NOTICE INVITING TENDER FOR OFFICE INTERIOR FURNISHING, ELECTRICAL, HEATING VENTILATION AIR CONDITIONING (HVAC), OFFICE FURNITURE, EPAX INTERCOM SYSTEM, UPS, CCTV, SMOKE DETECTOR, FIRE ALARM SYSTEM & MISCELLANEOUS ITEMS WORKS

ECGC

(A Government of India Enterprise)

You focus on exports. We cover the risks.

TIRUPUR BRANCH

346/347, 1ST FLOOR, KRE TOWERS KUMARAN ROAD, TIRUPUR – 641 601.

Ref: ECGC/TIRUPUR /Tender /01/2023

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SECTION 1

1. Introduction

1.1 Invitation to Bidders

By way of this NOTICE INVITING TENDER ('**NIT'**) Document (hereinafter 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 / PSUInsurance companies for **Office Interior Furnishing, Electrical, Heating Ventilation & Air Conditioning (hereinafter referred as 'HVAC') Office Furniture EPAX intercom System, UPS, CCTV, Smoke Detector, Fire Alarm System & Miscellaneous items Work.** in an office space area of 5008 square feet **located at 346/347, 1st floor KRE Towers Kumaran Road, Tirupur – 641601.**

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.

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	16/06/2023
Bid Document Availability	The Bid Document can be downloaded from website up to 06/07/2023
Earnest Money Deposit	Rs.4,00,000/- only
Pre-bid Queries (if any)	27/06/2023 at ECGC Ltd., Tirupur Branch, 137/2 1st & 2nd Floor, CG Complex, Kumaran Road, Tirupur – 641 601.
Address for Communication and submission of bid	ECGC Ltd., Tirupur Branch, 137/2 1st & 2nd Floor, CG Complex, Kumaran Road, Tirupur – 641 601.
E-mail & Phone no.	tirupur@ecgc.in 0421-2232998/2233444
Date and time limit for receipt of bids	06/07/2023 up to 17:00 hours.
Date & Place of opening of Technical Bid / Pre- qualification Bid	07/07/2023 at 15:00 hours. ECGC Ltd., Tirupur Branch, 137/2 1st & 2nd Floor, CG Complex, Kumaran Road, Tirupur – 641 601.
Date of opening of Financial Bid	Within 15 (fifteen) 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 or 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 and expenses 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 Government. Financial Institutions / Banks / Government/Semi- Government Departments/ regulator/ statutorybody/ 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:

3.3.4. Bidder shall produce credential in the form of work orders & completion certificate of at least 1 (one) similar nature of work in Tirupur or Tamil Nadu of the minimum value of Rs. 250.00 Lakh put to tender during last 5 (five) years prior to the date of issue of this tender notice.

or

3.3.5. Bidder shall produce credentials in the form work orders & of completion certificate of 3 (three) similar nature of work in Tirupur or in Tamil Nadu of the minimum value of 125 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 Work Orders and 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.

iii) Completion certificate of any similar work carried out for a PSU for a minimum value of Rs.50 lakh (if any) may also be furnished in addition to above documents.

3.3.6. 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**.

3.3.7. 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.

3.3.8. 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.

3.3.9. 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.

3.3.10. Bidder can be from any part of India, but should have a local functioning administrative office in the state of Tamil Nadu which shall be at least a minimum of 5 years old. 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 – Shri K Rajendran, Assistant General 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. 4,00,000/- (Rupees Four Lakh Only) in favor of ECGC Ltd. payable at Tirupur, for "Notice inviting Tender for Office Interior furnishing, Electrical, Heating, Ventilation and air conditioning (HVAC) office Furniture, EPAX intercom system, UPS, CCTV Smoke Detector, fire Alarm System and Miscellaneous items works. at ECGC Ltd.'s Tirupur 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) office Furniture, EPAX intercom system, UPS, CCTV Smoke Detector, fire Alarm System and Miscellaneous items works. at ECGC Ltd.' Tirupur 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) office Furniture, EPAX intercom system, UPS, CCTV Smoke Detector, fire Alarm System and Miscellaneous items works. at "ECGC Ltd.'s Tirupur 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) office Furniture, EPAX intercom system, UPS, CCTV Smoke Detector, fire Alarm System

and Miscellaneous items works. at ECGC Ltd.'s Tirupur 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, Tirupur branch, 137/2, 1st & 2nd Floor, CG Complex, Kumaran Road, Tirupur – 641 601, Up to 5.00 PM. on 06/07/2023 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 first 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 (seven) 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 tirupur@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.

3.21 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 Tirupur. 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 (seven) 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 has to be carried out in an empty premises & can be executed around the clock without causing any disturbance to the neighbours, all necessary clearances including police permissions to carry out work during the night shall be obtained by the successful bidder.

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 Interior furnishing, Electrical, Heating, Ventilation and air conditioning (HVAC) office Furniture, EPAX intercom system, UPS, CCTV Smoke Detector, fire Alarm System and Miscellaneous items works. at ECGC LTD, No:346,347 1sf Floor, KRE Towers, Kumaran Road, Tirupur – 641 601

viii. “The Project Site” means designated locations of the Company as may be specified in Contract.

ix. “Departmental Schedule” means the 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 07 (seven) days from the date of acceptance of tender award letter.

xi. “Start date” means the date of start of the work; which shall be 07 (seven) 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 and air conditioning (HVAC) office Furniture, EPAX intercom system, UPS, CCTV Smoke Detector, fire Alarm System and Miscellaneous items works. at ECGC LTD**, **No:346,347 1sf Floor, KRE Towers, Kumaran Road, Tirupur – 641 601** 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 prior 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 scare / 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 (ten) 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 (ninety) days from the date of handing over of site by ECGC.

4.5 Co-operation and safety

4.5.1 All works are to be carried out by the Vendor who 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 where 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 any 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 If the work is suspended by reason of rain, strike, lockouts or any other cause, the contractor shall take all necessary precautions and care for the protection of work and at his own expenses and 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 a period 15days of honoring the 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 the 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 (seven) 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 other 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 (twelve) 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 (seven) 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 Tamil Nadu; 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 License 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 (fifteen) 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 Tirupur, 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

Sr No	Description	Details	
1	Name of the Company/ Firm/ Individual		
2	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>	
3	Registered Physical Address		
4	Correspondence Address		
5	Business profile of the company/firm (attach a separate write-up or brochure regarding business activities of the company/firm)		
6	Date of incorporation		
7	Board of Directors/ Management/ Promoters/ Partners/ Proprietor	(i)	
		(ii)	
		(iii)	
		(iv)	
		(v)	
8	Contact Person Details (Name, Landline and mobile Number, e-mail id)		
9	E-mail id of the bidder,		
10	PAN of the bidder	<copy required>	
11	TIN of the bidder	<copy required>	
12	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 shouldbe 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 itsletter 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 itsletter 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	Ongoing projects	Number: Value: Details: Start date: Name of party/entity: Nature of Work:
21	Any penalty imposed for delay or no-completion in past 5 years	Details
22	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-

S.No.	Financial Year	Turnover from renovation and repairing work [Rs in Lakhs]	Turnover from all other sources (Rs in Lakhs)	Remarks
1	2017-18			
2	2018-19			
3	2019-20			
4	2020-21			
5	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 the Company 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 Ltd.,
Tirupur Branch,
137/2 1st & 2nd Floor, CG Complex,
Kumaran Road, Tirupur – 641 601

Dear Sir/Madam

SUBJECT: RESPONSE TO THE REQUEST FOR PROPOSAL FOR "INTERIOR FURNISHING, ELECTRICAL, HEATING, VENTILATION AND AIR CONDITIONING (HVAC) OFFICE FURNITURE, EPAX INTERCOM SYSTEM, UPS, CCTV SMOKE DETECTOR, FIRE ALARM SYSTEM AND MISCELLANEOUS ITEMS WORKS., AT ECGC LTD, 346/347, 1ST FLOOR, KRE TOWERS KUMARAN ROAD, TIRUPUR – 641 601

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 the 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 Ltd.,

Tirupur Branch,

137/2 1st & 2nd Floor, CG Complex,

Kumaran Road, Tirupur – 641 601

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: **"INTERIOR FURNISHING, ELECTRICAL, HEATING, VENTILATION AND AIR CONDITIONING (HVAC) OFFICE FURNITURE, EPAX INTERCOM SYSTEM, UPS, CCTV SMOKE DETECTOR, FIRE ALARM SYSTEM AND MISCELLANEOUS ITEMS WORKS.",** at the following address: ECGC Ltd, 346/347, 1ST FLOOR, KRE TOWERS KUMARAN ROAD, TIRUPUR – 641 601 mentioned on behalf of M/s.____ (Name of the Bidder) in theorder 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 " **INTERIOR FURNISHING, ELECTRICAL, HEATING, VENTILATION AND AIR CONDITIONING (HVAC) OFFICE FURNITURE, EPAX INTERCOM SYSTEM, UPS, CCTV SMOKE DETECTOR, FIRE ALARM SYSTEM AND MISCELLANEOUS ITEMS WORKS.** at ECGC LTD, 346/347, 1ST FLOOR, KRE TOWERS KUMARAN ROAD, TIRUPUR – 641 601 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	53- 95
2	PART-B	ELECTRICAL	96 - 135
3	PART-C	HVAC, TECHNICAL & MATERIAL SPECIFIATIONS	136 - 194

BILLS OF QUANTITY

SUMMARY			
S.NO	DESCRIPTION OF ITEM	PAGE NO	AMOUNT (RS)
1	FURNISHING WORK	195-204	
2	ELECTRICAL & DATA CABLING WORK	205-214	
3	AIR CONDITIONING WORK	215-221	
4	SUPPLY & INSTALLATION OF GODREJ MAKE FURNITURE	222-234	
5	SUPPLY & INSTALLATION OF EPABX INTERCOM SYSTEM	235	
6	SUPPLY & INSTALLATION OF UPS	236	
7	SUPPLY & INSTALLATION OF CCTV	237	
8	SUPPLY & INSTALLATION OF SMOKE DETECTOR & FIRE ALARM SYSTEM	238	
9	SUPPLY & INSTALLATION OF MISCELLANEOUS ITEMS	239-241	
	TOTAL (EXCLUDING GST)		

SPECIFICATIONS – PART A

INTERIOR FURNISHING

1.0 GENERAL DATA

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 BOQ, in writing only with CC to Owner.

1.1 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 BOQ 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

1.2 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 bought 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.

1.3 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.

1.4 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.

2.0 CIVIL WORKS:

i) All work shall be done strictly according to the items described in the schedule of quantities & rates and as per latest applicable CPWD specifications or latest BIS Codes. In the event of any item not finding a place in C.P.W.D. specification or in BIS codes, the matter will be referred to the Architect for decision. The decision of Architect shall be final regarding the

specifications to be adopted. All Standards, codes, Technical Specifications, Codes of Practice referred to shall be of the latest editions including all applicable official amendments and revisions whether such reference has been made or not.

ii) Testing of materials / works shall be carried out as per latest CPWD specification / BIS codes from approved test laboratory. The contractor shall carry out all such tests at his own cost & time. The nos. of samples to be submitted for testing and the frequency of testing shall be as specified in the specifications / standards or codes.

iii) All the works shall be carried out in accordance with drawings, specifications, description of item in schedule of quantities or as per the direction of ARCHITECT to his full satisfaction. If the substitution of any approved / specified material and make, due to its non – availability, with an alternative one, becomes necessary, the agency must get specific approval of the same before placing order for purchase of materials.

iv) Providing and operating necessary measuring and testing devices and materials are included in the Contractor's scope of work. The quoted price shall be inclusive of the cost of all such tests, which are required to ensure achievement of specified quality. No separate payment for testing shall be made.

v) All finished work must be truly vertical & horizontal or in any other plane as specified. The rates quoted by the agency must include the cost for taking necessary measures to achieve it.

vi) Any scaffolding used shall be of double vertical supports and no portion of scaffolding shall touch the wall surface.

vii) The workmanship is to be the best available and of a high standard. Use must be made of special trades men in all aspects of the work and allowance must be made in the rates for so doing. Contractor shall maintain uniform quality and consistency in workmanship throughout.

viii) Any work not conforming *to* specifications or workmanship shall be rejected and the same shall be rectified or removed and replaced with work of the required standard of workmanship at no extra cost to the employer.

ix) Rates quoted *for* the items shall be valid for carrying out the item of work at any and / or all floor heights.

3.0 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.

3.1 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.

3.2 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.

3.3 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

4.0 VITIFIED /GLAZED/CERAMIC TILE AT FLOOR/ DADO

The samples of tiles/ slabs 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.

5.0 WALL FINISHES

5.1 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.

5.2 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.

5.3 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 wire mesh strips 400mm wide or as shown, installed before plastering.

5.4 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.

5.5 SAMPLES

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

5.6 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.

5.7 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.

5.8 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.

5.9 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.

5.10 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.

5.11 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.

5.12 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.

5.13 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.

5.14 APPLICATION

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

5.15 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.

6.0 UPVC/ ALUMINUM WORK

6.1 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.

6.2 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.

6.3 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.

6.4 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 bernetallic 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.

6.5 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 or in boiling water cold sealing process as per IS 1868/IS 6057. Polyethylene tape protection shall be applied on the anodized section before they are brought to site. All care shall be taken to ensure surface protection during transportation, storage at site and installation. The tape protection shall be removed on installation.

6.6 GLAZING:

Glazing shall comprise of reflecting bronze or approved shade tinted or heat reflective float 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.

6.7 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 execution of work.

6.8 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/expansions bolts of approved make in approved manner. Special concrete blocks with cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 stone aggregate 10 mm size) with 3mm thick M.S. plate 100 x 100mm shall be cast set at suitable places into the jambs of openings. Door and windows frames shall be welded to the blocks with spaces in approved manner.

The contractor shall be responsible for assembling composites, bedding, and pointing with mastic inside and outside at the mullions and transoms, fixing lugs to the frames, placing the doors/windows in their respective opening and bedding with mastic. The contractor shall be responsible for all 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.

6.9 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.

7.0 PLYWOOD

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

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

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

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

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

8.0 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 be commercial hardwood type ready for lamination or painting.

8.1 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.

8.2 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.

8.3 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 be securely 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, the members shall be lapped or jointed by GI straps or extra wood blocks. All joints shall be done with neatness and as approved and directed by the Architect.

9.0 PARTITIONS AND CABINET WORK

General:

Partitions, cabinets, etc. shall be fabricated and workshop as far as practicable and then brought inside the building ready to set in place. The various members shall be worked in the best manner known to the trade, mortised and tenoned, doweled, blocked, and glued together 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. Drawer front, 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. Quoted rate shall include labour/materials required to fix the sub-frame to the wall with MS flats ('L'/ 'U') shape clamp with adequate screws and repairing the portion damaged while putting the gutties. etc. and making good the same. Quoted rate shall be inclusive of making provisions for electrical conduits and switch boxes and time required while coordinating with other Contractors for the final finishing of the work. All electrical works shall be got carried out through licensed "A" class Electrical Contractor having experience of similar work and duly approved by Architects/ ECGC Ltd . The work shall be executed as per specifications and strictly in keeping with relevant IS code and rules and regulations of authorities. All work/materials will be as per good engineering practice. Wherever glass is mentioned it will be clear float glass.

WOOD WORK AND JOINERY:

PLY WOOD:

Ply wood shall be BWR quality phenol bonded as per relevant Indian Standard Specifications with commercial or decorative facing as required. These shall be obtained from approved sources and thickness shall be as shown in drawings.

BLOCK BOARDS:

Block board shall be Grade-I exterior grade bonded with BWR type synthetic phenol bonded adhesives. These shall be of the required thickness and type and obtained from approved sources.

LAMINATE:

Laminates where specified shall be of approved brand type, texture and thickness and manufacturer as per IS:2046-1969.

Fixing of laminates shall be done as per best trade practices and strictly as per printed instructions of the manufacturers using phenol Formaldehyde Synthetic Resin adhesive of approved make. Unless otherwise indicated laminated shall be 1.0 mm thick of approved make.

JOINERY:

All details shall conform to the drawings, but all measurements shall be checked at site. The scantlings shall be accurately planned and finished smooth to hold full dimensions shown in the drawings after finishing and rebates, roundings and mouldings made before they are framed. No patching or plugging of any kind shall be prepared and got approved by the Engineer before proceeding with bulk manufacture.

IRONMONGERY:

This section shall cover all finish hardware, latches, locks and other fittings and fixtures etc., used in wood doors. All finish hardware shall be well made, reasonably smooth, and free sharp edges and corners flaws and other defects and shall be as per relevant Indian Standard Code. Unless otherwise required all finish hardware shall be polished brass.

All hardware shall be of approved make and shall be specifically got approved by the Engineer before ordering. No fittings and fixtures shall be fixed before all major work is over. While fixing correct handling of fixtures shall be ensured.

All finish hardware shall be fixed by skilled carpenters experienced in this work. Work shall be done as per manufacturer’s printed instructions and to the satisfaction of the Engineer.

All hardware fixed to respective locations shall be adequately protected from damage and splashes of mortars and paints by covering suitably with Jute clothes/Black PVC sheet till handling over of the work to the Engineer/Owner to his satisfaction. The finished hardware shall be absolutely clean without any foreign materials and fully showing original finish in its best condition.

VERTICAL BLINDS:

Vertical blinds shall be 100mm wide scotch guard cloth of approved shade & colour Pull cords shall be 1.7 mm di braided nylon with a core of rayon threads.

The Blinds shall be operable in any direction with a tilt up to 180 degrees and can slide to one side for opening purposes. All metal parts shall be corrosion-resistant and rotating parts shall be self-lubricating. The fixing of the top rail shall be with special GI brackets at approx. 1 mt. Centre to centre.

The installation shall be done by expert workmen approved by the suppliers, strictly as per manufacturer's printed instructions. The installed blinds shall stay flat and in plum in one line and shall operate smoothly to the approval of the Consultant/ ECGC Ltd.

9.1 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 isolated wood from masonry wherever practicable. All concealed wood etc. shall be treated fully and liberally with solignum before placing in position.

9.2 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".

9.3 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.

9.4 HARDWARE

9.4.1 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.

9.4.2 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.

9.4.3 SAMPLES

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

9.4.4 QUALITY

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

9.4.5 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.

9.5 PAINTING

9.5.1 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.

9.5.2 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

9.5.3 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.

9.5.4 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.

9.6 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.

9.7 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.

9.8 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 sprit 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 sprit at the rate of 1.5 kg. of whiting to one liter of sprit. 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 paid 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 price of clean fine cloth, damped with methylated sprit and applied by light rubbing. The finished surface shall have a uniform texture and high gloss.

9.9 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 carpenters 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 flossy finish as approved by the Architect.

9.10 FIRE RESISTANT COATINGS ON WOODWORK

9.10.1 General:

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

9.10.2 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.

9.10.3 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 BOQ.
4. Each cabinet shall be powder coated handle, Godrej, lock/spring loaded hinges brass ball catches and shutter to be fixed using hinges of approval quality.
5. 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.

9.10.4 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.

10.0 UPVC DOOR AND WINDOW

10.1 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.

10.2 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.

10.3 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.

10.4 FIRE RESISTANCE:

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

10.5 QUALITY CONTROL:

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

10.6 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.

10.7 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.

10.8 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.

10.9 WINDOW PERFORMANCE:

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

10.10 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.

10.11 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.

10.12 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.

10.13 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.

10.14 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.

10.15 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.

10.16 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.

10.17 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.

10.18 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.

10.19 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.

10.20 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.

10.21 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.

10.21.1 Touch Lock:

These are handles which lock the sliding windows on pushing the slider.

10.21.2 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.

10.21.3 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.

10.21.4 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.

10.22 D Type Handle:

10.23 Single Roller:

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

10.24 Double Roller:

Use roller made with Zinc Alloy & copper using bearing in the roller to ensure smooth functioning & to take heavy loads

10.25 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.

10.26 Sliding Gear:

Used for Sliding Windows & Doors. When the handle is locked the window is locked at 2 – 3points 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.

10.27 Openable Door & Window:

The following hardware's are used in Openable Doors & windows.

10.28 Single Point Lock Handle:

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

10.29 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.

10.30 Openable 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.

10.31 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.

10.32 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.

10.33 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.

10.34 Both Side Door Handle:

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

10.35 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 SS 304.The thickness of the friction hinge is 2 & 2.5 mm with height 16 mm & backset 18 mm.

10.36 75 mm Window Hinge:

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

10.37 100 mm Door Hinge:

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

10.38 Door Hinges:

Used 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.

10.39 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.

10.40 2D Hinges:

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

10.41 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.

10.42 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.

10.43 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.

10.44 Cylinder both side key:

Required Cylinder is made of Complete Brass and is 80mm long.

10.45 Double sash door bolt:

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

10.46 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 modules 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.

10.47 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.

10.48 WARRANTEE:

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

10.49 TECHNICAL SPECIFICATIONS

S.NO	TECHNICAL SPECIFICATION	
I	Impact strength down to 400C	No breakage
ii	Notch impact strength	> 30 kJ/m2
iii	Ball impact hardness	100 N/mm2
iv	Tensile strength	> 40 N/mm2
v	E module	> 2500 N/mm2

Vi	Linear Thermal Expansion	Coefficient 300C to+500C 0.80 x 10-4 K-1
vii	Thermal Conductivity	0.16W/mK
viii	Specific volume resistance	10 16 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/m2 irradiation energy better than authenticity grade 4 of grey scale

11.0 POP and False ceiling items

11.1 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.

11.2 Location:

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

11.3 Material:

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

11.4 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.

11.5 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, screw fixed 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 fastner, 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.

11.6 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.

11.7 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 W/M0k 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.

11.8 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 Centre 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.

11.9 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.

11.10 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.

12.0 LIST OF APPROVED MAKE:

S. No.	Item	Description
1.	Verified Tiles	Nitco, Kajaria, AGL, Varmora
2.	Engineers Marble/ Composite Marble	(16 Mm Thick Marble Stone Slab) AGL Or Equivalent.
3.	Ceramic Tiles	Kajaria, Nitco, Somany, AGL, Varmora.
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 tore steel.
8.	Structural Steel	Sail, Tisco, Ispat , Tata
9.	Ready-Mix Concrete	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 , Lingel , Aaloplast or equivalent.
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 For Fixing	Shall Be Dash Fasteners Of Appropriate Size By Hilti Or M/S. Dev Ashish Trades Or Approved Eq. New Delhi.
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, Archid Marino or equivalent
28.	Veneer	Green , Duro , Century, Timex,Archid or equivalent
29.	Adhesive	Fevicol, Araldite, Anchor or equivalent
30	Solid Surfaces (Curion)	DUPOINT/HI-MAC/ LG 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) Gate Valve	Leader, Sant, Zoloto
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/Ici.
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	Dish Washer	Bosch, Samsung OR equivalent approoved
63	Auto Sanitizer Dispenser	Puremist / Equivalent Make/Range

12.0 WALL PANELLING

12.1 MATERIAL

Material received at site shall be of approved quantity and with marking. Without approval no material shall be ordered. Received material shall be handled with due care to protect against any harmful loading, unloading shifting, storing. Place of stone shall be well ventilated, dry and covered to prevent damping and moisture contamination.

12.1.1 Timber

The timber shall be of the best of its kind available, properly seasoned and of mature growth. It shall be free from decay and insect attack, saps, warps, cracks, knots & knot holes and any other defects which may affect the looks or harm the strength of the member. All the timber shall be seasoned as per CPWD Specifications.

12.1.2 Plywood

(i) Unless otherwise stated, only BWR / BWP grade plywood boards shall be used. Plywood shall comply with standards and specifications. Face veneers may be either commercial or decorative on both sides or one side commercial and the other decorative. Type of face veneer and grade of plywood boards shall be, as specified.

(ii) CROSS GRAIN/ LONG GRAIN FLEXIPLY: - Shall have flexibility and high bending quality. It can be cold formed to curved surface requirements. Made of gurjan species, exclusively with phenolic resin and conditioned to undergo any sort of rigorous climatic changes such as alternate wetting and drying. Shall not require any external heat or water sprays which are the conventional for post forming.

ELASTICITY: - Cross grain 200N/mm^2

(iii) DENSITY: - 0.75gm/cc

(iv) BENDING RADIUS: -

6mm	10mm diameter
8mm	12mm diameter
12mm	30mm diameter

12.1.3 Block boards:

All Block boards and formed boards shall be of specified thickness, uniform in colour texture, finish. They shall comply to IS code and shall bear IS marking. They shall be pressed with exterior quality phenol formaldehyde resin in hot press. Unless otherwise stated, grade I (Exterior grade) block board shall be used for construction. Face veneers shall be commercial on both faces.

12.1.4 MDF Boards

(i) MDF of exterior grade with no VOC content shall be used. All MDF board where specified shall be Phenol Formaldehyde bonded and generally conform to IS code and shall bear IS marking.

(ii) MDF Boards shall not be used in wet areas such as toilets, bathrooms etc. and location subject to direct water. At every joint of the cladding an expansion gap of 3mm to 6mm should be provided.

12.1.5 Laminate Sheets

Laminate shall be of the brand, catalogue surface finish, colour as specified and approved by the Architect. All laminates shall be in finish as per design intent unless mentioned otherwise. Laminates shall comply with standards and specifications.

12.1.6 All fittings and fixtures shall be as specified in Schedule of Items or on drawing by Architect. Approved makes only shall be used for respective items. Fittings shall be guaranteed by the manufacturer for its performance.

12.1.7 Adhesives and glue shall be as per IS for exterior quality and water repellent.

12.1.8 Fabric shall be of approved make and shade and fixed with approved adhesive as specified by Architect. Wall fabric shall achieve Class 1 surface spread of flame.

12.1.9 Fasteners: All fixing anchor, bolts, screws, nuts, washers or other miscellaneous anchoring/ fixing devices shall be of nonmagnetic stainless steel and approved by Architect and shall provide adequate strength.

12.1.10 High Pressure Laminate (HPL) / compact laminate Panels

Compact Laminate shall be as per IS 2046 (Indian Standard) and as per fire retardant BS-476/97 standard. The solid compact laminate (Phenolic Core Board) shall be based on thermostatic resin, homogeneously reinforced with cellulose fiber and laminate on both side with suede finish, scratch and impact resistant, to achieve the cubicles dimensions joint-less partitions.

1 mm thk BRTISH BUFF / stone laminate laminate of Marino / Greenlam approved colour, make as approved, glued with approved phenol formaldehyde based adhesive or approved equivalent overlaying on substrate without any gap/air bubbles pressed uniformly to line level and plumb, item complete with all edge lipping with water based PU TW lipping mounted flush to surface as per detailed drawings and Architects recommendations: all accessories, fixing implements , men material and lift upto 6 mtrs. Finished complete with all necessary masking with avg. mim 10mm wide masking tape before applying polish to edge lipping and getting mock up approved by Architect /Engineer in charge. Item to include protecting finished item by avg. 20 microns thk polythene sheet till handover of facility complete

The cubicle system will be equipped with heat and bacteria resistance. The modular cubicle shall possess 100% resistant properties towards: Water, chemical, impact.

Following criteria shall be involved in selection of compact laminate

a) No solvent are used in production
b) No heavy materials are used.
c) The energy requirements during curing are extremely low.
d) Recycling is possible.
e) More than 60% of raw materials are renewable.
f) The durability of the product ensures the performance of the composite throughout its entire life cycle.

I. PLYWOOD

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

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

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

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

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

II. 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 be commercial hardwood type ready for lamination or painting.

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.

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.

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 be securely 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, the members shall be lapped or jointed by GI straps or extra wood blocks. All joints shall be done with neatness and as approved and directed by the Architect.

III. PARTITIONS AND CABINET WORK

General: Partitions, cabinets, etc. shall be fabricated and workshop as far as practicable and then brought inside the building ready to set in place. The various members shall be worked in the best manner known to the trade, mortised and tenoned, doweled, blocked, and glued together 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. Drawer front, 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 69 mm thick Everest drywall partition system, which include "Everest Steel" G.I framework (180GSM Galvanizing; 345 Mpa Yield Strength), comprising of 51mm Floor and Ceiling track profile, 0.5mm thick, having two equal flanges of 32mm, fixed to the floor and ceiling, in plumb with each other, with sleeves and screws at 610mm; Vertical G.I studs of size 51mm, 0.5mm thick, having one flange of 42mm and another flange of 44mm and two equal lips of 5mm insert fixed into the track profiles at 610mm centers.

9mm Everest Heavy Duty Fibre Cement board (Confirming to IS 14862; Type - B) are screw fixed to the either side of the framework with 25mm drywall screws, respectively, at 300 mm centers. Glass wool of 48kg/m3 density and 50mm thickness will be placed in between the cavity of frame.

Jointing and Finishing: Finally edges of the board are to be jointed and finished so as to have a flush look which includes filling and finishing with Everest compound of std. make with Self adhesive Fiber glass mesh tape

8.2. WPC (wood polymer composite)

Amer Profile panels of wood polymer composite panel of size i.e. 213 mm wide and 21 mm total thickness and length 2500 mm as shown in drawings. The color and patteren of the WPC panels shall be (wenge dark brown wood color) or approved by architect. The reputed brands for WPC shall be its color appearance, thickness, width and length, falling mass impact resistance, heat Reversion etc. These panels shall be fixed with aluminum sections of size 25mmx37.5 mm filled with wooden packing to hold screws and then fixed to the main structure members. Complete in all respect as approved by architect and engineer in charge.

8.3 Glass partition

Glass partition of 10mm Toughened Glass using slim line System-45 Frames clip in profile to a height of maximum 3m or as per drawing. The Fixed glass to be fixed using BP45 Profiles at Top & Bottom & fixed frame cleat . The profile size to be 45x20MM to be fixed on to the floor/ ceiling as per the architect design. H Junction profile to be used at all Glass to Glass vertical joints, 90 Deg L Junction Profiles and T Junction profiles necessary as per design. In case of Glass overall panel MP45 & BP45 Over panel Profile to be used. The EPDM rubber shall be used for fixing glass of 10 mm .The Profile shall be matt natural anodized, the Profile Manufacturer to supply all the necessary clips, seals and fixing accessories for the system. All Profiles to be with 2 mm Gauge thickness Excluding 20 Micron of Anodizing.

Paint

Vapour Permeable, superior Lime finish for Interior, formulated by Pure Lime Plaster. After cleaning of surface and removing any loose or flaking materials, apply two coats of **Stucco Grassilo**; Lime Plaster based finish on one coat of quartz primer mixed with sealer of approved shade to achieve desired finish, excluding the cost of surface preparation and scaffolding, applying by special trowel and appropriate tools, all complete.

Acrylic Emulsion Paint

100% Premium acrylic emulsion paint having VOC less than 50 gm/litre and UV resistance as per IS 15489:2004, Alkali & fungal resistance, dirt resistance exterior paint of required shade (Company Depot Tinted) with silicon additives. New work (Two or more coats applied @ 1.43 litre/ 10 sqm. Over and including priming coat of exterior primer applied @ 0.90 litre/10 sqm. (on ceiling and wall)

SPECIAL NOTES

6. All laminate shall be 1.0mm thick. on vertical surfaces & 1.5mm thick. On horizontal surfaces unless otherwise specified.
7. All hardware like multipurpose locks, hinges, handles, magnetic catches etc. shall be used only after written approval of samples.
8. Rates of all furniture items including three coats of synthetic enamel paint/sprit polish etc. as specified in the BOQ.
9. 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.
10. 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.

IV. FALSE CEILING ITEMS

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.

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

3. GENERAL NOTES FOR FALSE CEILING WORK:

4. 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.
5. Existing floor to slab height on the site shall vary from 3.00mtrs .to3.2 mtr. 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 6mmply backing for supporting light fixtures in the false ceiling and shall not be charged separately.
6. AllGI steel to be marked with "GYPSTEEL" which is as tandar dhologram of India gypsum.

All Board to be marked with" GYPSTEEL" which is as tandar dhologramof India gypsum.

7. 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 lightorfixedgypsumboardsizeupto100 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 0.55mmthick having one flange of 20mm and another flange of 30mm and web 27mm along with perimeter of ceiling ,screw fix edto 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 of15mm 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 IS2095 part 1 2011) is then screw fixed to ceiling section with 25mm dry walls 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 X1200mm as per approved sample of Ceiling panels comprise of a powder-coated beaded steel frame with gypsum / ply wood 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.

8. Vertical Linear Baffle Ceiling

Horizontal level suspended ceiling comprising of Vertical Linear Baffle Ceiling made out of Aluminum Extrusion in Aluminum alloy grade 6063 T5. The baffle blade shall be in size of 50x100x3600mm in powder coated to Wood grain/Plain finish (Red Oak, Cherry, Black & White)..The baffle shall be electro statically polyester powder coated to a coating thickness of 60-80 micron. The powder coating shall pass Salt Spray Test for 750 Hours as per ASTM B117, QUV –A Test for 1000hours as per ASTM G-154 – (Cycle – 1) and Humidity test for 1000hours as per DIN 50017. The powder coating shall have an adhesion of GT0 as per EN ISO 2409. The shade variation within a manufacturing batch shall be delta E<1 using Excite/BYK Gardner instrument and gloss level 25±5 at 60˚ as per ASTM D523 (Not applicable of Wood Grain Shade). The baffle blade shall be suspended using Slotted U-profile of 20 x 30 x 3700mm (Thk-1.5mm) having slots in module of

25mm to keep baffles a tan on-center spacing in multiples of 25mm. Longer lengths of Baffle to be connected by Baffle Joiner and the ends to be fixed with End caps. Baffles should have an on center.

v. LIST OF APPROVED MAKE:

S. No.	Item	Description
1	Full body Verified Tiles	Simpolo , Kajaria, Johnson or equivalent
2	Ceramic Tiles	Simpolo , Kajaria, Johnson or equivalent
3	Tile Adhesive	Latticrete , Unitile, Pidilite or equivalent
4	Cement: OPC 53 Grade	Shall be ordinary Portland cement 53 grade manufactured byJK Cement, A.C.C. Cement by Associated Cement Companies Ltd., Ambuja cement , Ultratech cement.
5	White Cement	j.K., Birla , or equivalent
6	Reinforcement Steel: Tmt-Fe-500	Tata Tmt, Tata Tiscon, Jindal, Sail, Sail, RATHI tore steel.
7	Structural Steel	Sail, Tisco, Ispat , Tata
8	Ready-Mix Concrete	Acc, Ultratech, Ns.
9	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	Hinges And Drawer Slide(Heavy duty telescopic channels)	Hettich /Ozone/ Haffle
13	Locks, Handles	Godrej, Dorset, Harrison Or Eq. Approved Architect.
14	Door Closers, Floor Springs,Hardware for main Glass doors (patch fittings)	Dorma / Euro/ Ozone / Enox / Doorset or equivalent
15	Aluminum section for partition	Jindal,Indial , Tata steel or equivalent
16	Plain/ Toughened Glass	Saint- Gobain , Indo Asahi , Modi , Trutuf or equivalent

17	Mirror	Saint Gobin, Jolly, Modi-Guard
18	Silicon	G E / Dow corning / Wacer
19	Window Hardware	Approved By Architect.
20	Paint , polish	Shall Be of First Quality Manufactured By :(Paints And Primers)Berger Paints, Asian Paints, Dulex Nerolac Paint
21	POP Punning and putty	Shall Be Gold Size Putty by Gyprock / India Gypsum / Birla , Asian paint
22	Expansion Bolts For Fixing	Shall Be Dash Fasteners Of Appropriate Size By Hilti Or M/S. DevAshish Trades Or Approved Eq. Chandigarh.
23	Flush Doors	Green Ply, Merino, Archid, Century, or equivalent
24	Laminates, Decorative Laminate	Marino, Sunmica, Greenlam, Archid.
25	Plywood, Block Board, MDF	Century, Greenlam, Green Ply, ArchidMarino or equivalent
26	Veneer	Green , Duro , Century or equivalent
27	Adhesive	Fevicol, Araldite, Anchor or equivalent
28	Solid Surfaces (Curion)	DUPOINT/HI-MAC/ STARON OR equivalent
29	False ceiling Gypsum Board	India Gypsum / Saint Gobin / Asia
30	False Ceilings: Grid (As Approved)	Armstrong/ AMF With Micro Look Edges or as approved.
31	GI Sections	India Gypsum / Saint Gobin / Jindal or equivalent
32	Rolling and vertical Blinds	RM, NL or equivalent
33	Heat Reflective Film and frosted film	Garware Or Approved Eq.
34	CP Fittings	Jaquar / Kohlar or equivalent
35	Sanitary Ware	Jaquar /Hindware / or equivalent
36	Sanitary Fittings	Jaquar /Hindware or equivalent
37	Stainless Steel Sink	Nirali, Nilkanth, Orient.
38	C.I.Pipe / RWP	Bengal Iron Corporation or equivalent ISI make Rif, Sif, Bis.

39	G.I. Pipe	Tata, Jindal, Zenith or equivalent
40	Cpvc pipe	Astral/Supreme or equivalent
41	C.I Brass La Pips	Electro Steel, Kesoram Or Approved Equilent.
42	U.P.V.C Pipe	Astral, Finolex, Prince, Supreme.Supreme Make (Is Type " B' Is 13592 Swr Range
43	Shuttering	Shall be Indian Plywood Manufacturing Co. Bombay or Swastik by Sudershan Plywood
44	Loft Tank	Syntax, Uniplast, Sheetal.
45	Hardware Fittings	Ecie, Sigma, Everite.
46	Wood Preservative	Wood Guard Or Approved Eq/Ici.
47	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.
48	Hand Drier	Jaquar , Askon or equivalent
49	Refrigerator	Samsung, Whirlpool, Godrej With Ss Finish, Or As per approval
50	Microwave	LG, Samsung, Equivalent Make/Range.

SPECIFICATIONS – PART B

-ANNEXURE-I (PART-B) ELECTRICAL:

SPECIFICATION & BILL OF QUANTITY:

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 personal 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 adopters 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 or wires in future, in co-ordination with other installation, to the satisfaction of the Consultant Engineer-in-charge. Conduits shall be bend 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 and2 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 conduitfill shall not exceed 40%. The minimum size of conduits shall be 25mm diameter for lighting and outlets andconduit 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) Radios 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 30meter distance and at both ends of road crossing, indicating HV cables and MV cables as applicable. Special CI markers shall be provided at all buried cable joints indicating “Electrical Cable Joints. GI plates engraving the size of cable and the place it serves shall be tied to the cable at regular intervals of 2 meters for easily identification of the cables.

2.13. TESTING OF CABLES

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

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

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

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

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

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 25m x 3 mm copper strips.

3.4. CONNECTION OF EARTHING CONDUCTORS

Main earthing conductors shall be taken from the earth connections at the main switchboards to an earth electrode with which the connection is to be made. 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, than the soil resistivity immediately surrounding the earth electrodes shall be reduced by adding sodium chloride, calcium chloride, sodium carbonate, copper sulphate, salt and soft coke or charcoal in suitable proportions as directed by the consultants.

3.10. RESISTANCE TO EARTH

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

4 TESTING.

4.1. GENERAL

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

a) Wiring Continuity Test

b) Insulation Resistance Test

c) Earth Continuity Test

d) Earth Resistivity Test

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

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

4.2. TESTING OF WIRING

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

4.3. INSULATION RESISTANCE TEST

The insulation resistance shall be measured by applying between earth and the whole system of conductors, or any section thereof with all fuses in place and all switches closed (except in concentric wiring) all lamps in position of both poles of the installation, otherwise electrically connected together, a direct current pressure of not less than twice the working pressure (provided that it does not exceed 660 volts for medium voltage circuits) be applied. Where the supply is derived from A.C. three phase system, the neutral pole of which is connected to earth, either direct or through added resistance, pressure shall be deemed to be that which is maintained between the phase conductor and the neutral.

The insulation resistance measured as above shall not be less than 50 divided by the number of points on the circuit provided that the whole installation shall not be required to have an insulation resistance greater than one mega ohm.

The insulation resistance shall not be measured between all conductors connected to one phase conductor of the supply and all the conductors connected to the middle wire or to the neutral or to the other phase conductors of the supply. Such a test shall be carried out after removing all metallic connections between the two poles of the installation and in these circumstances the insulation resistance between conductors of installation shall not be less than that specified above.

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

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

In a two-wire installation a test shall be made to verify that all non-linked single pole switches have been fitted in the same conductor 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 inter-connecting 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 accordance with relevant Indian Standards. The meters shall be flush mounted and draw out type. Indicating lamps shall be neon type and of low burden. Indicating lamps shall be backed up with fuses of 5 Amps and toggle switch.

6.11. MOULDED CASE CIRCUIT BREAKERS (MCCB)

MOULDED CASE CIRCUIT BREAKERS(MCCB) : MCCB's shall be in accordance with IS: 2516-1985 & IEC 157-1 with the latest amendments. It shall be enclosed type made of Heat resistant high strength, flame retarding, thermosetting material rated for 500 V, 50 Hz. It shall have three position indicator 'ON', 'OFF' & 'TRIP' at top, bottom & middle position. It shall be provided with shunt trip and additional 2 Nos. NO & NC contacts. The minimum breaking capacity of MCCB's shall be 20 KA up to 100 AMPS rating and 35 KA for MCCB's above 100 AMPS rating up to 200 A and 50KA for MCCBs above 200 A. All MCCB.s shall have door operating handle (Rotary Operating Handle). The

short circuit with standing capacity shall be ICS Rating and not ICU Rating.

6.12. EARTHING

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

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

6.13. PAINTING

All sheet steel work shall 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 short circuit protection. The over load or short circuit devices shall have a common trip bar in the case of DP and TPN Miniature circuit breakers. The MCB shall be tested and certified as per Indian Standards prior to installation.

All final distribution boards shall be provided with MCB's. TPN final distribution boards shall consists of 3 rows of single pole MCB's for each circuit, and each phase shall be connected to the incoming supply through double pole MCB isolator. Separate neutral bus bars shall be provided for each phase in the case of TPN Distribution Boards. In case Earth Leakage Circuit Breaker (ELCB) has to be provided in Final Distribution Boards then on the incoming side instead of DP MCB Isolator a DP ELCB shall be provided of Current rating same as that of DP MCB Isolator and current sensitivity maximum of 100mA.

The ELCB shall conform to IS : 12640 - 1988 (Residual Current-Operated Circuit Breakers- Specifications) Solid links between MCB Isolator and backed by HRC fuse/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±10%, 50 Hz±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 file system. 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 x2.5 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.
	Cables
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.
	Distribution Board & Panels
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
	Over Load (Phase)
I	Current setting Ir (Ir=XIn) OFF 0.4 to 1.0 in steps of 0.1
Ii	Time delay, tr(Inverse) 10 sec at 6/r
Iii	Over Load (Neutral)
Iv	Current setting In (Intrl =XIr) 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 a office:

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

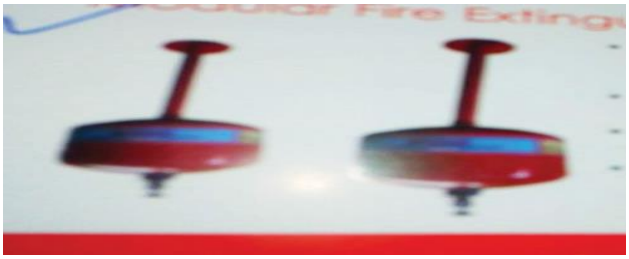
9.1 -CO_2 gas type 4.5 kgs – Conforming to IS15683.

9.2 -ABC Powder type / DCP type 4.0 kgs or approved kg –Conforming to IS 15683.

9.3 Modular 

oved

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 a duration 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 shall be 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 conduc-tor 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.

ANNEXURE-I (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 expose 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 incompliance 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 & handling 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 +12 HP), 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 aluminum 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 diameter. 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 DISTRUBUATION SYSTEM)

1.0 Scope

The scope of this section comprises supply fabrication, installation and testing of all sheet metal / aluminum 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 / aluminum of the following thickness, as indicated in schedule of quantities & as described in the IS: 655 with latest.

4.0 RECTUNGULARS DUCT:

Dimensions of duct	**Gauge G. I**	**Aluminum**	**Type of joints**	**Type of Bracings**
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 frame with 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 frame with 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 1200 mm from joints. Or 40 x 40 x 5 mm MS. Angle diagonal bracing.

2250 and above	18	14	50 x 50 x 6 mm angle iron frame with 10 mm dia nuts and bolts at 125 mm centre.	50 x50 x 5 mm MS angles bracing at 1200 mm from joints. Or 50 x 50 x 5 mm MS. Angle diagonal bracing.

Sheet metal ducts shall be fabricated out of galvanized steel sheets conforming to BIS 655, BIS 277, BIS 737 & SMACNA. Sheets used shall be produced by Hot dip process and galvanizing shall be Class 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 (mm x mm)	Size of rod dia (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 x25mm 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 than 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 by 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 canvass sleeve. Each sleeve shall minimum 150 mm securely bolted to duct and the connecting duct work rigidly held in line with unit inlet or outlet.

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 it's 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. Aluminium supply and return grilles shall be powder coated and to have colour of client's choice or extruded aluminium as per bill of quantities. For fixing of grilles in the walls HVAC Contractor has to provided 50 mm x 50 mm wooden frame of kail wood.

The frames have to be given coating of fire retardant paint. Nothing extra shall be paid on this account.

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

ii. Linear Supply air/ Return Air Grilles:

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

13.0 LINEAR DIFFUSER:

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

The Material of Grilles shall be as follows:

i. All grilles shall be selected in consultation with the Client/Architect/Consultant. Different spaces shall require horizontal or vertical face bars, and different width of margin frames.

ii. All grilles shall have a soft, continuous rubber gasket between the periphery of the registers and the surface on which it has to be mounted. The effective area of the registers shall not be less than 75 percent.

iii. Grilles shall be adjustable pattern as each grille bar shall be pivot able to provide pattern with 0 to 100 deg horizontal arc and upto 30 deg C deflection up or down. Bars shall hold deflection settings under all conditions of veloRegional and pressure. Extruded aluminium grilles shall have fixed bars.

iv. Bars longer than 45cm shall be reinforced by set-back vertical members of approved thickness.

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

Diffuser	**MS**	**Aluminum**
a) Frame	20-gauge	18 gauge
b) Louvers	20-gauge	18 gauge
Grills:		
a) Frame	20-gauge	18 gauge
b) Louvers	26-gauge	24 gauge
V.C. Damper:		
a) Frame	20-gauge	18 gauge
b) Louver	26-gauge	24 gauge

v. Fresh air intake and extract louvers:

All the louvers shall be rain protection type and shall be fabricated from extruded aluminum section. The louvers shall additionally be provided with heavy duty expanded metal (aluminum –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 aluminum foil. The thermal conductivity of glass wool shall not exceed 0.024 Kcal/hr. sqm deg C (0.19 BTU in/Hr. Sq. ft deg F at 10 deg C - mean temperature and density shall not be less than 48 kg/m3.

Thickness of Insulation:

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

Return Duct	Unconditioned Space	50 mm

When specified / indicated The insulation shall be applied as follows:

3.0 Duct Insulation Thermal Fibre Glass

A. Clean all duct surfaces thoroughly

B. 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.

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

D. 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 ¾" 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.

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 / cm3

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.

7.0 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 Fibre Glass Insulation finished with dimensionally stable Black Glass Tissue (BGT) facing & 24 G perforated aluminium 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 Fibre Glass Insulation finished with dimensionally stable Black Glass Tissue (BGT) facing & 24 G perforated aluminium

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 aluminium 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 screwedwith 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 aluminium sheet & should have 2-3 mm dia perforation at 3 to 4 mm center to center distance with the help of self-tapping screws and shall be neatly finished to give true surface finish.

Part 5: TECHNICAL SPECIFICATION

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.

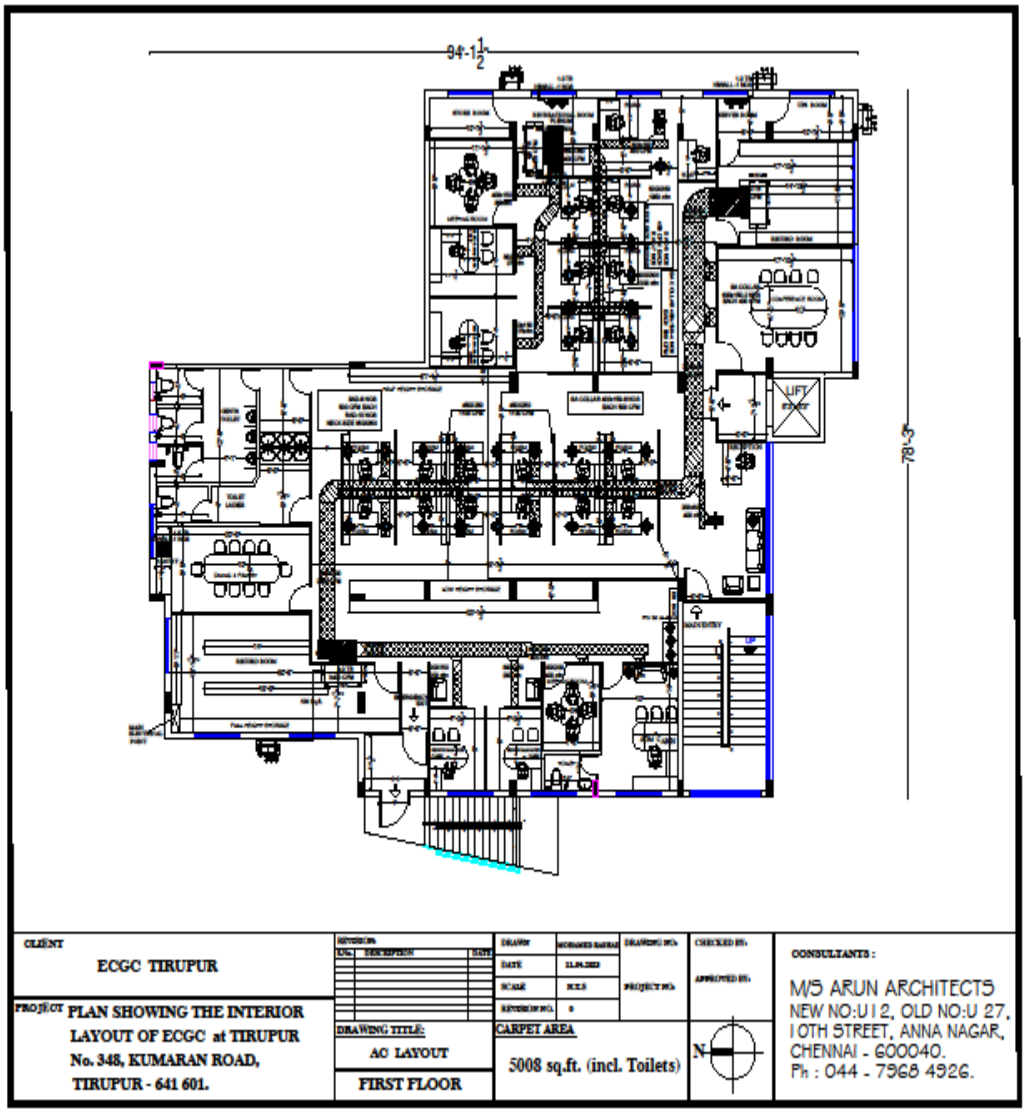
S. No	Description of Item	Approved Makes
1.	**High side Equipment**	
1.1	VRV/VRF/MRV System using compressor of following make only.	Eta Gree /Haier/ Mitsubishi/Daikin
1.2	Y-Joints VRV/ VRF system	Toshiba/Hitachi/ Mitsubishi or equivalent
3.	**Fans**	
3.1	Propeller Fan	Carya ire/ Kruger/ Nuair (UK)/ Nicotra
4.	**Cables & Accessories**	
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 withEarthing Links	Power/Grip well /Baliga Lighting Ltd.

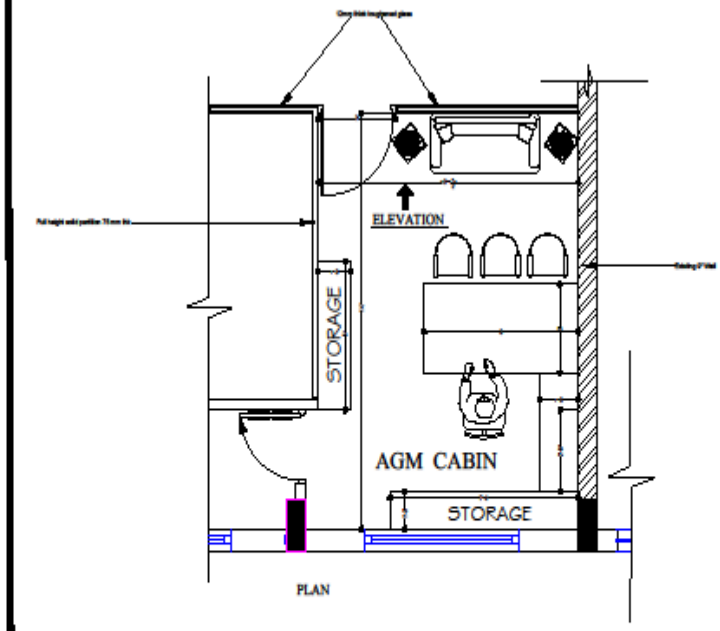
4.5	PVC Insulated Copper Conductor Stranded Flexible Wires	Finolex/ National Cables – NC/ polycab/ Sky toneHavells
4.6	PVC Conduit & Accessories (ISIApproved)	BEC/ Precision/ D Plast/ Polypack
4.7	MS/ GI Conduit (ISI Approved)	BEC/ AKG/ STEEL KRAFT
4.8	Accessories for MS/GI Conduit (ISIApproved)	Sharma Sales Corporation/ Super SalesCorporation
4.9	Bimettalic 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.	Ducting & Grilles	
5.1	Grilles/ Diffusers	Carya ire / 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

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

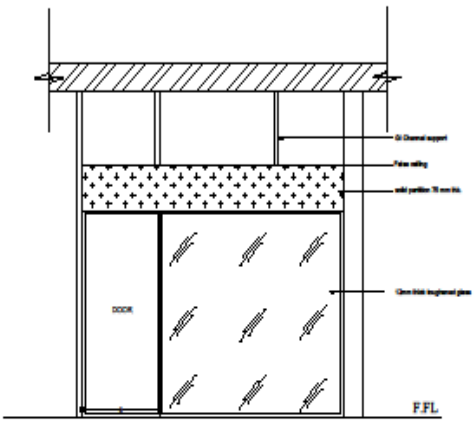
	VCD/ Gravity louvers/ Exhaust & fresh air louvers	Cary aire /Ravistar/Mapro/ Tristar
5.8	Overload Relays with built- i n s i n g l e - p h a s e preventer	L&T/ Minlec/Siemens/ Group Schneider (MG) France
6.	**Pipes & Fittings**	
6.1	UPVC pipe for Darin	AKG/Polypack/supreme
6.2	Cu- Pipes	Totaling /Rajco /Mazflow
7.	**Insulation**	
7.1	Expanded Polystyrene (TF Quality) (Pre-moulded pipe section/slab)	Thermolloyd/ Beard Sell/ Styrene Pakagings/ DEBS Products/ 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 Elastomeric Insulation	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
8.	**Electrical Equipment**	
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
8.21	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


94-1 1/2
78'-3"
UFT
CLIENT
ECGC TIRUPUR
PROJECT
PLAN SHOWING THE INTERIOR LAYOUT OF ECGC at TIRUPUR
No. 348, KUMARAN ROAD,
TIRUPUR - 641 601.
REVISION
NO. DESCRIPTION DATE
DRAWN
DATE
SCALE
REVISION NO.
DRAWING NO.
PROJECT NO.
CHECKED BY:
APPROVED BY:
DRAWING TITLE:
AC LAYOUT
FIRST FLOOR
CARPET AREA
5008 sq.ft. (incl. Toilets)
N
CONSULTANTS :
M/S ARUN ARCHITECTS
NEW NO:U12, OLD NO:U 27,
10TH STREET, ANNA NAGAR,
CHENNAI - 600040.
Ph : 044 - 7968 4926.

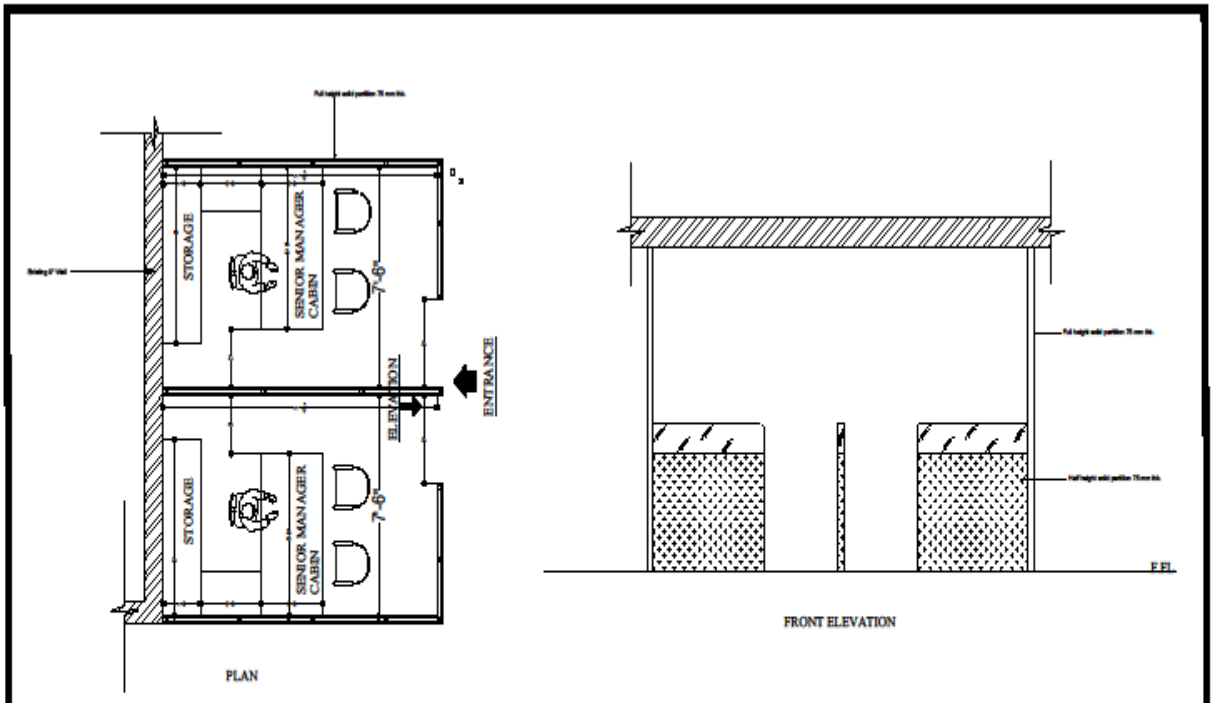


PLAN

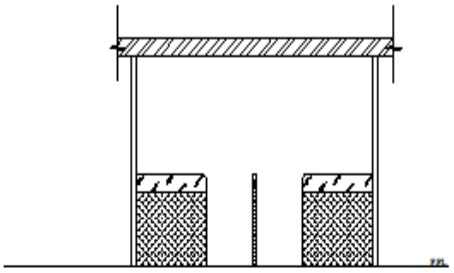


ELEVATION

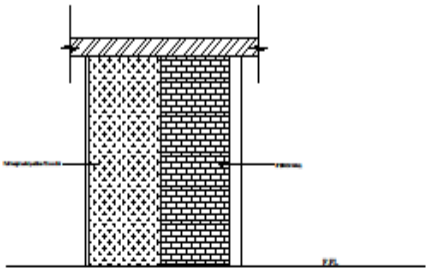
CLIENT : ECGC TIRUPUR	AGM CABIN PLAN AND ELEVATION DETAIL	CONSULTANTS : M/S ARUN ARCHITECTS NEW NO:U I 2, OLD NO:U 27, I OTH STREET, ANNA NAGAR, CHENNAI - 600040. Ph : 044 - 7968 4926.
PROJECT : PLAN SHOWING THE INTERIOR LAYOUT OF ECGC at TIRUPUR No. 348, KUMARAN ROAD, TIRUPUR - 641 601.	DATE : 11.04.2025 / DESIGNED BY : MOHAMED RASHAD	
	SCALE : NTS / CHECKED BY :	
	REVISION :	



CLIENT : ECGC TIRUPUR	SM CABIN 1 PLAN AND ELEVATION DETAIL	CONSULTANTS : M/S ARUN ARCHITECTS NEW NO:U I 2, OLD NO:U 27, I OTH STREET, ANNA NAGAR, CHENNAI - 600040. Ph : 044 - 7968 4926.
PROJECT : PLAN SHOWING THE INTERIOR LAYOUT OF ECGC at TIRUPUR No. 348, KUMARAN ROAD, TIRUPUR - 641 601.	DATE : 11.04.2025 / DESIGNED BY : MOHAMED RASHAD	
	SCALE : NTS / CHECKED BY :	
	REVISION :	



ELEVATION 1



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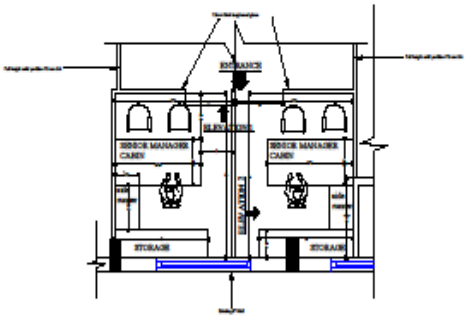

PLAN

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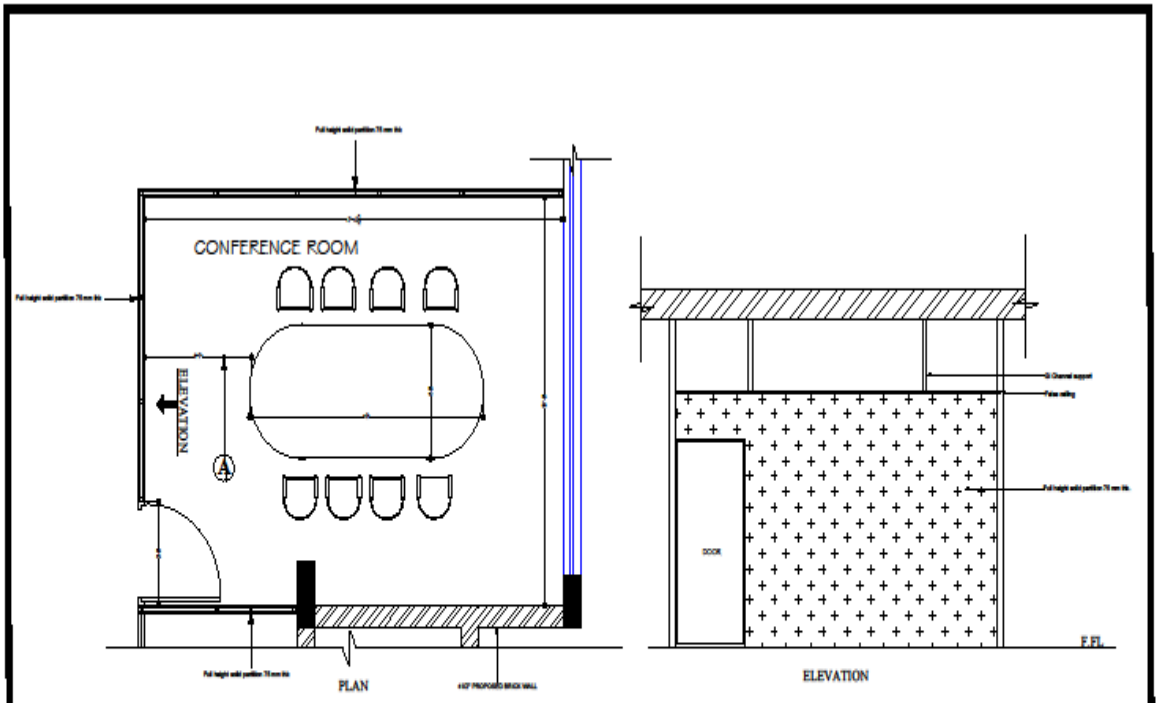
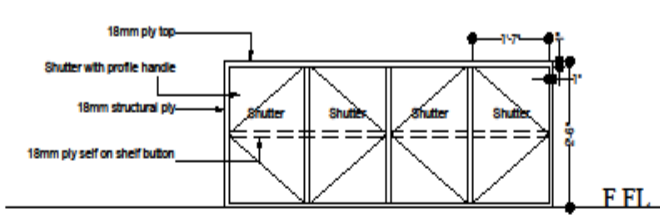
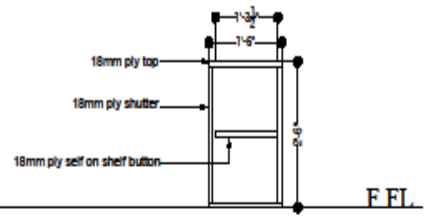
PROJECT : PLAN SHOWING THE INTERIOR LAYOUT OF ECGC at TIRUPUR No. 348, KUMARAN ROAD, TIRUPUR - 641 601.	DATE : 11.04.2023	DESIGNED BY : MOHAMED RASHAD	
	SCALE : NTS	CHECKED BY :	
	REVISION :		



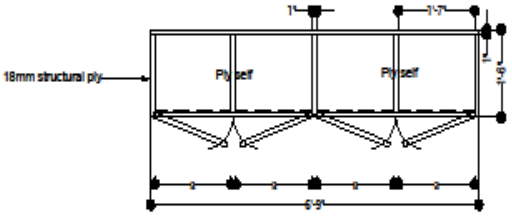
CLIENT : ECGC TIRUPUR	CONFERENCE ROOM PLAN AND ELEVATION DETAIL		CONSULTANTS : M/S ARUN ARCHITECTS NEW NO:U12, OLD NO:U 27, 10TH STREET, ANNA NAGAR, CHENNAI - 600040. Ph : 044 - 7968 4926.
PROJECT : PLAN SHOWING THE INTERIOR LAYOUT OF ECGC at TIRUPUR No. 348, KUMARAN ROAD, TIRUPUR - 641 601.	DATE : 11.04.2023	DESIGNED BY : MOHAMED RASHAD	
	SCALE : NTS	CHECKED BY :	
	REVISION :		



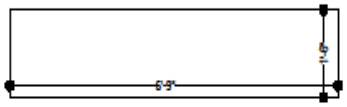
FRONT ELEVATION



SECTIONAL ELEVATION

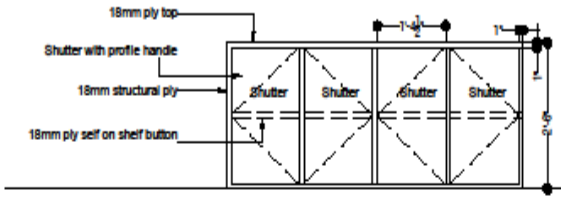


SECTIONAL PLAN



PLAN

CLIENT : ECGC TIRUPUR	RECREATIONAL ROOM NEARBY STORAGE DETAILS		CONSULTANTS : M/S ARUN ARCHITECTS NEW NO:U12, OLD NO:U 27, 10TH STREET, ANNA NAGAR, CHENNAI - 600040. Ph : 044 - 7968 4926.
PROJECT : PLAN SHOWING THE INTERIOR LAYOUT OF ECGC at TIRUPUR No. 348, KUMARAN ROAD, TIRUPUR - 641 601.	DATE : 11.04.2018	DESIGNED BY : SHIVA SHANKARI .P	
	SCALE : NTS	CHECKED BY :	
	REVISION :		



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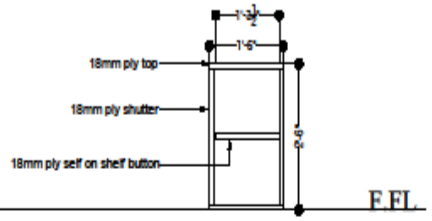

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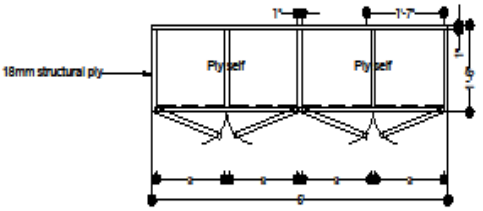

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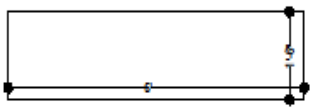
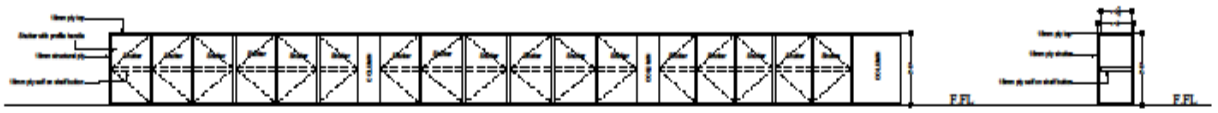


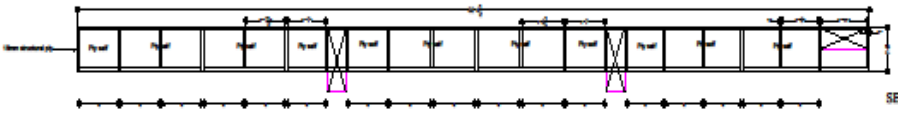
PLAN

CLIENT : ECGC TIRUPUR	SM CABIN STORAGE DETAILS		CONSULTANTS : M/S ARUN ARCHITECTS NEW NO:U 12, OLD NO:U 27, 10TH STREET, ANNA NAGAR, CHENNAI - 600040. Ph : 044 - 7968 4926.
PROJECT : PLAN SHOWING THE INTERIOR LAYOUT OF ECGC at TIRUPUR No. 348, KUMARAN ROAD, TIRUPUR - 641 601.	DATE : 11.04.2023	DESIGNED BY : SHIVA SHANKARI .P	
	SCALE : NTS	CHECKED BY :	
	REVISION :		



FRONT ELEVATION

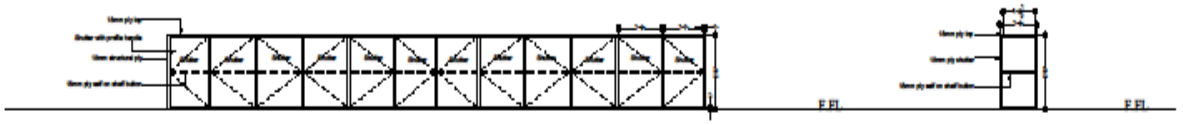
SECTIONAL ELEVATION



SECTIONAL PLAN

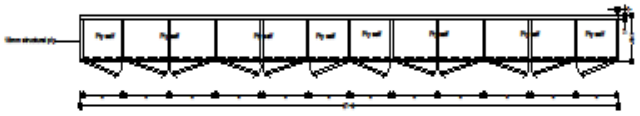
PLAN

CLIENT : ECGC TIRUPUR	HALF HEIGHT STORAGE SM CABIN STORAGE DETAILS		CONSULTANTS : M/S ARUN ARCHITECTS NEW NO:U I 2, OLD NO:U 27, I OTH STREET, ANNA NAGAR, CHENNAI - 600040. Ph : 044 - 7968 4926.
PROJECT : PLAN SHOWING THE INTERIOR LAYOUT OF ECGC at TIRUPUR No. 348, KUMARAN ROAD, TIRUPUR - 641 601.	DATE : 11.04.2023	DESIGNED BY : SHIVA SHANKARI .P	
	SCALE : NTS	CHECKED BY :	
	REVISION :		



FRONT ELEVATION

SECTIONAL ELEVATION



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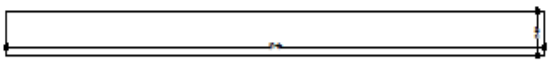

PLAN

HALF HEIGHT STORAGE

CLIENT : ECGC TIRUPUR	SM CABIN STORAGE DETAILS		CONSULTANTS : M/S ARUN ARCHITECTS NEW NO:U 12, OLD NO:U 27, 10TH STREET, ANNA NAGAR, CHENNAI - 600040. Ph : 044 - 7968 4926.
PROJECT : PLAN SHOWING THE INTERIOR LAYOUT OF ECGC at TIRUPUR No. 348, KUMARAN ROAD, TIRUPUR - 641 601.	DATE : 11.04.2023	DESIGNED BY : SHIVA SHANKARI .P	
	SCALE : NTS	CHECKED BY :	
	REVISION :		

TECHNICALSPECIFICATION FOR ELECTRICAL INSTALLATION WORKS

GENERAL: All provisions of the "General Conditions" and "Supplementary General Conditions" shall form a part of this section.

WORKS INCLUDED IN THIS SECTION

a) 230V single phase, 2 wire lighting & power distribution system complete.

b) An adequate equipment grounding system.

c) Conduit, pull wire and outlet boxes for Telephone system.

CODE REQUIREMENTS: All work shall be done in accordance with the Institute of Electrical Engineers/I.S.S. code amended up to date/ Indian Electricity Rules.

MATERIALS: All materials to be used in this work be new and bear the Architects/ ECGC Ltd.

RECEPTACLES: All 250V receptacles shall be 2 wire three pin 5 amp flush mounted modular series of flush type of approved make. For power loads, the flush type 6 pin socket shall of 15 amp. Rating and be also of approved make.

SWITCHES: All flush type switches shall be totally enclosed type of 5 amp modular series rating for up to four light outlets and 15amp. Rating for more than four light outlets.
Being controlled by one switch. These shall be of approved make for light loads. For power loads, the flush type modular switches shall be of 15 amp rating and be of approved make.

COVER PLATE: These shall be as per the standard modular series and shall be a integral part of the switch or socket and of colour approved by the Architects as required.

LOCATION: The drawings indicate diagrammatically various outlets and equipments. In the event of things in the indicated locations of equipment

or fixture being necessary due to developed conditions in the building construction or rearrangement of furnishing, such changes shall be made without any extra cost by the contractor. The route of various conduits shall take into consideration the provisions of other services and shall be decided accordingly at site by the Architects/ ECGC Ltd.

POSITION OF LIGHTINGS & DISTRIBUTION BOARDS & SWITCH GEARS:

The recommended position of the lighting points, control switches, distribution boards and switch gears, as shown on the layout drawings, will be adhered to as far as practicable.

Should there be any discrepancy or incomplete description, ambiguity or omission in the drawings and other documents, whether original or supplementary, forming the contract, the contractor shall immediately on discovering the same, draw attention of the Architects. Prior to the installation of lighting, and plug points, switches etc. final position shall be ascertained by the contractors with the Architects representative.

PAINTING AND MARKING: All exposed steel work not actually embedded in building construction (viz. Conduits, junction boxes, switch boards etc.) will be painted to match the existing shades of walls as instructed. This work will be done by the contractor without any extra charge. The contractor shall satisfy the Architects/ ECGC Ltd that he has trained labour for making joints of Copper cable/wire etc. Wherever recessed fittings/ fixtures are required to be installed the Contractor shall be responsible for making the recesses in the false ceiling. Only such electrical material of makes and type as approved by Architects/ Project Manager, shall be used.

CONDUITS: These shall be of 16 SWG upto 32mm dia and 14 SWG thick for 38mm and above dia steel, stoveenameled having perfectly circular tubing and capable of being cleaned and tight fitting joints. For flexible conduits14 SWG thick galvanised MS Flexible conduits will be used.

USE OF BENDS: These shall be of 14 SWG. As far as possible, the conduit system shall be so laid out that it will obviate the use of tees, elbows and sharp bends. No length of conduit shall have more than the equivalent of two quarter bends frominlet to outlet

CROSS SECTION: The conduits shall be of ample sectional area to facilitate the drawings of cables. In no case shall the total cross section of

cables measured overall be more than half the area of the conduit.

DRAW BOXES: M.S. draw boxes of ample dimensions shall be provided at convenient points on walls to facilitate pulling of long runs of cables. They will be completely concealed with hylam covers flushed with finish surface. These boxes will be as few as possible and located where found suitably by the Architects/ ECGC Ltd. All the G.I boxes used for housing switches, plugs, drawing of wires etc. shall be five sided and of minimum 20 SWG.

SWITCH BOXES:

G.I boxes of required sizes shall be provided to house switches and plug sockets. These shall be attached to conduits by means of check nuts on either side of their walls. These shall be completely concealed leaving edges flush with wall surfaces.

CLEANING OF CONDUIT RUNS:

The entire conduit system including outlets and boxes shall be thoroughly cleaned after completion of erection and before drawing in cables.

PROTECTION: To safeguard against filling up with the plaster etc. all the outlet boxes and switch boxes will have to be provided with temporary covers and plug within the tendered cost which shall be replaced by sheet covers as required.

PAINTING BEFORE ERECTION: The conduit shall be painted at such places where the pipe had been damaged due to vice or wrench grip.

WALL SOCKETS & PLUGS:

Wall sockets will be of the following type:

a) For light plug point 5 amps. capacity 3 pin type.

b) For power plug point 15 amps. capacity 6 pin type.The quoted rate shall also include earthing the third pin with 16 S.W.G. G.I wire.WIRES AND CABLES :

a) All wire/cables shall have been manufactured in accordance with the

latest I.S. specifications amended upto date. The wiring shall be carried out in the mentioned manner each of which will conform to the given specifications. In concealed/surface conduit system including providing supply and fixing of conduit, bends junction boxes, Brass bushes, check nuts etc.

Looping system will be followed throughout including supply and drawing of required sizes of wire without damaging the same. All flush type accessories will be used. The installation will generally be carried out in conformity with the I.S.I. Code, Indian Electricity rules. For the purpose of determining the load per circuit, the following rating of points shall be assumed:

i) Light point 60 watts.

ii) Single Fluorescent Lamp 50 watts.

iii) Double Fluorescent Lamp 100 watts.

iv) Convenience Plug point 60 watts.

v) Power plug points 500 watts. The Light plug points shall be complete with 3 pin 5 amps Plug & socket enclosed in G.I. box with the controlling switch as required and the third pin shall be earthed with 16 SWG Bare copper wire.

Wiring for power plugs shall be as mentioned in the Bill of Quantities. Each circuit shall have not more than one power plugs and the plugs shall be earthed with 14 SWG Bare wire.. The point shall be complete with a 3 pin 15 amps. plug socket 15amps switch combined mounted on G.I. Box.

POINT RATE: The rate per point shall include all materials, & labour required for completing the point as mentioned in BOQ.

27.4 DRAWINGS

The contractor shall submit one set of Originals & further six copies of layout to Architects/ ECGC Ltd after completion of work. These drawings must give the following information.

1 Runs of conduit, diameter of conduit, Number of wires contained and size of wires for point wiring, mains, submains and cables etc.

2 Location of all main switches, junction, outlet Boxes, and point switches.

No completion certificate will be issued until the drawings are submitted. The drawings will be prepared & submitted by the contractor without any extra Charges. Completion Tests The installation with fitting complete shall satisfactorily pass the following test.
Before current is switched on.

1 All lamps & appliances having been connected and with All switches "ON" A pressure not less than twice the working pressure (subject to a limit of 500 Volts) shall be applied and the insulation resistance must not be less than 50 Mega OHMS divided by the number of points.

2 With all lamps & appliances removed from the circuit and all the switches "ON" a similar test between the poles shall satisfy the above requirement.

3 To ensure that all single pole switches are on the live side of the apparatus they control.

The Contractor shall notify in writing to the Architects/ ECGC Ltd about the completion of the work, within 45 Days from completion as accepted by Architect/ ECGC Ltd. They sent their representative to remain present at the time of carrying out the tests by the contractor. The contractor will fix up this date in consultation with the Architect's for each test.

Should the above test not comply with the limits as laid down in I.E. rules, the contractor shall rectify the faults at his own cost until the required results are obtained. The contractor shall be responsible for providing the necessary instruments and subsidiary earths for carrying out the test. The above tests shall be carried out by the contractor without any extra Charges.

LIST OF APPROVED BRAND/ MAKES IN INTERIOR FURNITURES LIST

The Interior Works Subject to Approval of Samples by the Consultants / ECGC LTD. All the Materials Used Have to Confirm to Green Interior Norms of IGBC.

Sl No	LIST OF MAKE	BRAND / MANUFACTURER
1	PLYWOOD	Century ply/ Greenply/Merino/ Archid Ply or Approved Equivalent
2	FLEXIBLE PLYWOOD	Century ply/ Greenply/Merino/ Archid Ply or Approved Equivalent
3	LAMINATE	Merino/Archid/Century ply/ Greenply or approved FSC equivalent
4	FLUSH DOORS	Century ply/Ambi Ply Greenply or approved FSCequivalent
5	VENEER	Century ply/ Greenply/Timex or Approved Equivalent
6	LOCKS	Dorma/Dorset/D-line/ IR/ Hager/ Hafele/ Union/ Hettich/ Blum or Approved Equivalent
7	DOOR CLOSURE/ FLOORSPRINGS	Dorma /Ozone/Dorset/ D-line/ Union/ Hafele/ / orApproved Equivalent
8	HANDLES	Ozone/Godrej/Doorset/Assaalbay or Approved Equivalent
9	HINGES	Ozon/ Dorma/ IR/ Union/ Hager /Hafele/Hettich/Blum or Approved Equivalent
10	PROPRIETARY SLIDDING/ FOLDING DOORS	Ozone/Dorma or approved equivalent
11	PATCH FITTINGS	Ozone/Dorma/ Union or Approved Equivalent
12	GLASS / MIRROR	Saint Gobain/ Modi float / Ashai or ApprovedEquivalent
13	SCREWS	Nettle fold make / Approved Equivalent confirming to IS 1365
14	ALUMINIUM SECTIONS	Jindal/Bhoruka/Hindalco
15	ALUMINIUM CLEATS (3mm)	Jindal/ Bhoruka/ Hindalco
16	GRANITE\MARBLE SLABS	First Quality, Water-cut type of or ApprovedEquivalent
17	ITALIAN MARBLE SLABS	First Quality, Resin bonded, Imported or Approved Equivalent

18	ETCHING, FROSTING FILM/VINYL SHEETS	3M or Approved Equivalent
19	DIGITAL PRINTED VINYL	3M or Approved Equivalent
20	EMULSION// LUSTER/ ENAMEL PAINTS/	Berger/ Nerolac/ Asian/ J & N/Jotun/ICI or Approved Equivalent
21	PRIMER	Berger/ Nerolac/ Asian/ J & N/Jotun/ICI or Approved Equivalent
22	PUTTY FOR PAINT	Asian / Birla Wall Putty, Epoxy, Thin coating Putty or Approved Equivalent
23	VINYL/ ANTI-STATIC FLOOR	Amstrong/ Gerflor/Tarkett/Forbo or Approved Equivalent
24	RUBBERISED VINYL FLOOR	Amstrong/ Gerflor/Tarkett/Forbo or Approved Equivalent
25	OFFICE SEATINGS	Godrej / Featherlite / Eurosit or Approved Equivalent
26	CORIAN HARD SURFACE	Merino Hanex / LG / or Approved Equivalent
27	WRITING BOARD	White Mark Boards
28	ADHESIVES	Fevicol SH or Approved Equivalent
29	SLIDING CHANNELS	Hager/ Hettich/ Hafele or Approved Equivalent
Sl No	**LIST OF MAKE**	**BRAND / MANUFACTURER**
30	POWDER COATING PAINT	MRF Marpol / Berger
31	GRG, PLAIN GYPSUM BOARD,SUSPENSION	India Gypsum Ltd/Gyproc
32	UNIVERSAL GYP PLASTER	India Gypsum Ltd/Gyproc
33	PVC SPACERS/ CORNERBEADINGS	Arpitha Exports/ BOSS/Johnsonite or Approved equivalent
34	GRG/ MR Grade/ GYPSUM BOARD WITH SUSPENSIONSYM	India Gypsum Ltd/Gyproc
35	CALCIUM SILICATE BOARD WITH SUSPENSION SYM	Hilux - Ramco Industries Ltd
36	FALSE CEILING SUSPENSIONSYSTEM	India Gypsum Ltd/Gyproc/ AMSTRONG
37	UNIVERSAL GYP PLASTER(PUNNING)	India Gypsum Ltd/Gyproc
38	STAINLESS STEEL SINK	AMC/ Nirali or Approved Equivalent
39	CERAMIC TILES	Kajaria World/ H& R Johnson/ Somany/Nitco
40	VITRIFIED TILES	Johnson/ Nitco/ Bell/ Euro/Kajaria/Somany
41	SELF-LEVELLING COMPOUNDFOR FLOOR	Roffee/ Fosroc or approved equivalent

42	POLYMER BASED CEMENTITOUS GROUTS	Laticrete/ Bal Endura or approved equivalent
43	FIRE RATED DOORS	Signum/ Promat or approved equivalent
44	STEEL FIRE RATED DOORS	Signum/ Shakti-Met-Dor or approved equivalent
45	PLASTER MESH	Arpitha Exports or Approved Equivalent
46	WHITE CEMENT	Birla White/ JK or approved equivalent
47	VITRIFIED TILES	Euro/ RAK or Approved Equivalent
48	Chairs , Modular and Compactors	GODREJ

TECHNICAL SPECIFICATIONS

This section includes Technical Specifications for following equipments/works.

1. VRV ODU System
2. High Wall Splits
3. Cassette Splits.
4. Insulation –Piping
5. Electrical
6. Standards

The section includes Data sheets. Bidders have to complete the data sheets & submit the same with the offer.

VARIABLE REFRIGERANT VOLUME SYSTEM (VRV)

SCOPE:

All variable Refrigerant Volume Air Conditioners shall be fully Factory assembled, charged with refrigerant wired, piped and tested at the factory.

The system shall comprise of Air Cooled Multi Split type Outdoor units, and a variety of indoor units connected by common Refrigerant piping and Power and Control Cabling.

The appropriate Indoor units are detailed below, however the Units offered shall be as per the Bill of Quantities. The outdoor unit configuration may be modified by the Bidder giving the same tonnage as specified.

SPECIFICATION OF VARIABLE REFRIGERANT VOLUME SYSTEM(VRV):

GENERAL:

The system selected is a modular system, with number of indoors connected to centrally located outdoor units, as per detailed design given in the tender. The outdoor units for all the system shall be air cooled type and mounted on the terrace of the building. Indoor units in various areas shall be as per enclosed drawings/Bill of

Quantities.

Whenever feasible in open spaces or large rooms the indoor units shall be logically split and connected to separate outdoor units.

All the VRV air conditioners shall be fully factory assembled, wired, internally piped and tested. The outdoor unit shall be pre-charged with first charge of R 410 a refrigerant. Additional charge shall be added as per refrigerant piping at site. All the units shall be suitable for operation with 415 V +_ 10%, 50 Hz +_ 3%, 3 phase supply for outdoor units & 220 V +_ 10%, 50 Hz _+ 3%, 1 Phase supply for in door units.

The VRV system shall provide stable, trouble free & safe operation, with flexibility of operating desired indoor units. The outdoor units must be capable of delivering exact capacity proportional to the number of indoor units switched on & the heat load in the airconditioned area. The proportional operation shall be achieved by varying speed of the compressor in the outdoor units.

The system should have variable refrigerant temperature facility to reduce power consumption.

The operation of the VRV system shall be through independent remote controllers as specified. The entire system shall be controlled by a system controller and shall be compatible to be integrated through a BACNET protocol with an intelligent building management system. The system controller shall be able to control start/stop on time schedule and also provide common fault from the system. The BMS will be provided by others.

OUTDOOR UNITS:

The outdoor units of the VRV system shall be compact air cooled type. All the compressors of the outdoor units must be hermetically sealed scroll type with smooth Sine wave DC inverter motor, suitable to

operate at heat load proportional to indoor requirement.

“Anti-Corrosive “treatment (Blue Fins) for Al fins of Condenser Coils is mandatory. The treatment should be suitable for areas of high pollution and salt laden air.

The outdoor units must be suitable for minimum up to 150 m refrigerant piping between outdoor unit and the farthest indoor units, total piping of 1000m for all the indoor units. Allowable level difference between outdoor unit and indoor units shall be 90m in case of outdoor unit on top and 40 m in case of outdoor unit at bottom. Allowable level difference between various indoor units connected to one out door unit shall be up to 15m.

Back up operation, in case of failure of one of the compressors of outdoor unit, for single module outdoor units or failure of one of the modules in case of multiple module outdoor units shall be possible. The VRV outdoor unit shall always be supplying at least 33% of back up operation, of the full load capacity.

The outdoor unit shall employ system of equal run time for all the compressors, inverter or on/off type, within each outdoor unit-Single Module or Multi Module.

The outdoor units shall be suitable to operate within an ambient temperature range of -5 deg C to 43 deg C, in cooling mode.

Air cooled condenser shall have Axial Flow, upward throw fan, directly coupled to fan motors with minimum IP 55 protection. The outdoor unit condenser fan shall be able to develop external static pressure up to 8 mm of H2O.

The entire operation of outdoor units shall be through independent remotes of indoor units. No separate Start/Stop function shall be required.

Starter for the Outdoor unit compressor shall be “Direct on Line” type. Inverter compressor of the unit shall start first and at the minimum frequency, to reduce the inrush current during starting.

Refrigerant control in the outdoor unit shall be through Electronic Expansion Valve. Complete refrigerant circuit, oil balancing/equalizing circuit shall be factory assembled & tested.

Noise level of outdoor units shall not exceed 63 dB(A) at a distance of 1.5 m from

the unit.

The outdoor units shall confirm to Technological Guideline for Harmonic Suppression – JAEG 9702-1995. High Harmonic Environmental Target Level for Power Distribution system shall be 5%.

Outdoor units shall be complete with following safety devices:

- High pressure switch
- Fan driver overload protector
- Over current relay
- Inverter Overload Protector
- Fusible Plug

Monitoring from BMS

Necessary relays and contacts shall be provided for monitoring the status of the outdoor units from the building management system. The outdoor units shall provide necessary volt free contacts for this purpose. Status shall include start/stop/run and trip.

Unit shall be supplied with

- Connection pipes
- Clamps
- Necessary relays for hard wired points to BMS For providing ON/OFF status And trip alarm

Units shall be available in following configuration 6 HP, 8 HP to 60 HP, within increments of 2 HP.

Outdoor Air Processing Unit:

For fresh air treatment an outdoor air processing unit shall be provided. Size will be as per BOQ. The unit shall be complete with long life filters and a wired remote controller. The unit shall be capable of cooling Mumbai ambient air of 37.7 deg C to a temperature of 18deg C.

The indoor processing unit shall be connected to VRV outdoor units of the specified capacities.

Where required drain pumps shall be provided.

The unit must include as standard equipment, maintenance free long-

life filter, resin net with mold resistant.

Specification for Controls System for VRV air conditioning system:

Wired Remote Controller:

Wired remote controller shall be supplied as specified in the “Bill of Quantities”

The controller must have large crystal display screen, which displays complete operating status.

The digital display must allow setting of temperature with 1 deg C interval.

Remote shall be able to individually program by timer the respective times for operation start and stop for a period of 1 week. Remote shall have 24 hrs. clock function.

Programming can be enabled or disabled. Provide scheduling of start/ stop and temperature limit- 5 settings per day.

Remote must be equipped with thermostat sensor in the remote controller that will make possible more comfortable room temperature control

The remote shall be able to monitor room temperature & preset temperature by microcomputer and can select cool/heat operation mode automatically.

The remote must constantly monitor malfunctions in the system & must be equipped with s “self diagnosis function” that let know by a message immediately when a malfunction occurs.

It shall be possible to wire the remote up to 500Rmt

Intelligent Control system:

Intelligent control system controller shall be supplied as specified in the “Bill of Quantities”. The System supplied must integrate with the VRV system. The VRV system supplied must be provided with a control system, from the supplier of VRV equipments. The required hard ware must be selected, suitable for up to minimum 128 indoor units.

Complete operation & monitoring of VRV air conditioning system shall be possible through the control system. Following functions shall be possible Control shall be capable of following:

- Controlling 128 indoor units

- Zone control
- Malfunction code display
- All the functions available with wired remote controller
- It should be possible to write the remote to 1000m
- Scheduling of indoor units,24hrs.clock & programming.
- Remote start/ stop of indoor units
- Graphical report
- Energy saving function
- Mal function report
- Monitor and report from remote side
- Interface for using BAC net or Lon works at Client's option
- Colour LCD touch panel icon display
- Multi language (English, French, Italian, German, Spanish & Chinese)
- Yearly schedule
- P.P.D. (Power Proportional Distribution Function)
- History of 500 actions
- Simple Interlock Function
- Fire Alarm System interface.

Following major functions shall be provided:

Monitoring	Air conditioning status monitoring. Indoor unit error monitoring. Indoor air inlet temperature monitoring. Filters choke sign monitoring.
Control, Operation & Setting	Start/Stop Control Temperature adjustment mode setting Remote control setting Temperature Setting Filter sign reset
Display	Air Conditioner operation setting & Status Set temperature Indoor unit error Indoor air inlet

	temperature Filter Sign
Measurement	Accurate operation time Number of switching times Power consumption with KWH meter Room temperature Outdoor temperature
Alarm	Fire Alarm interface

Necessary data cabling and connections shall be provided for remote

monitoring and Control of the complete VRV System.

- Remote monitoring of the complete HVAC system shall be possible.
- System shall be capable to take external signal like Security/Fire for forced shut off.
- Required hardware shall be suitable for operation between-10 Deg C to Deg C & humidity range, of 0% To 98%, without condensation.
-

Refrigerant Piping:

Piping shall be refrigerant grade hard copper piping as required. Pipe jointing shall be done using special fittings. Refnet joints supplied by VRV manufacturer shall be provided where required. Piping shall be suitable for the high pressure of R410a and piping thickness shall be increased accordingly.

Piping jointing shall be of the brazed type. The piping shall be tested at38.5kg/cm2. The indoor and outdoor units shall be connected with refrigerant piping. All piping connections for the units should be performed inside the unit. The refrigerant piping should be insulated with Armaflex/equivalent insulation as specified under insulation.

Brazing shall be carried out to the requirements of relevant code of practice using silver soldered brazing rods. Compression fittings will be accepted on refrigerant pipe work. After installation of the

complete piping the same shall be tested with nitrogen at 38.5 Kg.cm2.

After successfully pressure testing the pipe work the same shall be vacuumed to 7mm Hg and vacuum shall be maintained for 4 hours, vacuuming shall be achieved using a vacuum pump. Use of compressor for vacuuming shall not be permitted. Vacuum shall then be broken with R-410 a gas to atmospheric pressure. The pipe shall once again be vacuumed to 7mm Hg pressure. This exercise shall be carried out twice before the owner's representative before charging the refrigerant in the circuit.

Material Specifications

<table>
<tr><td>S No.</td><td>Item Description</td><td colspan="5">Specification</td><td>Make</td></tr>
<tr><td>.</td><td>Copper Pipe: Phosphoric acid De-Oxidized seamless copper pipe
1. Suitable for R410 A refrigerant
2. Tested as per JIS H3300
3. Should have clean inner surface and capped before delivery</td><td colspan="5"><table><tr><td>Size φ (mm)</td><td>Temper</td><td>Thick (mm)</td></tr><tr><td>6.4</td><td>O</td><td>0.80</td></tr><tr><td>9.5</td><td>O</td><td>0.80</td></tr><tr><td>12.7</td><td>O</td><td>0.80</td></tr><tr><td>15.9</td><td>O</td><td>1.00</td></tr><tr><td>19.1</td><td>½H</td><td>0.80</td></tr><tr><td>22.2</td><td>½H</td><td>0.80</td></tr><tr><td>25.4</td><td>½H</td><td>0.88</td></tr><tr><td>28.6</td><td>½H</td><td>1.00</td></tr><tr><td>31.8</td><td>½H</td><td>1.10</td></tr><tr><td>34.9</td><td>½H</td><td>1.21</td></tr><tr><td>38.1</td><td>½H</td><td>1.32</td></tr><tr><td>41.3</td><td>½H</td><td>1.43</td></tr></table></td><td>1. Mandev Tubes,
2. Rajco Metal Industries P Ltd.
3.MEXFLOW–MEHTA TUBES</td></tr>
<tr><td>2.</td><td>Brazing Rod: Hard Solder, Phosphor Copper Solder</td><td colspan="5"></td><td>Harris</td></tr>
<tr><td>3.</td><td>Drain Pipe- PVC with 10 kg/sqcm pressure rating</td><td colspan="5">Pipe size 32 mm dia and 3 mm thick for individual connections</td><td>1. Finolex,
2. Supreme</td></tr>
<tr><td>4.</td><td>Insulation-
Closed cell Elastomeric Foam insulation basis Nitrile Rubber with Temperature range-40 degC ~120 degC</td><td colspan="5"><table><tr><td></td><td>Gas Line (mm)</td><td>Liquid Line (mm)</td><td>Drain Line (mm)</td><td>Humidity</td></tr><tr><td>Pune</td><td>19</td><td>13</td><td>6</td><td>Low</td></tr></table></td><td>1. Armaflex,
2. Superlon
3. Aeroflex.
4. Kflex</td></tr>
</table>

5.	Protection on Outdoor Piping	1. Stainless Steel Covering; 2. Galvanized tray with cover; 3. Epoxy paint over woven 100 GSM GRP mat covering over insulation. The pipe should run in GI tray covered with sheet.	
6.	Adhesive for Insulation (Bond)	SR type: SR 998/SR505, Armaflex 520 adhesive Covering: Daikin: Nitrile Rubber Tape of Armaflex or AEROTAPE equivalent	1. Pidilite, 2. Armacell
S No.	Item Description	Specification	Make
7.	Supports for pipe	1. Steel Band type for any size, as shown in picture with hard covering (like PVC Sleeve) over insulation. Insulation used should be of same thickness as used on pipe line. 2. Clamp shaped with hard covering (like PVC Sleeve) over insulation. Insulation used should be of same thickness as used on pipe line.	
8.	Supporting Rods	Fully threaded rod: 1. For Units Installation: 10~12 mm thick with direct insertion in to the fastener 2. 10mm for idu upto 4TR and above it 12mm 3. For Pipe Installation: 6~8 mm thick with direct insertion in to the fastener	

9.	Power Cables: 1. Cable Size should be selected on larger of Minimum Circuit Amps or Total Over Current Amps. 2. Max. allowable voltage unbalance between phases is 2%.		1. Finolex, 2. Polycab
10.	Control Cables: 1. Control Wire should pass through 25mm PVC conduit.	Control Cable: Copper sheathed with proper earthing 2C x 0.75mm2~ 2C x 1.25mm2	1. Finolex, 2. Polycab
11.	R410a Refrigerant	Refer to saturation chart for R410a temperature and pressure relation.	1. Dupont 2. Honeywell

Submittals:

Manufacturer's Data: Submit certified dimensioned drawings, including total weight and support points.

Product Data: Submit fan curves, coil performance and acoustic data for each unit.

Testing Data: Inspect fan scrolls and remove objects or debris. Inspect and flush coils and remove debris or obstructions. Verify that all fire dampers are open and control dampers are to their proper position.

Record the following design requirement for fans and fan motors from the design drawings and reviewed shop drawings:

A. Manufacturer, model and size.
B. Air quantities-cubic feet per minute.
C. Approximate fan speed- revolutions per minute.
D. Fan static pressure (total or external) 0 inches of water
E. Outlet velocity-feet per minute.
F. Fan brake horsepower.
G. Motor horsepower
H. Volts, hertz, amperes and service factor at design conditions.
I. Record the following data from fans and fan motors installed at the projects
J. Manufacture, model and size.
K. Motor horsepower, service factor and revolutions per minute.
L. Volts, hertz, full load ampere and service factor.
M. Motor starter and heater size.
N. Equipment location.
O. Completely adjust fans and duct systems by the adjustment of sheaves, dampers, and other volume and diverting control devices, to obtain the air quantities indicated in the Contract Documents. Integral dampers in terminal outlets and inlets are not to be used for adjustment of duct branches. Adjust outside air and return air modulating dampers to admit the specified quantities of air under all cycles of operation. Adjust final air quantities within 5% of the design requirements. Balance air outlets, with air pattern as shown on the Drawings.

P. Record the following test data for fans and fan motors installed at project at final balanced conditions:

1. Fan speed –revolution per minute.
2. Fan suction, discharge and total static pressure (external or total)- inches of water Static pressure drops across filters, dampers, coils washers, and eliminators in the
3. Supply fan casing in inches of water.
4. Motor operating amperes and voltage per phase at operating conditions.
5. Fan cubic feet per minute as required above.
6. Calculated brake horsepower.

CASSETTE SPLIT A/C UNIT

a. The units shall be used for cooling and dehumidifying air.

b. The units, with capacities as per Bill of Quantities, should be factory assembled and tested prior to dispatch to site. Units should be Cassettte type with indoor unit housing evaporator coil, blower, and outdoor unit housing the condensers and fans.

Indoor Unit: Indoor unit should be designed for the ceiling suspended and the grille should be fitted on false ceiling. It should comprise of plastic cabinet, evaporator coil & centrifugal fan with drive. Indoor unit shall have fresh air connection capability,

Blower: The blower should be designed for rated flow at a low noise level (Below 46 dBA at full speed. It should have settings for operating at three different speeds.)

Grill: A grill manufactured out of tough grade of plastic should cover the unit from lower side. It should be provided with swinging type supply air louvers and fixed type return air louvers. Central core should be removable with synthetic filters clipped on it.

Remote Control: The unit should be fitted with a remote sensor having facility to receive signal from a wireless remote to control ON/OFF, thermostat setting, fan speed and swing operations.

Outdoor Unit: Outdoor unit should comprise of hermetically sealed compressor of capacity matching with the evaporator. The compressor should be capable of continuous operation at an ambient DBT of 450 C. Inverter Type Compressor to be provided. Gas has to be Green gas.

Condenser: Air-cooled condenser of adequate heat rejection capacity and condenser fan with motor should be housed within a weather proof sheet metal cabinet, along with compressor.Sufficient louvers should be provided for air movement over condenser & fan motor. The unit should have access panels to facilitate clearing & maintenance of internal components.

DRAIN PIPING:The drain piping shall be Heavy grade PVC. Pipe crosses shall be provided at bends, to permit easy cleaning of drain line. The drain line shall be provided up to the nearest drain trap and pitched towards the trap. Drain lines shall be provided at all the lowest points in the system, as well as at equipment, where leakage of water is likely to occur, or to remove condensate and water from pump glands. Drain valves for main lines up to 300 mm diameter shall be 25 mm in size and for line sizes

above 300 mm diameter the drain valve size shall be 40 mm.

PAINTING: All pipes supports, hangers, etc., shall be given two coats of red oxide primer. All pipes, which are not to be insulated, shall then be given two coats of finish paint, of a type and Internationally approved colour, as approved by the Engineer-in- charge.Whatever the location (in a dedicated room, outside, under a canopy) the pumps, electrical cabinets, water tanks will be installed on metallic structures/supports. All the complementary necessary supports, fixings and accessories are in the scope of work of this lot.

INSULATION

Piping Insulation: All chilled water, refrigerant and condensate drain pipe shall be insulated in the manner specified herein. An air gap of 25 mm shall be present between adjacent insulation surfaces carrying chilled water or refrigerant. Before applying insulation, all pipes shall be brushed and cleaned. All Pipe surfaces shall be free from dirt, dust, mortar, grease, oil, etc. All MS pipes should be provided with a coat of zinc chromate primer, followed by two coats of cold setting adhesive compound. The cladding should have an overlapping portion with self adhesive. For all places where the pipe is supported in pipe hangers, proper rubber or readymade insulated supports should be used.

Nitrile Rubber insulation shall be applied as follows:

- Insulating material in tube form shall be sleeved on the pipes.
- On existing piping, slit opened tube of the insulating material shall be placed over the pipe and adhesive shall be applied as suggested by the manufacturer.
- Adhesive must be allowed to tack dry and then press surface firmly together starting from butt ends and working towards centre.
- The protective tape on the overlapping portion of the cladding should be peeled off and then applied.
- Wherever flat sheets shall be used it shall be cut out in

correct dimension. All longitudinal and transverse joints shall be sealed as per manufacturer recommendations.

- The insulation shall be continuous over the entire run of piping, fittings and valves.
- All valves, fittings, joints, strainers, etc. in chilled water piping shall be insulated to the same thickness as specified for the main run of piping and application shall be same as above. Valves bonnet, yokes and spindles shall be insulated in such a manner as not to cause damage to insulation when the valve is used or serviced.
- For mechanical protection of the insulation the same should be covered along the complete length with kora cloth ot suitable fibre cloth.

For False ceiling insulation: For insulation of false ceiling surface, Phenotherm should be cut in the exact shape of the top surface of the tile and then stuck to individual tiles. Alternatively for using Fiberglass, Fiberglass slabs of density 48kg/cu.m. shall be inserted in high density polythene bags and then spread over the false ceiling and held into place by proper adhesive tape.

ELECTRICAL PANELS & CABLE

Conduits: Conduits shall be of mild steel and shall be Hard drawn, stove enameled inside and outside with minimum wall thickness of 1.6 mm for conduits upto 32 mm diameter and 2 mm wall thickness for conduits above 32 mm diameter. GI pull wires shall be installed in the conduit while laying the conduit.

Cables: M. V. Cables shall be PVC insulated aluminium conductor and armoured cables conforming to BIS Codes. Cables shall be armoured and suitable for laying in trenches, duct,and on cable trays as required. M. V. Cables

shall be termite resistant. Control cables and indicating panel cables shall be multi core PVC insulated copper conductor and armoured cables.

Wires: 415 volts grade PVC insulated copper conductor wires in conduit shall be used. Cable

Laying: Cable shall be laid generally in accordance with BIS Code of Practice.

Wire Sizes: For all single phase/ 3 phase wiring, 415 volts grade PVC insulated copper conductor wires shall be used. The equipment inside plant room and AHU / Fan rooms shall be connected to the control panel by means of insulated copper conductor wires of adequate size in exposed conduits.

Drawings: Shop drawings for control panels and wiring of equipment showing the route of conduit cable shall be submitted by the contractor for approval of Client & Consultant before starting the fabrication of panel and starting the work. On completion, four sets of complete “As-installed” drawings incorporating all details like, conduits routes, number of wires in conduit, location of panels, switches, junction/ pull boxes and cables route etc. shall be furnished by the Contractor.

Testing: Before commissioning of the equipment, the entire electrical installation shall be tested in accordance with relevant BIS codes and test report furnished by a qualified and authorized person. All tests shall be carried out in the presence of the Client’s engineers

LIST OF BUREAU OF INDIAN STANDARDS CODES	
IS: 277 – 1992	Galvanized steel sheet (plain & corrugated) wire for fencing
IS: 554-1985 (Reaffirmed 1996)	Dimensions for pipe threads where pressure tight joints are required on the threads.
IS:655-1963 (Reaffirmed 1991)	Metal air ducts

IS:659-1964 (Reaffirmed 1991)	Air conditioning (safety code)
IS:660-1963 (Reaffirmed 1991)	Mechanical Refrigeration (safety code)
IS:694-1990 (Reaffirmed 1994)	PVC insulated (HD) electric cables for working voltage upto and including 1100 volts
IS:732-1989	Code of practice for electrical wiring
IS:780-1984	Sluice valves for water works purposes
IS:822-1970(Reaffirmed 1991)	Code of procedure for inspection of welds
IS:1239 (Part-I)-1990	Mild steel tube
IS:1239 (Part-II)-1992	Mild Steel Tubulars and other wrought steel pipe fittings
IS:1255-1983	Code of Practice for installation and maintenance of Power Cables upto and including 33KV rating (second revision)
IS:1554-1988(Part-I)	PVC insulated (Heavy Duty) electric cable for working voltages upto and including 100 volts
IS:1897-1983 (Reaffirmed 1991)	Copper bus bar / strip for electrical purposes
IS:2379-1990	Colour code for the identification of pipeline
IS: 2551-1982	Danger notice plate
IS:3043-1987	Code of practice for earthing
IS:3103-1975(Reaffirmed 1999)	Code of practice for industrial ventilation
IS:3837-1976(Reaffirmed 1990)	Accessories for rigid steel conduit for electrical wiring
IS:4736-1986 (Reaffirmed 1998)	Hot-dip zinc coatings on steel tubes
IS:4894-1987	Centrifugal Fan
IS:5133-1969(Part I)(Reaffirmed 1990)	Boxes for the enclosure of electrical accessories
IS:5216-1982 (Part I) (Reaffirmed 1990)	Guide for safety procedure and practices in electrical work
IS:5312 (Part I)-1984 (Reaffirmed 1990)	Swing- check type reflux non return valves for water works
IS:5424-1989(Reaffirmed 1994)	Rubber mats for for electrical purposes
IS:5578 & 11353-1985	Marking and identification of

	conductors
IS:6392-1971(Reaffirmed 1988)	Steel pipe flanges
IS:8623-1993	Low voltage switchgear and control gear assemblies (Requirement for type / partly type tested assemblies)
IS:8623-1993(Part II)	Bust Bar Trunking system
IS:8828-1996	Circuit Breakers for over current protection for house hold and similar installation
IS:9537-1981 (Part I)	Rigid Steel Conduits for electrical wiring
IS:10810-1988	Methods of test for cables
IS:13947-1993(Part I)	General rules for low voltage switch gears and control gears
IS:13947-1993 (Part II)	Circuit Breakers IEC 947-2
IS:13947-1993(Part-IV)	Low voltage switch gear and control gear for contractors and motor starters
IS:13947-1993 (Part-V)	Control Circuit Devises
BS:EN:779-1993	Filters
ASHARE HAND BOOKS	American Society of Heating Refregeration and Airconditioning application 2003
	Fundamentals 2001 systems & Equipment 2000
	ASHARE indoor air quality standandar 62-1999
IEC	Relevant Sections

LIST OF APPROVED MAKES OF MATERIAL FOR ELECTRICAL WORKS

The Electrical Contractor shall supply the materials of the following makes and shall quote the rates applicable to them. Fill the last column about his makes to be used.

MATERIAL	MAKES RECOMMENDED
1)PVC wires- FRLS	Polycab / Finolex / RR
2)Cables	Polycab / Finolex / RR
3)Telephone & Coaxial cable	Polycab / Finolex / RR
4)Casing and capping	Modi / Presto-plast / Zeolite
5)PVC pipe / accessories	Precision / Finolex / Jain
6)Al. lugs	Dowels / CTI / Jainsons
7)Cable glands	Dowels / Jainsons / Braco
8)Switches (Modular)	Legrand Arteir / Achor Roma
9)Switches (Regular)	Anchor Penta / Vinay calir10
10)MCB / DB	Legrand Lexic DX series / Merlin-Gerin / Indo Asia
11)Under Floor Raceways or Cable Management System	Legrand / Honeywell
12)Light Fittings	Philips / Havells / Crompton / Wipro
13) Ceiling Fan-28W	Crompton / Havells / Usha (BLDC only)
14) Exhaust Fan	Almorand / Crompton /Usha / Havellls
15)Earth Strip / wire	EC Grade only
16)CAT-6 Cable	D-Link / Digisol
17)Cable Trays	Profab / Asian / Fabricated at site
18)MV Switchgear	
a)MCCB	ABB/Siemens / L&T / Schindler
b)S.F.Unit	ABB/Siemens / L&T / Schindler
c)HRC Fuses	ABB/Siemens / L&T / Schindler
d)Contactors	ABB/Siemens / L&T / Schindler
19)Meters (digital)	Conserve / HPL / Enite / Selec
20)Indicating lamps (Only LED type)	Teknic / Telemecanique
21)C TS / PT S	Kappa / AE / Pragati / Reco
22)Capacitors	Ducati / Prabodhan / Subodhan
23) PF Relay	Syntron / Ducati
24)Connectors	Wago / Connect Well
25)Transformer	Power Engineer / Silverline / Transfab
26)VCB	PCE / Megawin / ABB (with all protections like HT Meters, Relays, Indicators, CT / PT, etc.,)

27)Meter Cubical	Huppen
28)LBS	PCF / ABB / KEB Approved
29)Any other	To be approved by consultant
Above makes of materials are indicative. This shows the requirement of acceptable quality for work to be executed. The contractor shall get each & every material approved by the Electrical Consultant, before execution of the work. Some items listed above may not be in Contractors / Panel Builder scope. Quantities mentioned in the BOQ are also indicative, may very to any tune at the time of execution. Any item in part or in whole may get deleted at the time of execution	
Test certificates of all materials are to be submitted by Contractor time to time used at site by him.	
Liasioning means the Co-ordination of Electrical Inspector, Drawings to be submitted to the same Office, any submission to MSEDCL etc. shall be in the scope of the Electrical Contractor. In all respect contractor to get charging of connection at all respect	

SCHEDULE OF QUANTITIES					
FURNISHING WORK					
Sl. No	Description of Item	Qty.	Rate	Per Unit	Amount (Rs)
1	PARTITIONS				
1A	Solid Full Height Partition				
	Providing and fixing in position full height solid partition 75 mm thk. as indicated in the drawing excluding the door made out of aluminium hollow sections of 50mm x 50mm size of 2mm thick of (JINDAL / INDAL) make as internal framed structure placed horizontally & vertically in 550 mm x 550 mm / 600mm x 600mm center to center or as directed by the Architect. The alternate corner vertical members of the partition shall be taken up to the ceiling level (payment shall be made for the partition measured below the false ceiling level Only) and the same shall be anchored to the ceiling securely with help of suitable cleats. The Framework shall be fixed with 8mm thick BWP Grade Plywood (IS -710) of approved make on both sides finished as per following specifications. The partition to be finished with 1.0mm thick decorative laminate of approved manufacture on both sides Rate shall be inclusive of provision of pencil groove as directed by the Architect. Height of the partitions up to soffit of false ceiling / laminate finish top shall be considered for payment. Alternate, corner vertical members of the partition shall be fixed with necessary brackets /supports at RCC levels. The framework above the false ceiling shall not be considered for payment. The item does not include the doors.	2000		1Sft	
1B	Solid Full Height Glazed Partition				
	Location: Front façade and AGM, Meeting room cabin.				
	Size: Full height. Minimum height shall be 9’0” and the maximum height shall be 10’0” or ceiling height				

Sl. No	Description of Item	Qty.	Rate	Per Unit	Amount (Rs)
	Material: 12 mm thick. Toughened glass with Aluminium glass profile of Enox glazing profile EAPS- 1032 or equivalent make at bottom of the floor and the top below the ceiling.	175		1Sft	
1C	AEROCON WALLS (UPS Room)				
	Supply and installation of partition walls of 4" thick of finished with POP(Plaster of Paris) punning and Finished with 3 coats of approved colour of plastic emulsion paint over a primer coat . Aerocon blocks of size 7'-0"X3'-0" panels with all finishes as per instructions complete.	140		1Sft	
1D	4'- 0" HEIGHT PARTITION				
	Supplying & installation of solid partition made of 50mm x 50mm ' size aluminium framework of 2mm thickness & fitted with 6 mm thick BWP Grade (IS -710) plywood and finished with 1 mm thick decorative laminate of approved manufacture. The partition to be provided with a skirting made of BWP Grade (IS -710) of height 4" finished with1mm thick decorative laminate on both sides. The partition shall be fitted with 12mm thick Thoughened glass polished on all sides to a height of 1'-0" (included in 4'-0" depth) .	1350		1Sft	
2	ENTRANCE DOOR				
	Location: Main entry; Size: Main door - Average size – Double leaf – 1800 mm width x 2400 mm (min.) height. Material: 12 mm thk. Clear edge polished toughened glass. Hardware: SS Floor Spring, Latch lock/Dead Lock (Bottom or Center) , SS Handle "H or D" type (900 Long and 25 mm dia). Installation of fully glazed frameless glazed door (Single or double leaf of size as mentioned in drawing and as directed by the Architect) made out of 12 mm thk. Toughened glass and the door shall be				

	fixed with, floor springs with SS finish patch fittings on top, bottom. The door shall have lock in the center of approved make and 900 mm long SS handles of 25 mm dia to be fitted horizontally/ vertically as per instructions of the Architect.				
	The Rate shall be including the making of necessary holes in glass for Access control locks, complete in all respects with all hardware, fittings, fixtures etc. complete . All necessary hardware, fittings, fixtures to be approved from the Architect or ECGC Officials before actual application of the same. Any change in the specifications must be first approved by ECGC/ Architect.	84		1Sft	
2A	GLAZED DOOR (AGM, Meeting room, conference)				
	Supply and Installation of fully glazed frameless glazed door (Single or double leaf of size as mentioned in drawing and as directed by the Architect) made out of 12 mm thk. Toughened glass and the door shall be fixed with (Dorma ,Hafele , Enox) make floor springs with SS finish patch fittings on top, bottom. Lock shall be of (Dorma ,Hafele , Enox). The door shall have lock in the center of approved make with 450 mm to 600 mm long SS handle of 25 mm dia. to be fitted horizontally/ vertically as per instructions of the Architect. The Rate shall be including the making of necessary holes in glass for Access control locks, complete in all respects with all hardware, fittings, fixtures etc. complete. All necessary hardware, fittings, fixtures to be approved by ECGC/ Architects before actual application of the same. Any change in the specifications must be first approved by client.	42		1Sft	
2B	PARTITION DOORS				

	Supply and installation of flush door 30mm thickness of size 3'-0" x 7'-0" Shutter shall be finished with 1.0 mm thick. laminate on both sides of approved shade and design. Door shall be lipped with 12 mm thick. TW beading along the edges. There shall be a provision of vision panel 8 mm thick clear float glass of size 300 mm x 300 mm with 12 mm TW beading around. The rate shall be inclusive of hardware, fittings, fixtures etc. a heavy duty SS such as lock of 6 lever of Godrej or Doorset make with SS mortise handle of approved make and model. Rate shall be inclusive of open door closers, SS heavy duty hinges, tower bolts, SS foot operated door stopper, SS buffer along the back side and any other related hardware , fittings, fixtures etc. required. The item shall include polishing of edges and frames in melamine , PU , paint as approved by the Architect.	200		1 Sft.	
2C	Supply & installation of door for UPS room made of 25x25 mm Mild Steel frame with members placed 220mm center to center vertically and 300 mm center to center horizontally covered with 12mm Calcium Silicate Board on both sides duly finished with putty and 2 coats of approved colour of plastic emulsion paint	21		1Sft	
3	FULL HEIGHT STORAGES FINISHED IN LAMINATE				
	Location: As per drawings, in back office area Size:Length as available size, 450 mm (D) and2400 mm (H). Material: 18 mm thick. BWP Grade Plywood(IS -710) finished with approved colour of 1mm thick decorative laminate on outside & 0.8 mm thick laminate on the inside .				
	Maintenance: Surfaces, exposed hardware & stain-prone areas should be cleaned with a soft damp cloth dipped in a mild soap solution, once a day.				
	SPECIFICATIONS FOR FULL HEIGHT STORAGES FINISHED WITH LAMINATE				

	Providing and fixing full height storage cabinet made out of 18mm thick BWP Grade Plywood (IS -710) of approved make including the fixing of shelves at 400 mm to 450 c/c and the shutters shall be in 18 mm thick BWP Grade Plywood (IS -710) and back covered with 18 mm BWP Grade Plywood (IS -710) The shutters shall be divided vertically into 2 parts and shall be fixed with “S” type L-hinges of approved make so as to get an equal 8 mm groove between all the shutters at the opening and hinged end of every shutter . The shutter shall be fixed with SS chain from inside so as to open the shutter less than 90 degree and to avoid the breaking of laminate at the hinged end. The shutters shall be finished externally with approved quality 1.0 mm thick. laminate and internally finished with 0.8 mm thick laminate. The rate shall be inclusive of provision of SS “D”type handles 4” or 6” as approved, Godrej locks with 3 keys, tower				
a	2'-6" Height	300		1Sft	
c	7'-0" Height	250		1sft	
4	GYPSUM False Ceiling :				
	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, screw fixed to				

	brick wall / partitions with the help of nylon sleeves and screws, at min. 600 mm centers. Then suspending G. I. (Galvanised Iron) intermediate channels 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, grilles diffusers shall be made. Necessary cutting / providing openings in the ceiling for AC fixtures, grilles, 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 doors (to inspect air-conditioner) of size 600 X 1200 mm 3Nos 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	1200		1Sft	

	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 including all type of tools, tackles, finishing etc complete as per approved sample & instructions of Architect/ Client. sample mock shall be approved by Architect/ Client. The ceiling to be complete with 3 coats of plastic emulsion paint over a primer coat.				
5	MODULAR FALSE CEILING - ARMSTRONG / equivalent make				
	Armstrong Classic Lite H1892M with “Suprafine Silhouette” detail. Location: ME-lobby Size: 600 mm x 600 mm (tile size). Material specifications: Size: 600 mm x 600 mm and 15 mm thk. Sound absorption (NRC): 0.55 Light reflectance of > 84% (WT) Thermal conductivity k = 0.052 - 0.057 W/M0k 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.				
	MODULAR CEILING: Providing and fixing modular false ceiling tiles of 600 mm x 600 mm center to center and 13 mm thick square mineral fiber 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 as approved by ECGC.	2,550		Sft	
6	SIDE UNIT - OFFICER TABLE(AM's & EO"s)				

	Providing a side unit of size 3''0" x 1’6” x height 2’6” made of 18mm thick BWP Grade Plywood (IS -710) for shelf, the shutters to be a sliding type and made of 18mm thick BWP Grade (IS - 710) and finished with 1.0mm thick approved colour of decorative laminate on the outside & inside surfaces finished with approved colour of 0.8mm thick decorative laminate. The exposed edges lipped with TW beading of size 1’ x ¾” and finished to desired wood effect by melamine polish after necessary surface preparation. The side unit to be complete with all accessories such as knobs, handles, lock & key arrangement of approved quality.	20		1No.	
7	ROLLER BLINDS				
	The roller blind system consist of a coated aluminium tube of 38 mm diameter with provision of fabric clamping. The Fabric is rolled up and down through a chain drive system with built in drivegear and an over run brake system. The side brackets are universal type suitable both for wall and ceiling mounting. The bottom end of the fabric is rolled over an oval shape aluminium tube with provision to lock the fabric.	520		1 Sft	
8	CENTRE TABLE				
	SIZE: - 450mm x 450mm x 450mm Ht (AGM Cabin & Reception)				
	Providing and making center tables of above mentioned size. Table top shall consist of 12 mm. Thk .float glass with champhered edge(bevelled edge) fitted to the frames with necessary arrangement. The base shall be made up of Steam beech wood frame as directed by the ECGC / Architect. It should be with 4 Nos of 20mmx35mm for vertical members tied in X pattern with 20mm x 35mm frames at bottom and All wooden frames to be finished with melamine polish after necessary surface preparation.	2		1No	
10	PIN-UP BOARD / SOFT BOARD				

	It is useful for the staff to pin-up the important notices, memos and Bank's related information and which needs to be visible. Material: 15 mm thick Pin-up board (soft board) with 18 mm thick. BWP Grade (IS -710) backing covered with approved coloured "Vermillion / Beige colour " fabric on SS supports. Maintenance: All surfaces should be cleaned with dry cloth/ duster daily with a soft damp cloth dipped in a mild soap solution.	75		1Sft	
11	PANTRY COUNTER (2'-0" WIDE) (BLACK GALAXY)				
	Providing and laying platform of 2'-0" width (clear) and at 2'-6" height (top) above Floor level finished with approved 20mm thick jet Black granite with bull nosed edges. The rate shall include the profile cutting and fixing counter wash basin and polishing the exposed edges of granite. A 2" granite facia shall be provided below the nosed edge.	20		Rft	
12	Supply and fixing, "Parry ware" or equal approved make, stainless steel sink having over all size of 1000 x 500mm single bowl with drain board and chromium plated waste coupling supplied with sink by the same manufacturer, providing bracket made of 25 x 25 mm x 3 or 4 m thick size M.S .Angle, applying 3 coats of anti-corrosive paint, grouting the same into wall with concrete of 1:3:6mix, fixing the sink, drain board to a perfect level to match work platform in kitchen, cutting grooves in masonry, restoring the same to their original condition, testing and commissioning etc., complete.	1		1NO	
13	KEY HANGING CUPBOARD				
	Supply & Installation of Key hanging cupboard made of boxing of 12mm thick BWP grade Plywood (IS-710) of size 3'-0"x2'-0" & depth 100mm made of 4mm thick clear float glass shutters held in 3"x1" paint quality TW frames .All plywood surfaces finished with approved colour of 0.8mm thick decorative laminate.	2		NO.	
14	SOFA				

	Providing 2 seater sofas and sofas in reception of size 1800mm x 750mm respectively made of 50mm x 50mmGypsteel framework at specified intervals and stuffed with good quality foam and upholstered with desired color and pattern of fabric (polyester of not less than Rs.300/- metre to be approved by architect).				
a	2 Seater sofa	3		1No	
b	3 Seater sofa	2		1No	
16	WALL/COLUMN PANELLING				
	Providing and fixing of wall paneling 6mm thick BWP Grade (IS -710) plywood on aluminium hollow sections of 50mm x 25mm size 2mm thick of (JINDAL /INDAL) make as internal frame structure placed horizontally & Vertically in 550 mm x 550mm or 600mm x600mm center to center or as directed by the architect. and then finished with 1.0 mm thick laminate of approved manufacture. All wood work shall be finished with two or more coats of melamine or PU polish over one coat of sealer.	1100		1Sft	
	TOTAL EXCLUDING GST				

Signature of the Tenderes

With the Seal of the company

Date:

Place:

ELECTRICAL & DATA CABLING WORK					
Sl.No	**Description of Item**	**QTY**	**RATE**	**UNIT**	**AMOUNT**
1	**MAIN SWITCH**				
1.1	Providing and fixing 250 A TPN onload (Change over switch) suitable enclosure etc.,	1		No	
1.2	Providing and fixing 250A TPN MCCB 35 KA , in suitable enclosure for main power etc.,	1		No	
2	**Main SUB PANEL BOARD**				
	Supplying, fabricating, installation, testing and commissioning of floor mounted Panel Board made of 16G CRC sheet in welded construction along with suitable and compact cable chambers including necessary stiffeners, self supporting, modular constructions, compartmentalized pattern complete with copper bus bars, copper interconnections etc. ring main earthing with 35x 10 mm copper flat, suitable earthing of all switch gear components with 6sqmm multistranded copper flexible PVC insulated ends terminated with suitable crimping type copper cable sockets and tinning at all tapping connections complete as required. The copper bus bar flat shall be provided for the entire length of bus chamber. The panel board shall be powder coated to grey shade after undergoing 7- tank process. The rate shall include the cost of providing necessary base channel for erection complete with anchor fasteners/ foundation bolt, and nuts etc., and all other connected civil works for grouting the panel. The panel shall be provided with the following:- Incomer : 1 No. 250 A TP&N MCCB (35KA) 1 No. instrument panel comprising of 1 No. 0-500V 75mm square flush mounting Digital Voltmeter with built in selector switch, 1 No. 0-100 A 75mm Sq. flush mounting Digital Ammeter with built in selector switch and 200/5A cast resin CTs) Outgoings:- 1 No 125A TP & N MCCB (25 KA) for split A/C 10 No. 63 A TP&N MCCB (25KA) for A/C (2 Lighting DB, 2 Nos Power DB, 2 Nos UPS) 1 No. 32 A TP&N MCB (25KA) for (Spare)				

Sl.No	Description of Item	QTY	RATE	UNIT	AMOUNT
	1 set 250 A capacity copper bus bars with 4 nos 35mm x 10mm copper flats for 3 phases and neutral duly insulated with PVC collor sleeve (heat shrink) mounted on SMC/DMC base block.	1		Set	
3	**DISTURBUTION BOARDS**				
3.1	**PDB - 1**				
	Supply, installation, testing and commissioning of wall mounted Vertical DB type 6 way 3 phase, Distribution board (PDB - 1) with double door concealed in wall and fabricated out of 16 Swg CRCA and powder coated to grey shade after undergoing 7- tank process. The rate shall include the cost of chasing the wall and concealing the same including making good the surfaces smooth to receive the putty and painting. The DB shall comprise of the following:- 1 No. 125A 4P MCB as incomer. Outgoing each with 1 No.63A DP ELCB+MCB(100mA) and 18 nos 35/25/20 SP MCB as outgoing with necessary interconnections copper wires etc.,	1		No	
3.2	**PDB - 2 (Raw Power DB)**				
	Supply, installation, testing and commissioning of wall mounted cubicle type 6 way 3 phase, phase segregated Distribution board (PDB - 1) with double door concealed in wall and fabricated out of 16 Swg CRCA and powder coated to grey shade after undergoing 7- tank process. The rate shall include the cost of chasing the wall and concealing the same including making good the surfaces smooth to receive the putty and painting. The DB shall comprise of the following:- 1 No. 63A 4P MCB as incomer. sets of out going each with 1 No.63A DP ELCB+MCB(100mA) and 24 nos 25/20/16A SP MCB as outgoing with necessary interconnections copper wires etc.,	2		1No	

Sl.No	Description of Item	QTY	RATE	UNIT	AMOUNT
3.3	**LDB**				
	Supply, installation, testing and commissioning of double door, wall mounting type, 8 way 3 phase, phase segregated Distribution board (LDB - 1) fabricated out of 16 G CRCA sheet steel, powder coated and with 10KA type 'C' MCB's. The rate shall include the cost of chasing the wall and concealing the same including making good the surface smooth to receive the patty and painting. The DB shall comprising the followings. 1 No. 40A 4P (25KA) MCB as incomer. 3 sets of out going each with 1 No.40A DP ELCB+MCB(100mA) and 24 nos 10/6A SP MCB as outgoing with necessary interconnections copper wires etc.,	2		No	
3.4	**UPS MAIN DB**				
	Supply, installation, testing and commissioning of wall mounted cubicle type 4 way 3 phase Vertical Distribution board (for UPS Main DB) with double door concealed in wall and fabricated out of 16 Swg CRCA and powder coated to grey shade after undergoing 7- tank process. The rate shall include the cost of chasing the wall and concealing the same including making good the surfaces smooth to receive the putty and painting. The DB shall comprise of the following:-				
	1 no 63A 4P MCB Isolator as incomer 24nos 40/63A TP MCB as outgoings with necessary interconnections copper wires etc.,	1		Set	
3.5	**UPS DB - 1**				
	Supply, installation, testing and commissioning of wall mounted powder coated 12 way single phase Distribution board (as UPS DB 1) with double door concealed in wall and fabricated out of 16 Swg CRCA and powder coated. The rate shall include the cost of chasing the wall and concealing the same including making good the surfcaes smooth to receive the putty and painting. The DB shall comprise of the following:-				

	1 no 63A DP MCB as incomer 12 Nos. 10/6A SP MCB as outgoing for computer nodes with necessary interconnections copper bus bars etc.,	3		Set	
3.6	**AC BOX**				
	Supply, installation, testing and commissioning of wall mounted powder coated Single phase AC Box 25/32 A MCB etc…	1		1No	
3.7	Supply and Installation of 63A FP MCB housed in manufacturer's powder coated MS box for 7.5/10 KVA UPS input control	2		No	
3.8	Supply and Installation of 80/63A DP MCB housed in manufacturer's powder coated MS box for 7.5/10 KVA UPS output control as per the UPS manufacturer requirement .	4		No	
4	**Cables and Cable Terminations**				
4.1	Supply & laying of 4 **core 95 sq.mm aluminium armoured LT UG XLPE cable** laid above the ground and clamping the same at adequate intervals to the slab/beam/wall etc. from 200A EB Main FSU switch, to Main Panel along with 2 runs of 10 SWG copper wire for earthing.	25		Mt	
4.2	Supply & laying of **4 core 35 sq.mm copper flexible cable** laid above the ground and clamping the same at adequate intervals to the slab/beam/wall from Main Panel to AC Main DB input on the suitable PVC pipe with 2 runs of 2 Rx 10 sqmm green wire for earthing.	10		Mt	
4.3	Supply & laying of **4 core 25 sq.mm copper Ar cable** laid above the ground and clamping the same at adequate intervals to the slab/beam/wall from main panel to Main on the suitable PVC pipe with 2 runs of 2 Rx 10 sqmm green wire for earthing.	100		Mt	
4.4	Supply & laying of **4 core 16 sq.mm copper Ar cable** laid above the ground and clamping the same at adequate intervals to the slab/beam/wall from Main Panel to UPS Main DB on the suitable PVC pipe with 2 runs of 2 Rx 10 sqmm green wire for earthing.	50		Mt	
4.5	Supply & Laying of **4 runs of 6 sqmm plus 2 runs of 4 sqmm copper conductor wire** drawn through 25mmØ PVC Conduits of 2mm thick	100		Mt	

5	Providing end terminations for the above cables using double compression brass gland and copper crimping socket including earthing the cable glands with copper earth clamp and connecting the same to earth along with 14SWG copper earth wire for the following cables:				
5.1	for 4 core 95 sqmm aluminium armoured LT UG cable.	4		No	
5.2	for 4 core 35 sqmm Copper armoured cable.	4		No	
5.3	for 4core 25 sqmm Copper armoured cable.	16		No	
5.4	for 4core 16 sqmm Copper armoured cable.	4		No	
5.5	Supply & Running 4core 16sqmm copper armoured cable and 1Run 10Wsg earth wire(LDB & Power DB)	60		mtr	
5.6	Supply and fixing water proofing box with 63A 4DP MCB with accessories	13		No	
5.7	Supply of double door IP:43 6way VTPN With MCCB & MCB VDB with following. The same shall be concealed to the wall(UPS Input Main DB) 1 no incomer feeder fitted with 1 no 100A 4-pole MCCB, 25kA 3nos 32A/16 SP MCBs, as outgoing feeders 3nos of 63A TP MCBs as outgoing feeders	1		1No	
6	**Lighting Wiring (for Lighting)**				
	Supply and installation of 2R 2.5 + 1 R 1.5 sqmm PVC insulated multi strand FRLS copper wire drawn in 20/25mm dia pvc conduit to be laid in partitions etc complete with all accessories including providing necessary marking of circuits with ferrules etc complete.	350		Mt	
7	**Raw Power Wiring**				
	Supply and installation of 2R 2.5 + 1 R 1.5 sqmm PVC insulated multi strand FRLS copper wire drawn in 20/25mm dia pvc conduit to be laid, partitions etc complete with all accessories including providing necessary marking of circuits with ferrules etc complete	400		Mt	
8	**UPS Wiring**				
	Supply and installation of 2R 2.5 + 1 R 1.5 sqmm PVC insulated multi strand FRLS copper wire drawn in 20/25mm dia pvc conduit to be laid, partitions etc complete with all accessories including providing	500		Mt	

	necessary marking of circuits with ferrules etc complete				
9	**Lighting**				
	Wiring of light, fan points				
	Providing and laying point wiring for lights, fans, exhaust fans, 6A plug points etc., partly laid in surface conduits (above false ceilling) and necessarily concealed in recessed conduits in wall / partition / vertical drops, etc with 3 runs of 1.5 Sq.mm PVC insulated Flame Retardant Low smoke Cable (FRLS) with copper conductor in 20/25 mm dia. PVC conduit pipe 16G thick as per IS 9537 Part II including all accessories like base clamp, bends, couplings, junction boxes, rubber bushes, etc., along with supplying and fixing 6A modular type switches of approved make with front plate for control housed in metal boxes recessed in wall/partitions made from electro plated sheet metal box of.				
	approved make including giving connections complete as required. The rate shall include the cost of providing and fixing necessary threaded MS powder coated ceiling suspended pipe/rod along with slotted U channel including securing the same with clamp / cable tie as required wherever required				
9.1	1 light controlled by one switch.	72		No	
9.2	2 light controlled by one switch.	15		No	
9.3	ceiling fan point along with 100W step type electronic regulator.	8		No	
9.4	Wall fan point with 5A socket	15		No	
9.5	Same as above item but for exhaust fan excluding regulator.	6		No	
9.6	Wiring for call bell points with modular bell push, modular type buzzer, with indicator and reset button.	2		No	
10	**Supply and fixing of Light fittings and Fans**				

	Supply and Installation of following light fittings complete with all accessories like and also the necessary mounting accessories				
10.1	Supply and installation including assembling testing and commissioning of **600 x 600 mm** modular recess mounted with **38W LED (Philips or Equivalent Make)** and suspended from ceiling either with 20mm dia 16 swg thick MS conduit (ISI marked) down rods (0.8mt long approx) and heavy duty ball and sockets sealing plate, check nuts etc or with 8 SWG GI chain and giving connections.	48		No	
10.2	Supply and fixing of fixing recess mounted **15Watts LED (Philips or Equivalent Make)**down light to be mounted on false ceiling.	30		No	
10.3	Supply and fixing of 230mm dia light duty exhaust fan with auto gravity louvre.**(Crompton or Equivalent Make)**	6		No	
10.4	Supply and fixing of 1x20 (4'-0") Watts LED Tube light fixture along with electronic ballast and lamp.**(Philips or Equivalent Make)**	20		No	
10.5	Supply and fixing of 1x10 (2'-0") Watts LED Tube light fixture along with electronic ballast and lamp. **(Philips or Equivalent Make)**	4		No	
10.6	Supply and fixing of 48" sweep ceiling Fan including standard down rod **(Crompton or Equivalent Make)**	8		No	
10.7	Supply & Installation of 12" Wall mounted fan **(Crompton or Equivalent Make)**	15		P/No	
11	**Sound systems**				
11.1	Providing and fixing 20mm dia rigid PVC pipe 2mm thick along with accessories laid above false ceiling including clamping the same to wall / slab / beams / partitions etc., along with providing suitable GI guide wire.	200		Mt	
11.2	Supplying and laying of 2Core 24/0.2 mm ATC Twin Twisted Speaker wire within the above 20mm dia PVC conduit including giving connections.	300		Mt	

11.3	Supply & Installation of **Philips / Bosch make** 6W False Ceiling mounted speaker with necessary accessories including line matching transformer.	15		Nos	
11.4	Providing and fixing resistance type volume control knob along with modular front plate housed in the manufacturers zinc passivated MS box with front plate including concealing the same in the wall / partition and making good the surfaces smooth.	5		Nos	
11.5	Providing amplifier of 60 Watts **Ahuja make** with CD player with pen drive option for playing light /instrumental music	1		Set	
12	**Telephone cabling and Data**				
12.1	Supply and laying of 0.6mm dia copper conductor, PVC insulated 4 pair CAT 05 CABLE telephone cable on the PVC conduit.	450		Mt	
12.2	Supply and laying of 0.6mm dia copper conductor, PVC insulated 10 pair telephone cable on the PVC conduit from Main BSNL krone to the office	150		Mt	
12.3	Supply and installation of modular type single RJ-11cat 05 TYPE telephone socket housed in the manufacturers zinc passivated MS box with front plate. i/o TYPE	27		No	
12.4	Supply and laying 20 pair krone connector housed in heavy duty metal/ABS plastic mould with suitable locking arrangements.	2		No	
13	Supplying and fixing 3Nos 6 A shuttered socket outlet controlled by 2 Nos10A SP switch with front plate housed in a suitable elctro plated sheet metal box of approved make box recessed in wall for UPS	35		Nos	
14	Supplying and fixing 1Nos 6 A controlled by 1No 6 A switch shuttered socket outlet controlled by 2 Nos10A SP switch with front plate housed in a suitable electro plated sheet metal box of approved make box recessed in wall for UPS	32		Nos	
15	Supply and installation of 2 nos 16A 5-pin socket with 2 nos of 16A modular switches housed in MS fabricated box to be concealed in wall/ partition for server and line printer.	15		No	
16	Supply and fixing 20A modular master double pole switch with front plate housed in suitable zinc passivized metal box to be fixed in partitions or concealed in walls.	25		No	

17	Supply & installation of GI Race Ways of approved manufacture of size 150 mm x 50 mm with cap, including all civil works, the floors appropriately & covering opening after laying race ways.	300		Mtr	
18	**Earthing**				
a	Supply, installation, testing and commissioning of earth electrode as per IS 3043 (**to be connected to UPS neutral only**) using 600x600x3mm copper plate fitted with 2 runs of 25x3mm copper flat riveted to the plate using copper rivets with a link on top for tapping connections including all accessories like 40mm dia B class GI watering pipe 2.5m long with funnel. The electrode and pipe shall be buried to the 2.5m depth with alternate layers of salt and charcoal. The rate shall include the cost of proving 450x450x300mm brick masonry chamber covered with removable FRC cover with holes to receive water along with RCC outer frame.	2		No	
b	Supply, installation, testing and commissioning of cast iron earth electrode as per IS 3043 using 100mm dia x 5/6mm thick cast iron pipe 3.0m long with funnel. The pipe shall be buried to the 3m depth with alternate layers of salt and charcoal. The rate shall include the cost of proving 450x450x300mm brick masonry chamber covered with removable FRC cover with holes to receive water along with RCC outer frame	1		No	
c	Supply and laying of 1R 10 Sqmm PVC insulated copper wire drawn in 25mm dia PVC pipe from plate earth electrodes to UPS-1,2 earth points and terminating both the ends with proper crimping type copper sockets to the earth links. The conduit will be partly underground and partly clamped on wall.	80		Mt	
d	Supply & Laying of 8SWG copper Wire for earthing Main panel board, Sub Main Panel Board, APFC panel and 125A Change Over Switch with ends terminated with copper cable sockets. The rate shall include the cost of providing and fixing earth bus using 25x3mm copper flat with holes for tapping connections with brass bolts and nuts.	100		Mtr	
II	**DATA CABLING WORKS (Structured)**				

1	Providing and laying 25mm dia PVC conduit of 2mm thickness for drawing data wires from server to various nodes with all necessary accessories like bends, couplings, junction boxes etc laid through false flooring, partitions walls (including and making good the surface).	400		Mt	
2	Supplying and laying UTP CAT 6 (Systimax) through the above PVC pipes / Raceways for data.	800		Mt	
3	Supply and installation of CAT 06 -RJ45 female jack (single plate).	32		Nos	
4	Installation and connecting of 24 port switch 1000 Mbps D link make	3		Nos	
5	Supply and installation of 12U closed rack.	2		Nos	
6	Supply and fixing 1 metre mounting cord (Systimax).	32		Nos	
7	Supply and fixing 2 metre mounting cord (Systimax).	32		Nos	
8	Termination and integration charges per set of nodes (Two ends) and testing, certification (Systimax) and documentation of all works.	32		Nos	
18	**Conference room requirements**				
	(Public Address system) Wall mount speaker,8wAmplifier,Volume control units, Wiring for speaker Power points & data points for LCD projector & TV			L.S	
19	Buy Back for dismantling & taking away the Old materials (i.e) DB's, Light fittings, Wiring ,etc from the old Office.			L.S	
	TOTAL(Excluding GST)				

Signature of the tenders

With the seal of the company

Date

Place

AIR CONDITIONING WORK					
Sl.No	Description of Item	QTY	RATE	UNIT	AMOUNT (Rs)
A	AIR-COOLED DUCTABLE SPLIT AIRCONDITIONERS - 25.5 TR				
1	AIR COOLED DUCTABLE SPLIT AIRCONDITIONER : Supply of Ceiling suspended Air Cooled Ductable Split air conditioner. The indoor unit shall be ceiling suspended type. The Indoor unit shall comprise of Fan, Cooling coil, Filter and Expansion device. The Outdoor unit shall comprise of Hermetic scroll Compressor, Air cooled condenser & Condenser fan. Compressor shall be cut-off automatically under part load conditions. The unit shall have microprocessor controls. The unit shall be factory assembled and only the refrigerant piping carried out at site. The operating refrigerant shall be 410 A. Only Copper coils will be considered.				
	8.5 TR Nominal Capacity Unit	3.00		Nos	
2	Inland transportation to site, Lifting and placing at the terrace Installation, Testing, Commissioning and Handing over the Air cooled ductable split air conditioners.				
	8.5 TR Nominal Capacity Unit	3.00		Nos	
3	Supply of HIWALL type Split Air-conditioner . The unit should be complete with ABS plastic panel mounted indoor unit, synthetic media washable filter, 2 stage Catechin-Dust filters, remote facility display panel , cordless digital remote controller, 3-speed fan with auto fuzzy logic control, 1 phase FIXED SPEED ROTARY / SCROLL compressor and all accessories . The other features to be included are refrigerant flow control, manual horizontal louver, motorized vertical louver, air flow direction control, hydrophilic evaporator fins and anti-corrosive blue condenser fins with COPPER condenser coil. Refrigerant-R-32				
	HI-WALL SPLIT AC-fixed speed- 1.0 TR - Latest 3 Star BEE Rating (for Server Room)	2.00		Nos	
4	Inland transportation to site, Lifting, Installation, Testing, Commissioning and Handing over of the above Split Air-	2.00		Nos	

	conditioner.				
5	REFRIGERANT PIPING : Supply, Installation and Testing of Refrigerant piping consisting of Suction/ Liquid line piping and fittings with 13 mm thick closed cell elastomeric insulation for the suction lines and finished with FACTORY LAMINATED GLASS CLOTH. The piping shall be carried out with hard drawn copper pipes (minimum 18 G wall thickness) with soldered / brazed socket fittings. Complete piping workmanship to be carried out as per recommended practice. The piping to be vaccum tested and leak tested. Scope includes all refrigerant pipes shall be properly supported and anchored to the building structure using steel hangers, anchors, brackets and supports etc which shall be fixed to the building structure by means of inserts or expansion shields of adequate size and number .				
a	1-1/8" dia(28.6 mm) with 13 mm thick insulation	45.00		Rmt	
c	5/8" dia(15.9 mm)	45.00		Rmt	
6	Supply, Installation of copper refrigerant pipe insulated with tubular nitrile rubber insulation and finished finished with FACTORY LAMINATED GLASS CLOTH, including supports for copper pipes such as angles, tray, rods, etc. This is over and above the 3 mts free kit to be provided along with the Hi wall split units. (1 Rmt means 1 Run of supply pipe and 1 Run of return pipe).	10.00		Rmt	
7	Nitrogen Pressure Testing at site (per circuit)	3.00		Lot	
8	Supply and First Charging of R-410A additional refrigerant gas.	1.00		Lot	
9	Supply and installation of cotrol cable carried out with 8 core x 1.5 sqmm shielded cable including PVC conduit, between indoor unit panel to outdoor unit	45.00		Rmt	

10	DRAIN PIPING : Supply, Installation and Testing of UPVC heavy class drain piping insulated out of 9 mm thick Class O closed cell elastomeric nitrile rubber material of approved make as per specification complete with supports, consumables, fittings, pipe sleeves, U trap & leak arresting of following sizes.				
a	25mm	25.00		Rmt	
b	32mm	30.00		Rmt	
11	Pressure Testing & Charging of Refrigerant as required	2.00		Lot	
12	Supply and Installation of GSS powder coated stand for the outdoor unit suiting the site conditions.	2.00		Nos	
13	Supply, Installation, Testing and commissioning of Voltage stabilizers of with over current and under current voltage protection, copper transformer - 25 V boost and buck and 2 minutes time delay system.				
	4 KVA Voltage Stabilizer	1.00		Nos	
14	S & I Timer Switch with Contactor (For AC)-25/32 A	1		P/No	
15	Supply and making end termination of cables including providing single compression type cable gland, sockets, crimping lugs, insulation tape including gland earthing with adequate copper clamps and adequate bare copper wire connecting to the main bus bars.	3.00		Lot	
16	FABRICATED STEEL WORK: Supply, Fabrication, Cutting, Welding, Erection at site and painting of M. S. Angle structural steel work for outdoor unit location etc based on the approved drawings. The work should be carried out as per good manufacturing and installation practices in concurrence with approved drawing. Finally all steel work to be painted with one coat of zinc chromate primer and two coats of synthetic enamel paint.	100.00		Kg	
17	GSS FACTORY FABRICATED RECTANGULAR DUCTING Supply, Installation, Testing & Commissioning of Factory Fabricated Rectangular Galvanised Steel Sheet Ducting made of Lock-forming quality GSS Class VIII ; complying with IS: 277 and having 120 GSM coating classification with				

	4-bolt TDC joint, GI full threaded rods and GI slotted channel support /hangers with bolts, nuts neoprene fire retardant gaskets and sealed with RTV / silicon sealant, elbows, turning vanes, slip on flanges, in accordance with the approved shop drawings and specifications , sizes and quantities as below :				
a	24 G - 0.63 mm - Rectangular	150.00		Sqm	
b	22 G - 0.80 mm - Rectangular	50.00		Sqm	
18	FLEXIBLE DUCT CONNECTOR: Supply and installation of Flexible Duct Connection factory made with Fire Retardant both sides PVC coated Double Polyester Fabric having density of 680 gms per M2 with both sides reinforced with GI strips roll formed special type locking arrangements with Polyester Fabric without puncturing the Fabric and subsequently TDF formed, ready to fit Flexible Duct Connectors.				
	8.5 TR Nominal Capacity Unit	3.00		Nos	
19	FIRE DAMPERS : Supply, Installation, Testing and Commissioning of fire damper tested and approved for 120 minutes rated as per UL-555 S- 1995 and CBRI. Construction out of factory - made, 1.6 mm thick 800 mm long ,1 50 mm wide GSS sleeves and inner V grooved flat type multi blade assembly. Frames to be welded and inner blades to be connected to the frame by means of chrome plated spindle rods and bronze self lubricated bushes. All blades to be connected by a suitable flat link arrangement. The dampers are also to be provided with SS concealed jam seal (compression type) on the sides. The damper operation is by spring mechanism with UL 555 fusible link. Fusible link shall close the fire damper at maximum 72 deg C.	1.50		Sqm	

20	ACOUSTIC INSULATION OF DUCTS: 10 mm Thick. Supply and Application of Acoustic insulation for the initial portion of supply air ducting. Material of construction shall be elastomeric nitrile rubber foam material with open cell structure. The material should be fiber free, super silent with very good sound absorption, damping and barrier properties with high resistance to air erosion. The density of the same shall be between 140-180 Kg/m3. The material should have a thermal conductivity not exceeding 0.045 W/mK @ 0 Deg C. The Thickness of the material shall be 15 mm. The fire rating should be minimum Class-1 as per BS 476 Parts 6&7. The insulation material shall be stuck to the cleaned duct surface by low VOC cold adhesive. The material and installation methodology should be in accordance with the specifications.	50.00		Sqm	
21	THERMAL INSULATION OF DUCTS : Supply and Application of External Thermal Insulation of Supply Air ducting. Material of construction shall be Cross Linked Closed Cell Polyolefin Foam with factory laminated reinforced aluminium foil. The density of the same shall be minimum 25 Kg/m3. The material should have a thermal conductivity not exceeding 0.032 W/mK @ 0 Deg C. The fire rating should be Class-O as per BS 476 Parts 6&7. The material should have excellent UV, Corrosion, Ozone, fungal growth and bacterial growth resistance. The material should be environment friendly with zero ODP and low GWP. The insulation material shall be stuck to the cleaned duct surface by low VOC cold adhesive. The material and installation methodology should be in accordance with the specifications.				
	9 MM THICK	150.00		Sqm	

22	DUCT DAMPERS: Supply, installation, testing and commissioning of Factory fabricated Rectangular shape - GI Volume control dampers, 1.6-mm GI Steel Frame, 1.6-mm GI blades, 150-mm width, with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration & engraved marking on position of damper.	1.00		Sqm	
23	LINEAR FIXED BAR GRILLE : Supply, Installation, Testing and Balancing of Linear fixed Bar Grille of Extruded aluminium construction, frame with frontal face flange of 16 mm and inner blades of 0,15,30,45 deg deflections 5 mm nominal thickness, blade pitch 12.5 mm, removable core type. The vertical tubed core should be fixed with black bush. The exact construction like one way, two way, curved, deflection angle etc and colour coding can be decided at the appropriate time.	4.00		Sqm	
24	SUPPLY / RETURN AIR DIFFUSERS : Supply, Installation, Testing and Balancing of powder coated, extruded aluminium construction square diffusers , external frame with flat 33 mm frontal face and inclined in internal core, center core assembly removable type to remove easily for cleaning purpose and for concealed fixing , removable center core type. The diffuser shall be 4-way as per specification. Only inner neck cross section area will be taken for quantity calculation. Size : 375 x 375 mm.	20.00		Nos	
25	COLLAR DAMPER: Supply, Installation, Testing and Balancing of Opposed Blade GI Black painted Collar Dampers, with pressed form blades & frames,22G frame & 26G blade (double skin)	3.00		Sqm	
26	Motorised Damper actuator with required	1.00		Nos	

	accessories				
TOTAL EXCLUDING GST					

Signature of the Tenderer/s

With the Seal of the Company

Date:

Place

SUPPLY & INSTALLATION OF GODREJ MAKE FURNITURE					
Sl. No	Description of Item	Qty.	Rate	Per Unit	Amount (Rs)
1	Supply & Installation AGM table				
	Godrej Impress table of size (1800x900x750mm) with Mobile Pedestal (510x445x635mm) Mobile Side Unit(1200x445x645mm) Credenza(2215x410x2000mm) The Main table shall be of size 1800 Width mm x 900 mm Depth x 750 mm height. Top surface of the table shall made up of MDF (Medium density fibre) board duly finished with Veneer and final coating of PU. The Main desk should contain in built key board pull out tray for keeping keyboard of computer. The front modesty panel of the table shall be made up of MDF board of size 1640 mm x 600 mm x 16mm which shall also be duly finished with Veener and PU coating. For personal storage one mobile pedestal (3 drawer unit) shall be provided of size 510 mm Width x 635 mm Height and 445 mm Depth. The storage pedestal shall also be made up of MDF duly finished with veener & final coating of PU. The Side shall be of size 1200mm Width x 445mm Depth x 660 mm Height. The side unit shall be made up of MDF board duly finshed with Veneer and final finish by PU Coating. The design of the side unit shall be such that it can be placed on either side of the main table. The side unit shall contain open space for keeping cpu in extreme right side, one closed storage shutter at extreme left end & open space in the middle with one shelf for keeping files. The thickness of the top of the side unit shall be 25mm. The Size of the Back unit shall be 2215mm width x 410 mm Depth x 2000mm height. The back unit shall be made up of MDF board duly finished with veneer & final finish by PU coating. Below storage shall be provided with wooden shutters & the upper left & right side of the back unit shall also be provided with wooden shutters. The middle 3 door shutters should be of glass of minimum 5mm thick for display purpose. The hardness of the PU coating shall be 1.5H.	1		No	
2	Supply & Installation MANAGER Table				

	Godrej Trident Middle of Size (1650x700x743mm) Trident Middle Main Desk with ERU (RHS) size shall be 1650 Width x 700 Depth x 743 Height (Main Desk) 1000 Width X 450Depth X 743 Height (ERU).Top shall be of 18 mm thickness made of PLT board with 2 mm Edge banding. Wenge and savannah Maple PLT board shall be used. The Understructure shall be in pre-laminated panels made with PLT boards . 2-Drawerand 3 - Drawer storage units with different combinations to support tops made with 18 mm PLT boards of different colours.Modesty and back panels made with 18 mm PLT boards. The pedestals / storages shall be fitted with necessary locks.	4		No	
3	Supply & Installation EO/AM /Reception Table				
	Godrej Trident Junior(1500x750x743 mm) Trident Junior 2 Main Desk size shall be 1500 Width x 750 Depth x 743 Height. Top shall be of 18 mm thickness made of PLT board with 2 mm Edge banding. Wenge and savannah Maple PLT board shall be used. The Understructure shall be in pre-laminated panels made with PLT boards . 2- Drawer and 3 - Drawer storage units with different combinations to support tops made with 18 mm PLT boards of different colours .Modesty and back panels made with 18 mm PLT boards. The pedestals / storages shall be fitted with necessary locks.	21		No	
4	Supply & Installation Conference Table				
	Godrei Mingle Unitized make. of size 300x115x74 Cm Work top-Made of 25mm Thick Pre-laminated twin board of E1-P2 grade and approved shade conforming to IS-12823:1990, Edge banded with matching 2 mm thick PVC lipping.				
	Access panels provided with soft closing hinges. Understructure-The Under-structure consists of mixture of 25mm and 18mm Pre-laminated twin board of E1-P2 grade and approved shade conforming to IS-12823:1990, Edge banded with matching 2 mm thick PVC lipping. Anodised aluminium alloy 63400 - WP profile is				

	added at bottom edges for improving the aesthetics. The product has a knock-down construction.				
	Wire Management-Bottom cabinet with door is provided for flow of wires and cables. Cutout provision below Access flap at four locations for standard 8 module Anchor Roma is provided. Beside each cutout, an additional cutout with plate is provided for mounting Audio Visual Cables (eg. HDMI,VGA-A,etc).	1		No	
5	Supply & Installation Meeting Table				
	Godrej Mingle POD Circular of Dia 100cm Work Surface-Made of 25mm Thick Pre-laminated twin board of E1-P2 grade and approved shade conforming to IS-12823:1990, Edge banded with matching 2 mm thick PVC lipping. Soft closing access flap provided for access to power supply and audiocables. Work top is available in two shapes Square and Pebble (Round) Side Panel-Made of 25mm Thick Pre-laminated twin board of E1-P2 grade and approved shade conforming to IS-12823:1990 matching to the Worktop, Edge banded with matching 2 mm thick PVC lipping. Cutout with Gromet provided for routing cables in case any Audio Visual equipment is to be fixed later.				
	Understructure-The Under-structure consists of an Inner Tube Assembly with Top for Worktop Mounting and Base plate with levelers. The Top Plate is made of 5mm thk hot rolled steel Plates (HR) (As per IS: 2062) & the bottom plate is made of 8mm thk hot rolled steel Plates (HR) (As per IS:2062). The Inner Tube Assembly is made of 25.4mmx 25.4mm x 1.2mm thk round electric resistant welded tube (ERW)(As per IS:7138) welded together using Tungsten inert gas welding. The whole structure is epoxy polyester powder coated (DFT 40-60 microns).				

	The product has a knock-down construction. Cutout for standard Anchor Roma 6 Module is provided for electrical fittings. An additional cutout with a plate is provided for mounting Audio Visual Cables(eg HDMI,VGA-A, etc.) Removable panel-The 3D removable panels are provided for ease of serviceability. It also provides easy access to internal space in case of any Audio Visual equipment is to be added later. It is made of 1.2mm CRCA MS IS:513 and EPOXY POLYESTER Powder Coated (DFT 40-60 microns).	2		No	
6	Supply & Installation AGM/MANAGER Chair				
	Godrej Marvel high back SEAT ASSEMBLY : The Cushioned seat should be made of Injection molded Plastic outer & inner. Plastic Inner should be upholstered with leatherette and moulded High Resilience (HR) Polyurethane foam of Density 45±2 kg/m3,and hardness load 16 ± 2 kgf as per IS:7888 for 25% compression. *Seat SIZE : 47.0 cm. (W) x 48.0 cm. (D) BACK ASSEMBLY: The Cushioned back should be made of PU Foam with insitu molded MS E.R.W Round Tube of size 1.9±0.03cm x 0.16 ±0.0128cm. It upholstered with Leatherette. HIGH BACK SIZE: 47.7 cm. (W) x 76.4 cm ARMRESTS : The armrest top should be moulded from polyurethane(PU) and mounted on to a drop lift adjustable type tubular armrest support made of 03.81±0.03 cm x 0.2±0.01 cm thk M.S. E.R.W tube having chrome plated finish. The armrest height adjustable up to 6.5±0.5cm in 5 steps. ACTIVE BIO-SYNCHRO MECHANISM: The adjustable tilting mechanism should be designed with the following features: • 360' revolving type. • Front-pivot for tilt with feet resting on ground and continuous lumbar support ensuring more comfort. • Tilt tension adjustment can be operated in seating position. • 5-position Tilt limiter giving option of variable tilt angle to the chair. • Seat/back tilting ratio of 1: 2 • The mechanism housing should be made up of HPDC Aluminium black powder coated.				
	SEAT DEPTH ADJUSTMENT : Seat depth adjustment should be integrated in the seat through a sliding mechanism. Seat depth adjustment range should be of 6.0±0.5 cm.				

	ADJUSTABLE BACK SUPPORT: Back Frame should be connected to the Up/Dn mechanism housed in Plastic T spine. It can be adjusted in the range of 7.42±0.5 cm for the comfortable back support to suit individual need. PNEUMATIC HT. ADJUSTMENT: The pneumatic ht adjustment has an adjustment stroke of 10.0±0.3 cm.				
	PEDESTAL ASSEMBLY: The pedestal should be High Pressure Die cast polished Aluminium and fitted with 5 nos. twin wheel castors. The pedestal should be 65.0 ± 0.5cm. pitch-center dia.(75.0 ± 1.0cm. With castors.)				
	TWIN WHEEL CASTORS: The twin wheel castors should be injection moulded in black PP having 6.0± 0.1cm wheel Diameter. Overall Dimensions of Chair Seat Height -43.1-53.1cm Height -112.7-130.2cm. Width & Depth of Chair as measured from base - Width-76.1 cm and Depth-76.1 cm	5		No	
7	Supply & Installation Officers Chair & Conference & Meeting Room				
	Godrej Marvel Mid Back SEAT ASSEMBLY : The Cushioned seat should be made of Injection molded Plastic outer & inner. Plastic Inner should be upholstered with leatherette and moulded High Resilience (HR) Polyurethane foam of Density 45±2 kg/m3,and hardness load 16 ± 2 kgf as per IS:7888 for 25% compression. *Seat SIZE : 47.0 cm. (W) x 48.0 cm. (D) BACK ASSEMBLY: The Cushioned back should be made of PU Foam with insitumolded MS E.R.W Round Tube of size 1.9±0.03cm x 0.16 ±0.0128cm. It upholstered with Leatherette. *. (D) *MID BACK SIZE: 47.7 cm. (W) x 60.1 cm. (D) ARMRESTS (FU3301/FU3302) : The armrest top should be moulded from polyurethane(PU) and mounted on to a drop lift adjustable type tubular armrest support made of 03.81±0.03 cm x 0.2±0.01 cm thk M.S. E.R.W tube having chrome plated finish.The armrest height adjustable up to 6.5±0.5cm in 5 steps.				

	ACTIVE BIO-SYNCHRO MECHANISM (FU3301/FU3302): The adjustable tilting mechanism should be designed with the following features: • 360' revolving type. • Front-pivot for tilt with feet resting on ground and continuous lumbar support ensuring more comfort. • Tilt tension adjustment can be operated in seating position. • 5-position Tilt limiter giving option of variable tilt angle to the chair. • Seat/back tilting ratio of 1: 2 • The mechanism housing should be made up of HPDC Aluminium black powder coated. SEAT DEPTH ADJUSTMENT (FU3301/FU3302): Seat depth adjustment should be integrated in the seat through a sliding mechanism. Seat depth adjustment range should be of 6.0±0.5 cm. ADJUSTABLE BACK SUPPORT (FU3301/FU3302): Back Frame should be connected to the Up/Dn mechanism housed in Plastic T spine. It can be adjusted in the range of 7.42±0.5 cm for the comfortable back support to suit individual need.				
	PNEUMATIC HT. ADJUSTMENT (FU3301/FU3302): The pneumatic ht adjustment has an adjustment stroke of 10.0±0.3 cm. PEDESTAL ASSEMBLY (FU3301/FU3302): The pedestal should be High Pressure Die cast polished Aluminium and fitted with 5 nos. twin wheel castors. The pedestal should be 65.0 ± 0.5cm. pitch-center dia.(75.0 ± 1.0cm. With castors.)				
	TWIN WHEEL CASTORS: The twin wheel castors should be injection moulded in black PP having 6.0± 0.1cm wheel Diameter. Overall Dimensions of Chair Seat Height -43.1-53.1cm Height -96.5-114.0.cm. Width & Depth of Chair as measured from base - Width-76.1 cm and Depth-76.1 cm	40		No	

8	Supply & Installation Dining Room Chair: Godrej Unwind without armrest The Seat and Back should be made up of injection moulded indoor grade Poly Propylene compound SEAT SIZE : 52.5 cm. (W) x 53.2 cm. (D) BACK SIZE : 51.6 cm. (W) x 40.5 cm. (H) The powder coated (DFT 50±10 microns) welded tubular frame should be made from 0 2.22 ± 0.03 cm x 0.16 ± 0.0128 cm and 3.5 ± 0.03 cm x 1.5 ± 0.03 cm x 0.16 ± 0.0128 cm MSERW tube. The shoes should be made of indoor grade Poly Propylene compound and snap fitted with tubular frame. Overall Dimensions of Chair Seat Height - 45.0 cm. Height - 84.5cm. Width-52.5 cm and Depth-55.8 cm.	10		No	
9	Supply & Installation Recreation Room Chair: Godrej Unwind with armrest The Seat and Back should be made up of injection moulded indoor grade PolyPropylene compound. SEAT SIZE : 52.5 cm. (W) x 53.2 cm. (D) BACK SIZE : 51.6 cm. (W) x 40.5 cm. (H) The powder coated (DFT 50±10 microns) welded tubular frame should be made from 0 2.22 ± 0.03 cm x 0.16 ± 0.0128 cm and 3.5 ± 0.03 cm x 1.5 ± 0.03 cm x 0.16 ± 0.0128 cm MSERW tube. The shoes should be made of indoor grade PolyPropylene compound and snap fitted with tubular frame. The Armrest should be made of indoor grade PolyPropylene compound and assembled over the tubular frame. Overall Dimensions of Chair Seat Height - 45.0 cm. Height - 84.5cm. Width-62.3cm and Depth-55.8 cm.	6		No	

10	Supply & Installation VISITORS Chair : Godrej Marvel with no wheels 1) SEAT ASSEMBLY : The Cushioned seat should be made of Injection molded Plastic outer & inner. Plastic Inner should be upholstered with leatherette and moulded High Resilience (HR) Polyurethane foam of Density 45±2 kg/m3,and hardness load 16 ± 2 kgf as per IS:7888 for 25% compression. *Seat SIZE : 47.0 cm. (W) x 48.0 cm. (D) 2) BACK ASSEMBLY: The Cushioned back should be made of PU Foam with insitu molded MS E.R.W Round Tube of size 1.9±0.03cm x 0.16 ±0.0128cm. It upholstered with Leatherette. BACK SIZE: 47.7 cm. (W) x 60.1 cm. (D) Visitor TUBULAR FRAME: The tubular frame should be cantilever type and made of Ø2.54± 0.03 cm X 0.02 ± 0.016cm thick SS 202 tube. The back should be connected to frame through chrome plated high pressure die case connector piece. Overall Dimensions of Chair Seat Height -44.8cm Height -98.2cm. Width & Depth of Chair as measured from base - Width-60.9 cm and Depth-64.2 cm.	30		No	
11	Overall Dimensions of SD 3 Single Drive Cover Unit 3 Bay(U/C + Fittings + Cover) shall be 3600mm(W)x400mm(D)x2121.5mm(H). The Construction shall be rigid knock down made out of 0.8 thick CRCA steel conforming to IS : 513 . Each body shall have a main unit plus add on units (1,2,3,4) . Finish shall be Epoxy polyester powder coated thickness of 40 microns. Shelf construction shall be made from CRCA steel 0.8 mm thick IS :513 .Uniformly distributed load capacity of 100 Kg . Undercarriage shall have construction in welded frame made of HR sheet 3 mm thick conforming to IS : 2062. The Movements shall be Drive Type configuration : In case of D2,D3 & D4 movement of units is achieved mechanically through a PU Drive Wheel and Sprocket -Chain-Tensioner arrangement mounted rigidly onto body size. For D3 each movable undercarriage shall be provided with 3 rollers on the shaft for driving ,3 antifriction ball bearing for rolling. LD understructure has 2 nos.	6		No	

	of anti-tilt bearing assembly. The roller assembly comprises of a die-cast step wheel, 2 deep-groove ball bearings and a MS shaft. The step wheel is made of cast steel and is fitted onto the MS shaft using a feather key. The two ball bearings are then fastened on either side of the step wheel using circlips. This entire roller assembly is then snap-fitted into a wheel housing. The wheel housing is fixed in the Uchannel of the understructure using machine screws. This wheel-housing is made of engineering plastic material made by injection-molding process. The entire roller assembly is designed to withstand the maximum loads of the body. Fittings shall be centralized locking arrangement through locking stiffener mounted onto back of single last unit so that it gets locked on channels when all the units are brought together. The Recess handle lock is of Godrej make & placed at suitable height .The 'sprocket-chain' arrangement is covered by a 1 mm thk. CRCA sheet Drive Unit Cover with dimensions 1202mm x 398mm x 87mm and is fixed onto the side of the body. The PU handwheel is rigidly fixed at suitable height on side of the body & projects out of cover by another 99.0 mm. Fixed unit (SD) does not have the Drive Unit Cover. When the last unit is twin movable, hinged doors as accessories are provided for the end bodies, so in this case locking stiffener is mounted onto drive unit cover; and with tile fascia option, it will be mounted in the recess of vertical trim. Each Drive Type units shall have Locking Knob near the drive wheel for manual locking of individual units when a person is using those units. Knob shall be rotated to unlock position when units are to be moved. End stoppers shall be provided to prevent derailment. The nuts & bolts are galvanized / blackodized / Zn Plated. Also total no. of loading levels per understructure shall be 15 for SD3. Label holder - It is an aluminium extrusion of length 396mm for LD/SD and 796mm for TD, fitted on to front cover of body. The Paper is 300GSM matt milky white sticker paper, to be inserted into the aluminium extrusion. The length of paper is 394mm for LD/SD and 794mm for TD. Over that a transparent plastic of corresponding				

	length of 150-200 micron polythene is to be inserted. Overall Dimensions of LD3 Single last Drive Unit 3 Bay(U/C + Fittings + Cover) shall be 3600mm(W)x400mm(D)x2121.5mm(H). The Construction shall be rigid knock down made out of 0.8 thick CRCA steel conforming to IS : 513 . Each body shall have a main unit plus add on units (1,2,3,4) . Finish shall be Epoxy polyester powder				
	coated thickness of 40 microns . Shelf construction shall be made from CRCA steel 0.8 mm thick IS :513 .Uniformly distributed load capacity of 100 Kg . Undercarriage shall have construction in welded frame made of HR sheet 3 mm thick conforming to IS : 2062. The Movements shall be Drive Type configuration : In case of D2,D3 & D4 movement of units is achieved mechanically through a PU Drive Wheel and Sprocket -Chain-Tensioner arrangement mounted rigidly onto body size. For D3 each movable undercarriage shall be provided with 3 rollers on the shaft for driving , 3 antifriction ball bearing for rolling. LD understructure has 2 nos. of anti-tilt bearing assembly. The roller assembly comprises of a die-cast step wheel, 2 deep-groove ball bearings and a MS shaft. The step wheel is made of cast steel and is fitted onto the MS shaft using a feather key. The two ball bearings are then fastened on either side of the step wheel using circlips. This entire roller assembly is then snap-fitted into a wheel housing. The wheel housing is fixed in the Uchannel of the understructure using machine screws. This wheel-housing is made of engineering plastic material made by injection-molding process. The entire roller assembly is designed to withstand the maximum loads of the body. Fittings shall be centralized locking arrangement through locking stiffener mounted onto back of single last unit so that it gets locked on channels when all the units are brought together. The Recess handle lock is of Godrej make & placed at suitable height .The ‘sprocket-chain’ arrangement is covered by a 1 mm thk. CRCA sheet Drive Unit Cover with dimensions 1202mm x 398mm x 87mm and is fixed onto the side of the body. The PU hand wheel is rigidly fixed at suitable height on side				

	of the body & projects out of cover by another 99.0 mm. Fixed unit (SD) does not have the Drive Unit Cover. When the last unit is twin movable, hinged doors as accessories are provided for the end bodies, so in this case locking stiffener is mounted onto drive unit cover; and with tile fascia option, it will be mounted in the recess of vertical trim. Each Drive Type units shall have Locking Knob near the drive wheel for manual locking of individual units when a person is using those units. Knob shall be rotated to unlock position when units are to be moved. End stoppers shall be provided to prevent derailment. The nuts & bolts are galvanized / blackodized / Zn Plated. Also total no. of loading levels per understructure shall be 15 for LD3. Label holder - It is an aluminium extrusion of length 396mm for LD/SD and 796mm for TD, fitted on to front cover of body. The Paper is 300GSM matt milky white sticker paper, to be inserted into the aluminium extrusion. The length of paper is 394mm for LD/SD and 794mm for TD. Over that a transparent plastic of corresponding length of 150-200 micron polythene is to be inserted. Overall Dimensions of TD3 Twin Drive Unit 3 bay(U/C + Fittings + Cover) shall be 3600mm(W)x800mm(D)x2121.5mm(H).				
	The Construction shall be rigid knock down made out of 0.8 thick CRCA steel conforming to IS : 513 . Each body shall have a main unit plus add on units (1,2,3,4) . Finish shall be Epoxy polyester powder coated thickness of 40 microns . Shelf construction shall be made from CRCA steel 0.8 mm thick IS :513 .Uniformly distributed load capacity of 100 Kg . Undercarriage shall have construction in welded frame made of HR sheet 3 mm thick				
	conforming to IS : 3062. The Movements shall be Drive Type configuration : In case of D2,D3 & D4 movement of units is achieved mechanically through a PU Drive Wheel and Sprocket -Chain-Tensioner arrangement mounted rigidly onto body size. For D3 each movable undercarriage shall be provided with 3 rollers on the shaft for driving ,3 antifriction ball bearing for rolling. The roller assembly comprises of a die-cast step wheel, 2 deep-groove ball bearings and a MS shaft. The				

	step wheel is made of cast steel and is fitted onto the MS shaft using a feather key. The two ball bearings are then fastened on either side of the step wheel using circlips. This entire roller assembly is then snap-fitted into a wheel housing. The wheel housing is fixed in the Uchannel of the understructure using machine screws. This wheel-housing is made of engineering plastic material made by injection-molding process. The entire roller assembly is designed to withstand the maximum loads of the body. Fittings shall be centralized locking arrangement through locking stiffener mounted onto back of single last unit so that it gets locked on channels when all the units are brought together. The Recess handle lock is of Godrej make & placed at suitable height .The 'sprocket-chain' arrangement is covered by a 1 mm thk. CRCA sheet Drive Unit Cover with dimensions 1302mm x 398mm x 87mm and is fixed onto the side of the body. The PU hand wheel is rigidly fixed at suitable height on side of the body & projects out of cover by another 99.0 mm. Fixed unit (SD) does not have the Drive Unit Cover. When the last unit is twin movable, hinged doors as accessories are provided for the end bodies, so in this case locking stiffener is mounted onto drive unit cover; and with tile fascia option, it will be mounted in the recess of vertical trim. Each Drive Type units shall have Locking Knob near the drive wheel for manual locking of individual units when a person is using those units. Knob shall be rotated to unlock position when units are to be moved. End stoppers shall be provided to prevent derailment. The nuts & bolts are galvanized / blackodized / Zn Plated. Also total no. of loading levels per understructure shall be 30 for TD3. Label holder - It is an aluminium extrusion of length 396mm for LD/SD and 796mm for TD, fitted on to front cover of body. The Paper is 300GSM matt milky white sticker paper, to be inserted into the aluminium extrusion. The length of paper is 394mm for LD/SD and 794mm for TD. Over that a transparent plastic of corresponding length of 150-300 micron polythene is to be inserted.TD units are designed with tie rod assembly options as well. it acts as a substitute to the				

	back panels (only in twin body) if the customer chooses to not have back panels. The assembly consists of 2 tie rods, 4 fixing brackets and 2 turnbuckles. The tie rods are fixed in a shape of 'X' between two opposite shelves. The tie rods are made of 4mm diameter rods of MS while the fixing brackets are made of 2mm thk. CRCA Steel conforming to IS: 513 Gr.D. This assembly is available for both heights – 1980H and 2361H. It consists of 'C' section 2 mm thk HR sheet & Square 25.4mm X 2mm thk ERW tube – both connected by screws. Prior to the grouting of the guide channels with the help of raul plug & screw, ensure the ground is level. The rail channels are of 3 lengths i.e., 800mm, 1600mm and 2400mm.				
					
12	Supply & Installation Fire Resistant Cabinet of 5' Height (FR-1360)-1554x680x586(mm)	1		No	
	Total				

Signature of the Tenderer/s

With the Seal of the Company

Date:

Place:

SUPPLY & INSTALLATION OF EPABX INTERCOM SYSTEM					
S.No	Description of Item	QTY	RATE	UNIT	AMOUNT (Rs)
1	MATRIX ETERNITY GENX 12 S AC Configuration 8/2/48 Expandable upto 240 Ports. Equipped with 8 Trunk 2 DKP Ports and 48 Analog Extensions	1		no	
2	EON 510 Key Telephone Instrument(Operator console)	1		nos	
3	Telephone Instruments Beetel M59 Caller Id Corded Landline Phone With 16 Digit Lcd Display & Adjustable Contrast,10 One Touch Memory Buttons,2Ways Speaker Phone, Music On Hold, Solid Build Quality, Classic Design (Black)(M59)	48		nos	
4	100 pair krone with module (MDF)	1		nos	
5	EPABX Installation and Testing Charge (one year onsite warrenty)	1		nos	
TOTAL (EXCLUDING GST)					

Signature of the Tenderer/s

With the Seal of the Company

Date:

Place:

SUPPLY & INSTALLATION OF UPS					
S.No	Description of Item	QTY	RATE	UNIT	AMOUNT (Rs)
1	BPE 10 KVA 192 VDC ONLINE UPS (I Phase I/P & I Phase O/P)	1		no	
2	EXIDE SMF EP 12V- 65AH BATTERIES	16		nos	
3	Powder coded Battery Stand (Metal)			LS	
TOTAL (EXCLUDING GST)					

Signature of the Tenderer/s

With the Seal of the Company

Date:

Place:

SUPPLY & INSTALLATION OF CCTV					
Sl. No	Description of Item	QTY	RATE	UNIT	AMOUNT (Rs)
1	MATRIX NVR 32 Ports (Model No:3202X)	1		nos	
2	MATRIX 2MP IP Camera Dome type (Model No:MIDR20FL28CWS)	32		nos	
3	10 TB Hard Disk	2		nos	
4	D-Link POE switch 24 Ports	2		nos	
5	Camera Installation Charge	32		nos	
6	PVC Back Box	32		nos	
7	32 Ports NVR Installation & IP Configuration charge	1		Set	
8	Supply & Installation SAMSUNG 81.3cm (32 Inches) Full HD Flat Panel Monitor (HDMI + USB, 60 Hz, LS32BM501EWXXL, White)FOR CCTV	1		No	
9	4U Rack with Industrial spike buster	1		Nos	
TOTAL (EXCLUDING GST)					

Signature of the Tenderer/s

With the Seal of the Company

Date:

Place:

SUPPLY & INSTALLATION OF SMOKE DETECTOR AND FIRE ALARM SYSTEM WORK					
Sl.No	Description Of Work	Qty	Rate	Unit	Amount (Rs)
1	Supply, Installation, Testing and Commissioning of dual chamber detector complete with base and connection UL/FM approved make				
a.	Optical type Smoke Detector	28		Nos	
b.	Optical type Heat Detector	28		Nos	
2	Supply, Installation, testing & commissioning of rate of rise Cum fixed temperature type heat detector complete as required.	4		Nos	
3	Supply, installation, testing & commissioning of response Indicator with twin LED enclosed in a box.	4		Nos	
4	Supply, installation, testing & commissioning of manual call Point complete with hammer &chain	2		Nos	
5	Supply, installation, testing & commissioning of LM Thooter Nos 490 High intensity electronic type with speaker	1		Nos	
6	Supplying &laying of 2x1.5sqmm fire alarm armoured cable,600/1000Vratedwithannealedcopperconductorhavi ngXLPEinsulation,steelwirearmouring&FRLSoutersheathcompleteasrequired.	300		1RM	
7(a)	Supply, Installation, jointing, Testing and Commissioning of 4 zones Main Fire Alarm Panel with all audio-visual indications complete as required, in suitable enclosure with locking arrangement confirming to IS:2189, digital microprocessor based panel with fault, fire and healthy indication battery charger and inbuilt battery space as required. The panel box should be made of CRC sheet with powder coatingwith2 layer primer. The display should be consisting of 80 chrbacklite alphanumeric LCD display with keypad for operation and monitoring and itshoulddisplayalltypesalarmcondition,short,opencondition.Itshouldbesuitableforinputof230VAC,50Hzsingle phase supply completewithprovisionof7Ah24volt DC SMF battery of Exide make for backup. Panel should be ETDC /ERTL approved.	1		1Nos	
8	Supply, installation, testing & commissioning of Photo Nos 450 Illumination EXIT Locator as directed.	2		1Nos	
	TOTAL(EXCLUDING GST)				

SUPPLY & INSTALLATION OF MISCELLANEOUS ITEMS					
Sl. No	Description of Item	Qty.	Rate	Per Unit	Amount (Rs)
1	FIRE EXTINGUISHERS				
A	Providing & fixing fire extinguishers, SITC of Fire Extinguisher dry chemical powder (ABC) stored pressure type 2 kg capacity with ISI mark with initial charger & installation brackets	5		P/No	
B	Providing & fixing fire extinguishers, SITC of Fire Extinguisher dry chemical powder (ABC) stored pressure type 4 kg capacity with ISI mark with initial charger & installation brackets	4		P/No	
2	Supply & Installation Water Dispenser Bluestar Model No:BWD3FMRGA,Grey OR Equivalent as approved by ECGC	4		No	
3	Supply & Installation Refrigerator(270 litre-2 doors)SAMSUNG 275 Litres 3 Star Frost Free Double Door Convertible Refrigerator with Power Cool Function (RT30A3743BX/HL, Luxe Black) OR Equivalent as approved by ECGC	1		No	
4	Supply & Installation Coffee maker Wonderchef Regalia Espresso Coffee Maker 15 Bar, for Espresso, Cappuccino, etc. with Steamer Spout for Cappuccino & Latte, Professional Style Coffee, Works with Coffee Powder OR Equivalent as approved by ECGC	1		No	
5	Supply & Installation Toilet paper holder Dolphy Stainless Steel Recessed Toilet Paper Holder with Cover for Bathroom OR Equivalent as approved by ECGC	5		No	
6	Supply & Installation Paper towel dispenser Kimberly-Clark ® Aquarius Multi Fold White Paper Towel Dispenser 70230 (45.1 cm x 29.4 cm x 12 cm) OR Equivalent as approved by ECGC	5		No	
7	Supply & Installation Hand Drier Bolt touch-free infrared hand dryer HDR-SSF-AK2803D OR Equivalent as approved by ECGC	3		No	
8	Supply & Installation Automatic Soap Dispenser Soap Dispensers Code :SDR-BLC-DJ0160AS Description :Automatic Soap Dispensers, Capacity : 0.8L, Material: Aluminium/ABS, Finish : Chrome/Black OR Equivalent as approved by ECGC	7		No	

9	Supply & Installation TV Unit (LCD Screen) 65" TCL P735 165.1 cm (65 inch) 4K Ultra HD LED Android TV with Voice Assistance (2022 model) OR Equivalent as approved by ECGC	1		No	
10	Supply & Installation OTG(OVEN TOASTER & GRILL) Havells 28 litres Oven Toaster Grill (OTG), 28R BL with Motorized Rotisserie, 1500 W(491903006) OR Equivalent as approved by ECGC.	1		No	
11	Providing and fixing at site 5.0mm thick plain reflective mirror mirror of given size 5'x3'& 2'x3' to be fixed at site with 12.0mm BWP ply backing and to 25 x 50mm teak wood frame duly finish with melamine polish to match the tile color including all materials, labour etc complete	36		Sft	
12	Supply & Installation SEIKO Abstract Mixed Material Wall Clock (41 cm x 41 cm x 5 cm, Brown, QXA598BN) Material: Plastic case (Wood-ed), Case Color: Brown, Dial Color: White OR Equivalent as approved by ECGC	5		No	
13	Supply & Installation Saint-Gobain GLASSNOTE SLIMBOARD ultra-slim, highly durable, lacquered glass board, patented technology and sleek ,contemporary lines, for hassle-free writing pleasure of Size 6'x4' with Magnetic Duster & Magnetic Buttons 100% aluminum extrusions & die cast rounded corners	1		No	
14	Supply & installation of customized photo frames of sizes 3'x3' for conference room ,reception and etc.	6		No	
15	Supply La Opala Diva, Sovrana Collection, Opal Glass Dinner Set 62 pcs, Moroccan Gold, White 8N Full Plate (275 mm), 8N Quarter Plate (200 mm), 16N Veg Bowl (180 ml), 8N Soup Bowl (340 ml), 2N Platter (310 mm), 2N Casserole (1350 ml), 2N Casserole Lid (Clear), 8N Cup (160 ml) and 8N Saucer (135 mm) OR Equivalent as approved by ECGC	2		sets	
16	Supply & Installation of Suspended Ceiling Projector system with 2-Gang filter & surge (White) including foldable screen as per specifications	1		No	
17	Supply & Installation of LOGITECH Group video conferencing bundle with expansion &	1		No	

	as per Vendor specifications				
18	Supply Grizzly® Floor Standing Magazine Holder Rack Cum Newspaper Stand-.(Black)	1		No	
	Total excluding GST				

Signature of the Tenderer/s

With the Seal of the Company

Date:

Place:

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: False ceiling, wooden partitions, panelling, electrical work, door, cabinet, AHU, Ducting etc., partitions, glazed door, flush door, , tables and counters, storage cupboards unit, cabinet, overhead storage, mobile compactors storage, locker cabinet, sofa, chairs, company logo, ,roller blinds, auto sanitizer dispenser, refrigerator, water dispenser, microwave, hot case, wall clock, signage, etc.

1. 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, CcTv, Access Control System, Fire Fighting System, Screen, IP -PBX system, Ups, networking, conduiting, etc.

2. HEATING VENTILATION & AIR CONDITIONING (HVAC):

HVAC Work Including Outdoor Unit, Indoor Unit,of split packaged airconditioners Hi-Wall Type Indoor, Clean Air Filter/Central Controller Refrigerant piping,MS Stand, Control Cable, Air Distribution, Duct Damper, Grills, Air Diffusers, Thermal Insulation, Louvers, etc.

Contractor shall maintain open format drawing and person at site, to incorporate updates from site working conditions.

ANNEXURE-J

DRAFT CONTRACT

THIS CONTRACT ("Agreement") is made and executed in Tirupur……, 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 Raheja Towers, 11th Floor, West Wing, 26, M.G. Road, Bengaluru – 560001 and Branch office at 137/2, CG Complex, Kumaran road, Tirupur - 641601 hereinafter referred to as "The Company" through its authorized representative Shri Subash Chandra Chahar/ Deputy General Manager (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, Ventilation and Air Conditioning (HVAC), office Furniture, Epax intercom system, UPS, CCTV, Smoke detector Fire Alarm System and Miscellaneous items works. in its office situated at **346/347, 1ST FLOOR, KRE TOWERS KUMARAN ROAD, TIRUPUR – 641 601** ("**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/TIRUPUR /Tender /01/2023.
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: 137/2 CG COMPLEX, KUMARAN ROAD, TIRUPUR – 641601
…….. tirupur@ecgc.in
   4. Both the Parties agree to the conditions mentioned in the Tender Document dated ……. under Reference no. ECGC/TIRUPUR /Tender

/01/2023.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. Signature_____ Name: Designation Address: Witness Signature_____ Name: Address:	On behalf of Vendor_____ Signature_____ Name: Designation Address: Witness Signature_____ Name: Address: