMCCB, Control panel with AMF RELAY. The Diesel Engine shall be complete with necessary control and safety devices as per CPCB II & IS/ BS specifications. The Engine shall be suitable for continuous operation of Generator, inclusive of Flywheel, flexible coupling, air cleaner, corrosion resistor, Radiator, fan with guard, Fuel pump, fuel filter, Electronic governor, starting system with separate Battery charger with 2nos 24V sealed low Maintenance Batteries, Voltage regulator, Instrument panel with RPM Indicator, Exhaust silencer (residential), protections against Low Lube oil pressure, high water temperature and with 120Ltrs capacity fuel tank with all pipe connections, fuel lines from Fuel tank to DG set, battery s				
a	62.5 kVA DG Set cost for above item no: 1.1	1	No		
b	AMF panel Incoming 160A MCCB's-2 no's and Outgoing 160A MCCB - 1 no	1	No		
12.0	<b><u>FLUE PIPING AND CONTROL CABLES</u></b>				
12.1	<b>EXHAUST PIPING</b>				
	Supplying, fixing & installing exhaust pipe fabricated out of 5 mm thick Class B MS and all fixing accessories and hardware for the following with 28G, aluminium sheet cladding & 100 mm thick 150 kg / cu M density mineral wool insulation wrapped in chicken mesh including all supporting structure with arrangements like Supporting frames, Hooks, Clamps, Hardware & Fasteners Etc complete as required.				

	100 mm dia MS Exhaust pipe including all necessary long bends, Short bends, Tees, residential silencer Etc. complete with insulation as above, flange, hardware and painting in apporved color & MS -ISMC Channels and Angles supports- for exhaust pipe & residential silencer.	60	Rmt		
12.1.2	Mineral wool / glass wool lagging for exhaust pipe system including aluminium cladding	60	Rmt		
12.1.3	Mineral wool / glass wool lagging for silencers	1	Nos		
12.1.4	Flexible bellows with suitable size of the flange.	1	Nos		
12.1.5	Supply and erection of Exhaust pipe supporting system with ISMC, ISAs complete including red oxide and black enamel painting and RCC foundation	500	Kgs.		
<b>12.2</b>	<b>COPPER CONDUCTOR CONTROL CABLES</b>				
	Supply and terminating of XLPE / SWA / PVC Control Cabling from Main LT panel to DG Synch./AMF panel for mains ( using suitable no. of cores 2.5 sq.mm PVC insulated copper conductor control cable), between engine and DG panel sensing for sensing engine parameters, lub oil level, temperature, speed ,bearing temperature, Including all control cables etc.	1	set - LS		
<b>12.3</b>	<b>DG RELATED MISCELLANEOUS ITEMS</b>				
12.3.1	4.5 Kg co2 type fire extinguisher	1	Nos.		
12.3.2	Supply for first fill of lube oil (Castrol / HPL / IOCL) and diesel of 150 Ltrs.	1	Nos.		
12.3.3	Hand operated fuel transfer pump with flexible hose PVC pipe of 5M length.	1	Nos.		
	<b>TOTAL</b>				



## HVAC WORKS

S.No.	Description of Item	Unit	Qty	Rate	Amount
1	Supplying, installing, testing and commissioning of VRF outdoor units of the following capacities. The scope includes making of suitable MS frames with railing, Channels, required installation accessories such as necessary bolts, screws & nuts, connecting kits etc, complete and necessary Interconnections of Power cables from Out door units panel, and earthing/ Refrigerant connections. The capacity of the Units shall be the nearest rating based on manufacturer.				
	The Outdoor condensing unit comprising of Inverter compressor's, Heat Exchanger, propeller / axial fans, refrigerant Circuit, Safety Devices & Oil Recovery System and in built starter. The starter unit shall be operated both from local and remote. The Refrigerant from the outdoor unit is distributed to the various indoor units thru a set of insulated refrigerant piping network, The outdoor unit shall have the multi-step of capacity control to meet load fluctuation and indoor unit individual control. Unit shall be equipped with an oil recovery system to ensure stable operation with long refrigerant piping. System suitable for Cooling Mode only and for R- 410a / Eqv. Outdoor condensing unit comprising of filter driers, sight glass, liquid receivers, accumulators, Safety Devices, Oil Recovery System with complete charge of gas and recommended oil. The outdoor unit shall be fully capable of working in conjunction with multiple indoor units of various capacities as listed in this BOQ.				
	Refrigerant Circuit shall include an accumulator, liquid and gas shut off valves, ball valves, distribution / refrigerant joints, control valves, and solenoid valves. Unit shall be equipped with an oil recovery system to ensure stable operation with long refrigerant piping. Refrigerant should be R410A and As per Indian Seasonal Energy Efficiency Ratio. The outdoor unit shall be mounted on VI pads to avoid vibrations.				
	The initial Charge of refrigerant gas - R 410 A for all outdoor units as specified				
	Termination for cables & MS Angles fabrication & all necessary clamps, etc for Mounting of Indoor & Out door Units, the MS angle frame as per ODU dimensions and consider 1.5 mtrs height railing all around the ODU with 1 mtr clear space all around the ODU				
i)	16 HP	Nos.	1		
2	Supply of VRV/VRF -4 Way Cassete Indoor Units of the following actual capacities. The scope includes required Cordless/Cord Remotes supports with necessary Panels, bolts, screws & nut set etc, and necessary interconnections with Power supply/ earthing/ Refrigerant Connections Complete as required and as per drawing. The capacity of the Units shall be the nearest rating based on manufacturer				

i)	1.00 TR	Nos.	0		
ii)	1.60 TR	Nos.	6		
iii)	2.56 TR	Nos.	2		
<b>3</b>	Supply of VRV/VRF -Hi-Wall Indoor Units having drainpump of the following actual capacities. The scope includes required Cordless/Cord Remotes supports with necessary Panels,bolts, screws&nutsetc, and necessary interconnections with Power supply/ earthing/ Refrigerant Connections Complete as required and as per drawing. The capacity of the Units shall be the nearest rating based on manufacturer				
i)	1.28 TR	Nos.	1		
<b>4</b>	Supply, installation, testing & commissioning of Stand alone System controller with Display for controlling the indoor & outdoor units from a Remote place for all the circuits.	Nos.	0		
<b>5</b>	Supply, installation, testing & commissioning of Required size/ quantity of Ref.net Joints & Multi kits for Indoor units.	Nos.	10		
	<b>SUB TOTAL A</b>				
	<b>GST @ 28%</b>				
<b>6</b>	Supply, installation, testing & commissioning of 16 SWG copper Refrigerant Piping of various sizes as given below. The rate shall include Copper pipe and insulation with 13 mm Thick Nitrile rubber tube (i.e. As per Unit Manufacturer recomendation) and necessary Installation accessories such as supports and clamps. The sizes given shall be verified by Supplier for adequacy and size based on manufacturer standards.				
i)	6.35 mm dia.	Rmt	25		
ii)	9.52 mm dia.	Rmt	15		
iii)	12.70 mm dia.	Rmt	31		
iv)	15.88 mm dia.	Rmt	32		
v)	19.08 mm dia.	Rmt	14		
vi)	22.22 mm dia.	Rmt	12		
vii)	28.58 mm dia.	Rmt	34		
viii)	34.92 mm dia.	Rmt	0		
<b>7</b>	Supply, installation, testing & commissioning of UPVC heavy duty drain pipe of various sizes as given below. The rate shall include insulation with 6 mm Thick Nitrile rubber tube and necessary Installation accessories such as supports and clamps. The sizes given shall be verified by Supplier for adequacy and size based on manufacturer standards.				
i)	25 mm (ID)	Rmt	38		
ii)	32 mm (ID)	Rmt	15		
iii)	40 mm (ID)	Rmt	12		

<b>8</b>	Supply, laying and commissioning of required size Power and Communication cable with including all accessories and including connecting.				
i)	(3 core x 1.0 Sqmm)Unarmoured Copper FRLS cable / as required for control from indoor units to outdoor units.	Rmt	95		
ii)	(2 Core x 1.0 sqmm)Control cabling for corded Remotes thru FRLS PVC Conduit for Indoor units	Rmt	65		
<b>9</b>	Supply, installation, testing and commissioning of initial Charge of refrigerant gas - R 410 A for all outdoor units as specified above	Lot	1		
<b>10</b>	Pressure testing of the entire system with Nitrogen and vaccumizing the nitrogen for all outdoor units as specified above	Lot	1		
<b>11</b>	Termination for cables & MS Angles fabrication & all necessary clamps, etc for Mounting of Indoor & Out door Units.	Lot	1		
<b>12</b>	GSS Tray type support covered with GI sheet on top for all exposed copper pipes running on terrace/balcony.	Rmt	5		
<b>13</b>	MS Stands for VRV Outdoor units	Kgs	100		
	<b>SUB TOTAL B</b>				
	<b>GST @ 18%</b>				
	<b>GRAND TOTAL(A+B)</b>				

## CIVIL WORKS

S.NO	DESCRIPTION OF ITEM	UNIT	QTY	RATE	AMOUNT
<b>1</b>	<b>DISMANTLING WORK</b>	LS	1		
	Dismantling existing brick wall, old fixtures, soil pipes, water supply pipe, Electrical & AC fixtures, flooring, pcc, skirting, dadoing, plumbing and sanitary fixtures, wall panelling, partitions, false celing, platforms, counters of marble, granite, Doors, Windows, ventilators, Cupboards, Window plywood covering etc. including transportation, all edges, gaps smoothing finishing. No extra payment will be paid. Valuable items to be handover to ECGC management.				
<b>2</b>	<b>AUTOCLAVED AERATED CEMENT BLOCKS MASONRY WORK</b>	Cft	178		
	Providing and laying autoclaved aerated cement blocks masonry with 100 mm thick AAC blocks in super structure above plinth level up to floor V level in cement mortar 1:4 (1 cement : 4 coarse sand ). The rate includes providing and placing in position 2 Nos 6 mm dia M.S. bars at every third course of masonry work.				
<b>3</b>	<b>PLASTERING</b>	Sft	1520		
	15 mm cement plaster on the rough side of single or half brick wall of mix : 1:6 (1 cement: 6 fine sand)				
<b>4</b>	<b>CERAMIC TILE FLOORING</b>				
	Providing and fixing 400mm x 800mm Ceramic Tiles of approved make, quality & shade and pattern as shown in the drg. In CM 1:4 in proper line and level. Rate shall be inclusive of providing and laying necessary PCC and Cement Mortar/Laticrete for a thickness of 3" and joint filling compound of the same shade of the tiles. Basic cost of tile 100/-.	Sft	219		
	Removing of / laying on existing tiles as per Architect directions. No extra payment will be paid.				
<b>5</b>	<b>GLAZED TILE DADO</b>				
	Providing and fixing 400mm x 800mm approved plain shade of Glazed tiles as per pattern for dado from FFL using CM / Laticrete 1:4 in proper line and level as directed by the Bank / Architect as shown in the drawings. The rate shall include necessary backing material, dural nosing for edges, water proofing and joint filling compound of the same shade as that of the ceramic tiles. All sanitary fittings shall be located on the joints or junctions of the tiles. Basic cost of tile 100/-.	Sft	1069		
<b>6</b>	<b>VITRIFIED TILES FLOORING</b>				

	<b>600mm x 1200mm</b>				
	Providing and fixing VITRIFIED Tiles of approved make, shade and pattern as shown in the drwg. / as approved by Architect. In Cement Mortar / Laticrete 1:4 in proper line and level with out spacers for maintaining the grid lines. Rate shall be inclusive of providing and laying necessary PCC and Cement Mortar for a thickness of 3" and joint filling compound of the same shade of the tiles and including pop covering on the new flooring for the protection of tiles with base covering plastic. The rate inclusive of spacers and matching grouting. Basic cost of tile 120/-.	Sft	1573		
<b>7</b>	<b>CEMENT CONCRETE FLOORING</b>				
	62 mm thick cement concrete flooring with concrete hardener topping, under layer 50 mm thick cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) and top layer 12mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix : 2 graded stone aggregate, 6mm nominal size) by volume, hardening compound mixed @ 2 litre per 50 kg of cement or as per manufacture's specifications. This includes cost of cement slurry, but excluding the cost of nosing of steps etc. complete. 12" raised base in concrete for mounting Genset to be considered.	Sft	250		
<b>8</b>	<b>WATER PROOFING (terrace area)</b>				
	Providing & laying water proofing treatment , by applying cement slurry mixed with water proofing cement compound consisting of applying (a) first layer of slurry of cement @ 0.488 kg/ sq.m mixed with water proofing cement compound @ 0.253 kg/ Sq.m. This layer will be allowed to air cure for 4 hours. (b) Second layer of slurry of cement @0.242 kg/ Sq.m mixed with water proofing cement compound @ 0.126 kg/ Sq.m. This layer will be allowed to air cure for 4 hours followed with water curing for 48 hours. The rate includes, preparation of surface, treatment and sealing of all joints, corners, junctions of pipes and masonry with polymer mixed slurry.etc. complete.	Sft	120		
<b>9</b>	Brick bat coba filling in toilet	Ls	1		
<b>10</b>	<b>GRANITE TOP</b>				
	Providing and Fixing imported granite counter of Sindhura Red texture of thickness 19mm gang saw cut and polished as per the directions of the architect. Surfaces like tops, sills & sides. All the edges should be moulded to bullnose/chamfered as per design / drg. The rate shall include necessary cement mortar 1:4, joint filling compound of same colour. Basic cost of tile 450/-.	Sft	74		
<b>11</b>	<b>RCC SLAB</b>	Rft	20		

	Providing and laying 0'4" tk. RCC platform of M20 (1:1.5:3) concrete (2'-0" width clear) . It shall be supported on brick wall. The rate including necessary steel bars to complete				
<b>12</b>	<b>UPVC WINDOWS/ VENTILATORS</b>	Sft	266		
	Providing and fixing factory made uPVC white colour sliding glazed window above 1.50 m in height dimension comprising of uPVC multi-chambered frame with in-built roller track and sash extruded profiles duly reinforced with 1.60 ± 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), appropriate dimension of uPVC extruded glazing beads, uPVC extruded interlocks and uPVC extruded Inline sash adaptor (if required), EPDM gasket, wool pile, zinc alloy (white powder coated) handle on one side of extreme panel along with zinc plated mild steel multi point locking having transmission gear with keeps, zinc alloy (white powder coated) touch lock with hook (if required for wire mesh panel),				
	stainless steel (SS 304 grade) body with adjustable double nylon rollers (weight bearing capacity to be 120 kg), G.I fasteners 100 x 8 mm size for fixing frame to finished wall and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (including 8mm thk. Single / double glass panes and silicon sealant). Variation in profile dimension in higher side shall be accepted but no extra payment on this account shall be made.				
	Two/Three track two/three panels sliding window made of (big series) frame 67 x 50 mm & sash 46 x 62 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead / double glazing bead of appropriate dimension. (Area of window above 2.50 sqm upto 4.00 sqm.) approved brand Fenesta, Apara, Encraft.				
<b>13</b>	<b>SPECIALISED POLYURETHANE SEALANT TREATMENT TO THE EXTERNAL WALLS : (With Joola&amp;Scaffolding )</b>				
	Cleaning of the surface. Making 'V' Groove upto the width and depth of 6mm. Filling of the groove with single component high flexible polyurethane sealant –ROOFSEAL PU (Armstrong ).	Rft	150		

<b>14</b>	<b>SPECIALISED HIGH SOLID, COLD APPLIED, ACRYLIC ELASTOMERIC LIQUID MEMBRANE WATERPROOF COATING TO THE EXTERNAL WALLS : (With Joola&amp;Scaffolding)</b>				
	Cleaning of the surface from dirt, dust and other contaminations. Providing and application of two coats of High solid, cold applied, Acrylic Elastomeric Liquid Membrane Coating with – RAINSEALFLEXICOAT 200 (Armstrong) diluting with 20% of water.	Sft	150		
<b>15</b>	<b>SPECIALISED ACRYLIC POLYMER ELASTOMERIC CEMENTITIOUS WATERPROOF COATING TREATMENT TO THE BATHROOM / TOILETS.</b>				
	Cleaning of the surface from dirt, dust and other contaminations. Providing and applying two coats of Acrylic Polymer Elastomeric Cementitious waterproof coating with –ROOFCOAT FLEXI 100 (Armstrong) mixing with cement as per manufacturers specifications.	Sft	670		
<b>16</b>	<b>SPECIALISED LIQUID CONCENTRATED MICRONISED HYDROPHOBIC CEMENT PLASTERING TREATMENT TO THE BATHROOM / TOILETS :</b>				
	Cleaning of the surface from dirt, dust and other contaminations. Application of two coats of Latex based acrylic polymer bonding agent - ROOFBONDSBR ( Armstrong )mixing with cement as per manufacturers specifications. On wet condition after the bond coat application immediately, providing and laying of micronized hydrophobic cement plastering at 1:4 ratio by mixing with Liquid Concentrated Micronized Cement plastering treatment with –ROOFGUARD 500 (Armstrong ) @ 500ML per bag of 50 Kgs cement at an average thickness of 20mm with neat finish.	Sft	600		
	<b>TOTAL</b>				

## PLUMBING WORKS

SL.NO	DESCRIPTION	Supply & Installation			
		UNIT	QTY	RATE	AMOUNT
<b>A</b>	<b>SANITARY FIXTURES &amp; CP FITTINGS</b>				
<b>1</b>	Supply, Installation and commissioning approved make wash down <b>wall mounted EWC</b> conforming to IS:2556 (Part 16)-2002 with 'P' or 'S' trap with concealed flush cistern fixed in wall with all internal parts of dual flush cistern, ultra-solid seat cover of approved make with rubber buffer and cap all of approved make etc. complete for finished item of work in all respects: White colour. Basic rate 20000/-.	Nos	2		
<b>2</b>	Supply and fixing of approved make 50% of white glazed 410x505x195 mm size Wall Hang Basin .The basin is mounted over GI rag bolts and the basin is fitted with the following CP brass fittings like 32 mm CP brass waste coupling CP brass bottle trap of casted type, 15 mm CP brass angular stop cock with wall flange 01 No's and 15 mm x 450 mm long PVC flexible hose inlet connecting pipe with end nuts for the Cold water connections etc. Basic rate 4000/-.	Nos	3		
<b>3</b>	Installation, testing & commissioning of <b>Pantry sink</b> with single bowl with drain board manufactured from 1mm thick stainless steel, 18G high grade chrome nickel steel with top quality polish,(brush steel finish) 1no.40mm dia Cp waste coupling,with 1no.40mm dia CP Bottle trap with extension pipe, 15mm dia rigid/swing gooseneck spout and necessary CP extension nipples, wall flanges etc.,complete. Basic rate 4500/-.	Nos	1		
<b>4</b>	Installing &testing <b>CP Health faucet</b> of approved make and 2 way bib cock with necessary CP flexible hose, CP wall flange , CP extension nipples etc complete. Basic rate 1100/-.	Nos	2		
<b>5</b>	Fixing approved make <b>CP Double coat hook</b> fixed on wall by using with SS screws in the toilet Area	Nos	2		
<b>6</b>	Supply, Installation and commissioning approved mak white vitreous china urinal basin of 430x260x350 mm and 340x410x265 mm sizes respectively with automatic flushing cistern with standard flush pipe and C.P. brass spreaders with brass unions and G.I clamps complete, including painting of fittings and brackets, cutting and making good thewalls and floors wherever required Basic rate 3000/-.	Nos	2		



7	Fixing of approved make <b>Mirror</b> of having 6 mm thick with copper backing and fixed on to 8 mm thick water proof plywood sheets with CP clamps, CP hooks, CP screws and the sides of the mirror shall be covered with PVC frame of approved colour etc., complete.	Sqm	3.5		
<b>B</b>	<b>INTERNAL PIPING DRAINAGE SYSTEM (SOIL,WASTE&amp; RAIN WATER)</b>				
	<b>TOILET PIPING</b>				
1	Supply, installation, testing and commissioning of approved make <b>type B - SWR PVC</b> pipes and fittings confirming to IS13592 & IS 14735 with with all necessary specials like bends,tees, offsets, doorbends, junctions,cowls etc., laid under floor/fixed on walls etc., complete and necessary supports etc complete .The fittings should be of rubber ring type for shafts and pasted type (solvent cement) for all other locations. <b>Internal Toilet Piping</b>				
	b) 75 mm dia.	Rmt	10		
	c) 110 mm dia.	Rmt	5		
	<b>Make: Hindware / finolex</b>				
2	Supply, installation and testing of PVC pressure pipes (6 Kg/sqcm) confirming to IS 4985 for waste connection from wash basin, kitchen sinks/pantry sinks/janitor sinks/Urinals to floor trap / anti syphonage pipe with solvent cement joints, including all the fittings, laid under floor / concealed in wall etc., the work shall include wall chasing and making good the same in cement mortar necessary supports (Suitable for PT slab) etc., complete.				
	a) 32 mm dia.	Rmt	8		
	a) 40 mm dia.	Rmt	4		
	c) 50 mm dia.	Rmt	2		
	<b>Make: Hindware / finolex</b>				
3	Supplying, installing and testing in position <b>110 PVC floor traps</b> of self cleansing design with outlet size of 75 mm diameter , including making connection with PVC soil / waste pipes using rubber gaskets, and fixing of SS gratings etc., complete all as specified & directed.	Nos	5		
	<b>Make: Hindware / finolex</b> <b>Grating: Intellotech/Chilly</b>				
4	Supplying, installing and testing in position <b>110 PVC Nani traps</b> of self cleansing design with outlet size of 75 mm diameter , including making connection with PVC soil / waste pipes using rubber gaskets, and fixing of SS gratings etc., complete all as specified & directed.	Nos	2		
	<b>Make: Hindware / finolex</b> <b>Grating: Intellotech/Chilly</b>				

<b>C</b>	<b>SHAFT &amp; EXTERNAL PIPING DRAINAGE SYSTEM (SOIL,WASTE&amp; RAIN WATER)</b>				
<b>1</b>	Supply, installation, testing and commissioning of approved make <b>type B - SWR PVC</b> pipes and fittings confirming to IS13592 & IS 14735 with with all necessary specials like bends,tees, offsets, doorbends, junctions,cowls etc., laid under floor/fixed on walls etc., complete and necessary supports(Suitable for Precast slab) etc complete .The fittings should be of rubber ring type for shafts and pasted type (solvent cement) for all other locations. <b>Vertical Downtakes</b>				
	a) 75 mm dia.	Rmt	10		
	b) 110 mm dia.	Rmt	10		
	c) 160 mm dia.	Rmt	10		
	<b>Make: Hindware / finolex</b>				
<b>2</b>	Supply, fixing and testingPVC Rain water Pipe conforming to <b>IS -4985, Class III (6kg/cm<sup>2</sup>)</b> with all fittings like shoes,bends fixed in the pipe shafts (ducts) and basement ceiling with suitable supports etc., complete. <b>Vertical Rainwater Pipes</b>				
	a) 75 mm dia.	Rmt	4		
	b) 110 mm dia.	Rmt	4		
	c) 160 mm dia.	Rmt	4		
	<b>Make: Hindware / finolex</b>				
<b>3</b>	Supply, fixing, testing and commissionig of approved make <b>PVCVent cowl</b> with necessary accessories etc., complete.				
	a)75mm dia	Nos	3		
	b)110mm dia	Nos	3		
	<b>Make: Hindware / finolex</b>				
<b>4</b>	Supply, fixing and testing <b>PVC Rain water collection khurra</b> with leaf trap grating made out of UPVC with flange and grating for rainwater outlets on terrace, complete.				
	a) 110 mm dia outlet	Nos	4		
	<b>Make: Ashirvad</b>				
<b>5</b>	Drilling with <b>core cutting</b> machine in RCC beams, slabs floors etc., for laying pipes and rendering the same in RCC 1:2:4, finishing the same to the satisfaction of the Owner or his authorized representative etc., including nominal reinforcement wherever required, complete. The quoted rate shall also include for providing EPOXY based water proofing compound for sealing the joints around the pipes.				
	<b>RCCslabs(250 mm)</b>				
	100mm dia. upto 150 mm dia.	Nos	1		

6	Constructing Inspection chamber of sizes as mentioned below over 100mm thick CC 1:4:8 leveling course, 100mm thick CC 1:3:6 for foundation with 150mm offset around, 230mm thick brick masonry in CM 1:3 using table moldbricks, 12mm thick plaster on outside, inside surfaces in CM 1:3, providing, fixing frame & cover in 100mm thick RCC 1:2:4 using 20mm metal, finishing top surface with CM 1:3 plaster and finished smooth.	Nos	1		
	600x600mm internal clear dimension with 450x450mm SFRC frame & cover of medium duty (MD-10 grade)				
7	Supplying, installation & construction of best quality Gully trap of size 150mm square with 100mm outlet embedded in plain cement concrete 1:4:8 (20mm metal), providing & fixing 100mm square CI grating on top of the trap, all the above encased in a chamber of 450x450mm built with 115mm thick brick masonry using best quality fly ash bricks in CM 1:3 over a bed of CC 1:4:8 using 40mm down size metal 100mm thick, plastering with CM 1:3, 13mm thick inside, exposed to surface, finished smooth with a floating coat of neat cement, providing & fixing CI/DI frame & cover of size 450x450mm etc., Complete. (for toilet waste water network)	Nos	1		
8	Constructing Catch basin of sizes as mentioned below over 100mm thick CC 1:4:8 leveling course, 100mm thick CC 1:3:6 for foundation with 150mm offset around, 230mm thick brick masonry in CM 1:3 using table mold bricks, 12mm thick plaster on outside, inside surfaces in CM 1:3, providing, fixing frame & cover in 100mm thick RCC 1:2:4 using 20mm metal, finishing top surface with CM 1:3 plaster and finished smooth.	Nos	1		
	600x600mm internal clear dimension with 450x450mm SFRC frame & cover of medium duty (MD-10 grade)				
D	<b>INTERNAL WATER SUPPLY SYSTEM (INCLUDING, SHAFT, TERRACE)</b>				
	<b>TOILET PIPING (Shaft, Terrace, Basement ceiling piping)</b>				
1	Supplying, installing, testing and commissioning of approved make Chlorinated Polyvinyl Chloride pipes (CPVC) up to 50 mm dia SDR.11, ASTM CTS, and above 50 mm dia CPVC schedule 40 ASTM IPS. Fittings up to 50 mm dia SDR 11. The fittings and specials such as tees, elbows, couplers, bends, enlargers etc., with CPVC brass threaded combination / transition specials such as male adapters brass threaded female adapters, brass FPT Tee, Brass FPT elbow etc., where connection with metal is to be made including necessary drilling holes, chasing walls, necessary supports (Suitable for Precast slab) and making the same good in geru mixed cement mortar 1:1 restore the same original condition neatly as directed by the Engineer in-charge. Joints to be made with CPVC solvent cement up to 50 mm dia as per ASTM D-2846 with disinfection and suitable primer & paint. (Concealed in toilet and ceiling level )- <b>INTERNAL DOMESTIC WATER</b>				
	a) 15 mm dia	Rmt	10		

	b) 20 mm dia	Rmt	27		
	<b>Make: Hindware / finolex</b>				
<b>2</b>	Supply and fixing of lever operated ball valve of approved make and provided with suitable CP brass ball and spindle, glass filled teflon seating and gland packing etc., complete. The valve shall be fixed after the union. The quoted rate shall include the cost of the union, nipple etc., complete. <b>(DOMESTIC WATER)</b>				
	a) 20 mm dia	Nos	2		
	<b>Make: Zoloto/Leader/RB</b>				
	<b>TOTAL</b>				

## **ANNEXURE – I**

### **SCOPE OF WORK**

The scope of work shall be generally as given in the Bill of Quantity, summary of items and as mentioned below:

#### **INTERIOR FURNISHING:**

Dismantling/ Removing of existing furnishing, furniture, false ceiling, wooden partitions, panelling, electrical work, door, windows, cabinet, AHU, Ducting etc. And flooring wall and floor, granite, skirting, brick work, plaster, cut out patch repair, pvc spout in balcony, uPvc door, window, sliding, louvers door, partitions, glazed door, flush door, repairing existing door/shutter, panelling, wall paper, Lacquer Glass, paint, p.o.p, false ceiling, plumbing work, piping, sanitary work, geyser, tables and counters, storage cupboards unit, cabinet, overhead storage, mobile compactors storage, locker cabinet, sofa, chairs, company logo, shutter, honeycomb shades, roller blinds, photo frames, artificial plant, grass tufts, outdoor roof cover (awning, green plants (outdoor wall), natural green plants (with pots), anti-birds net, auto sanitizer dispenser, refrigerator, water dispenser, microwave, hot case, rolling shutter, collapsible shutter, dishwasher, induction stove, wall clock, signage, etc.

#### **i. ELECTRICAL:**

Electrical work including all Low & Medium Voltage, Sub Distribution Panels, Distribution Boards, Raceways and Cable Trays, Cables, Mains & Sub Mains, Earthing, Point Wiring, Telephone, Computer, T.V. System, Lighting/ Fixtures, Addressable Fire Alarm and Pa System, fire extinguishers cylinders, Cc Tv, Access Control System, Fire Fighting System, Screen, IP -PBX system, Ups, networking, conduiting, etc.

#### **ii. HEATING VENTILATION & AIR CONDITIONING (HVAC):**

HVAC Work Including Outdoor Unit, Indoor Unit, Cassette Ac – (.8,1,1.3,1.5,2.0) Ton, Hi- Wall Type Indoor, TFA, Y-Joint, Clean Air Filter/Central Controller Refrigerant piping, UVGI Lamp, Air cooled Split Ac

System, MS Stand, Control Cable, Air Distribution, Duct Damper, Grills, Air Diffusers, Thermal Insulation, Louvers, Inline Fans, etc.

Contractor shall maintain open format drawing and person at site, to incorporate updates from site working conditions. Shall submit such drawing revisions as Drawing R/A Bill 1, 2, 3 and final.

iii. **CIVIL & BOUGHT OUT ITEMS:**

Civil & Bought out items to be executed in financial bid.

## **ANNEXURE-J**

### **DRAFT CONTRACT**

**THIS CONTRACT ("Agreement")** is made and executed in ....., on this \_\_\_\_ day of \_\_\_\_\_, 2023

#### **BY AND BETWEEN**

**ECGC Limited**, a Public Sector Enterprise wholly owned by Govt. of India and a company duly incorporated under the provisions of the Companies Act, 1956 having Corporate Identity Number U74999MH1957GOI010918 and PAN No. AAACE296K having its Regional office at ----- hereinafter referred to as "The Company" through its authorized representative ..... (Name/Designation) (which expression shall unless it be repugnant to the context or meaning thereof be deemed to mean and include its successors in business and assigns) of the **FIRST PART**.

#### **And**

\_\_\_\_\_, a Company/ Firm, with PAN No..... and having its Office at \_\_\_\_\_ hereinafter referred to as "**The Vendor**" through its authorized representative \_\_\_\_\_ (which expression shall unless it be repugnant to the context or meaning thereof be deemed to mean and include its successors in business and assigns) on the **OTHER PART**.

Both the Vendor and the Company shall individually be referred to as Party and collectively be referred to as Parties.

#### **WHEREAS:**

- A. The Company is in the business of providing credit risk insurance and related services for exporters and banks and has several branch offices all over the country. The Company is intending to engage services for Office Interior furnishing, Electrical, Heating, Ventillation and Air Conditioning (HVAC) and allied civil works

in its office situated at ECGC Ltd., Second Floor, HACA Bhavan, Opp. Public Gardens, Saifabad, Hyderabad 500 004 ( “**Purpose**”):

- B. The Vendor has represented to the Company that it has the requisite expertise and resources to provide the Services and has come out as the Successful bidder to the Tender having Reference no ECGC/Tender-01/Hyd/2023.
- C. Based on such representations, the Company has engaged the Vendor to perform the Purpose, and the Vendor has agreed to provide such professional Services to the Company, as per the terms of this Agreement.

**NOW THESE PRESENT WITNESSETH AND IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:**

1. AGREEMENT PERIOD:

- a. The term of the Services shall be valid and operative for a period of ....., commencing with effect from ..... till ..... unless terminated earlier in accordance with the provisions of this Agreement.

2. SCOPE OF SERVICES:

As mentioned at Clause 4.2 of Section 4 of TCC and Annexure – I of the NIT.

3. NOTICES:

All notices, requests and other communications to any Party hereunder shall be in writing either by hand delivery/postal/courier to their respective addresses mentioned above or through an email as hereunder;

For Vendor:

For Company: .....

- 4. Both the Parties agree to the conditions mentioned in the Tender Document dated 17.02.2023 under Reference no. ECGC/Tender-01/HYD/2023. Such Tender document shall form part of this agreement.



5. Both Company and Vendor shall sign such further and other documents, cause such meetings to be held, resolutions passed and do and perform and cause to be done and performed such further and other acts and things as may be necessary or desirable in order to give full effect to this Agreement and every part thereof.

IN WITNESS WHERE OF THE PARTIES HERETO HAVE HEREINTO SET AND SUBSCRIBED THEIR RESPECTIVE HANDS AND SEALS, THE DAY, THE MONTH AND THE YEAR FIRST HEAREINABOVE WRITTEN.

Signed, sealed and delivered in presence of:

On behalf of ECGC Ltd.	On behalf of <u>Vendor</u>
Signature_____	Signature_____
Name:	Name:
Designation	Designation
Address:	Address:
Witness	Witness
Signature_____	Signature_____
Name:	Name:
Address:	Address: