

NOTICE INVITING TENDER

FOR



**Office Interior Furnishing, Electrical, Heating Ventilation & Airconditioning (HVAC) and
allied Civil Works, Office Space Area 10633 sft, Fourth Floor, NBCC Place, South
Tower, Pragati Vihar, Bhishma Pitamah Marg, New Delhi 110003**

Ref: ECGC/ New Delhi Branch/Tender/ 01 /2022

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SECTION 1

1. Introduction

1.1 Invitation to Bidders

By way of this NOTICE INVITING TENDER ('NIT') Document (hereinafter also referred to as 'the Bid Document' or 'the Tender Document') **ECGC Limited** (hereinafter referred to as 'ECGC / the Company'), a company wholly owned by Government of India and set up in 1957, invites competitive Bids from reliable resourceful bonafide and experienced firms / companies / individual contractors (hereinafter referred to as ('the Bidder(s)'), who have experience in Similar Nature of work, for any Government of India Public Sector Companies-PSU Banks / PSU Insurance companies for **-Office Interior Furnishing , Electrical , Heating Ventillation & Airconditioning (hereinafter referred as 'HVAC') and allied Civil Works in an Office Space Area of 10633 square feet located at Fourth Floor, NBCC Place, South Tower, Pragati Vihar, Bhishma Pitamah Marg, New Delhi 110003.**

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

1. Bid Document Availability	The Bid Document can be downloaded from website w.e.f. 14.03.2022
2. Earnest Money Deposit	Rs.10,00,000/- only
3. Estimated Amount put to tender:	Rs.3,35,19,820/-
4. Pre-bid Queries (if any)	21.03.2022
5. Address for Communication and submission of bid	ECGC Ltd., New Delhi Branch, 3 rd Floor, Hansalaya Building, 15 Barakhamba Road, New Delhi 110001.
6. E-mail & Phone no.	newdelhi@ecgc.in 011-45333666/621
7. Date and time limit for receipt of bids	28.03.2022 up to 17:00 hours.
8. Date & Place of opening of Technical Proposals / Pre-qualification Bid	29.03.2022 at 15:00 hours. ECGC Ltd., Northern Regional Office, 4 th Floor, Tower 3, NBCC Office, Kidwai Nagar, New Delhi 110023.
9. Date of opening of Financial Bid	Within 15 days of opening of Technical Bids. Date will be communicated to Bidder(s) who will qualify in the Technical Bids.
10. 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 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.

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 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 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.

3.1.2 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.

3.1.3 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.

3.1.4 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.

3.1.5 Legal status of the Bidder shall be sole proprietor, a partner of a firm, Limited Liability Partnership or company or a consortium. If found to have applied severally for a single job all his applications will be rejected for that job. Bids by related parties will also be rejected.

3.1.6 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.

3.1.7 The Bidder, irrespective of its participation in the bidding process, shall treat the details of the documents as privileged, secret and confidential.

3.1.8 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.

3.1.9 Bids shall be submitted in two parts i.e. (1) Technical/Pre-qualification Bid and (2) Financial/Commercial Bid.

3.1.10 The Bidder shall submit the Technical/Pre-qualification Bid as per the form provided under **Annexure – A** and the same shall be enclosed in single sealed envelope.

3.1.11 The financial/commercial Bid **Annexure H** should contain the following documents in one cover (folder) i.e. **Bill of Quantities (BOQ)**. The bidder shall quote their rate for each item in BOQ rate column, and arrive at the amount of that item by multiplying quoted rate with quantity of the item.

3.1.12 Both **Technical/Pre-qualification bid and Financial/commercial Bid** are to be submitted concurrently during **submission of Tender in a sealed envelope at ECGC Ltd., New Delhi Branch, 3rd Floor, Hansalaya Building, 15 Barakhamba Road, New Delhi 110001.**

3.1.13 Supporting documents are to be submitted along with the 'Technical/Pre-qualification Bids. Incomplete or partial submission of relevant documents will lead to disqualification.

3.1.14 Each Bidder can submit only one Bid.

3.1.15 The Bidder should commit to provide the resources desired by ECGC for the entire duration of the engagement, at the agreed cost and terms and conditions.

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

3.1.17 All rates and total amount should be written both in figures and in words and if there is any discrepancy between the two, the lowest amount will only be accepted.

3.1.18 No questions or items in the annexures shall be left blank or unanswered. Where you 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.

3.1.19 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.

3.1.20 Bids must be received by ECGC at the address specified, no later than the date & time specified in the "Schedule of Events" in Clause 1.2.

3.1.21 ECGC is not responsible for non-receipt of bids within the specified date due to any reason including postal delays or holidays.

3.1.22 Any Bid received after the deadline for submission of Bids prescribed, will be rejected. No Bids shall be returned.

3.1.23 ECGC 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 ECGC 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 ECGC's website.

3.1.24 ECGC reserves the right to accept or reject any Bid or to cancel the Bidding process and reject all Bids at any time prior to contract award, without incurring any liability to the affected Bidder or Bidder(s). All decisions taken by ECGC are binding and final.

3.1.25 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.

3.1.26 The bid is liable to be disqualified in the following cases:

- i. Bid not submitted in accordance with Tender;
- ii. Bid received in incomplete format;
- iii. Bid is not accompanied by all requisite documents;
- iv. Bid is received after the due date;

3.1.27 The rates should be submitted only in the prescribed format. Non-conformance or quotations or BOQ received, in any other format, containing any notes, conditions, may result in rejection of the Bid.

3.1.28 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.

3.1.29 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.

3.1.30 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.

3.1.31 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.

3.1.32 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.

3.1.33 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. Necessary permission, wherever required, to be taken from the nodal contact person of ECGC- Mr. Sanjeev Kumar Sahu, AGM.”

3.1.34 Tender containing any condition leading to unknown / indefinite liability, are liable to be summarily rejected.

3.1.35 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.

3.1.36 The Bidder should quote their (own) rates for undertaking the work.

3.1.37 The work is to be carried out on fourth 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.

3.1.38 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.

3.1.39 The unit rate shall be deemed to be fixed price. In case of extra items, a record shall be maintained and shall be presented regularly to the Company for checking. In case of extra items where similar or comparable items are quoted in the Tender, extra rates shall be based on Tender rates

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 BOQ,

Second: - Similar nearest comparable item rate quoted in the BOQ,

Third: - Nearest comparable CPWD Schedule or rates/or practices.

3.1.40 The Bidder shall submit the insurance cover for the work in the form of **Contractor's All Risk Insurance Policy** (CAR) policy within fifteen (15) days from the acceptance of award of tender letter, from insurance company approved by IRDA.

3.1.41 Contractor shall not use modified/redirected old material of other projects.

3.1.42 The Bids shall summarily be rejected, if any one of the above said requirements has not been fulfilled and complied with.

3.2 Cost of Bidding:

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

ECGC reserves the right to reject or accept any or all the offer(s) 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:

- a. Participants fulfilling the following eligibility criteria will be considered as technically qualified:
 - i. Bidder shall produce credential in form of completion certificate of 1 (one) similar nature of work in Delhi/NCR of the minimum value of 250 Lakh put to tender during last 5 (five) years prior to the date of issue of this tender notice.
or
 - ii. Bidder shall produce credentials in form of completion certificate of 3 (three) similar nature of work in Delhi/NCR 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 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 credential.

Copy of completion certificate without actual date of completion will not be entertained.

- b. 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 2021, should be at least 250 Lakh value and as per **Annexure-C**.
- c. 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 & Income Tax Acknowledgement Receipt for assessment year 2021-22 to be submitted.
- d. 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.

3.4 Preparation of Bids

3.4.1 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.

3.4.2 Documents Comprising the Bid

3.4.2.1 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):

- a. Technical/Pre-qualification Bid Form as per Annexure A
- b. Price/ Commercial Bid as per Annexure H
- c. Supporting documents as mentioned in Annexure B to G.

3.4.2.2 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.

3.4.2.3 The papers like Forms, supporting documents as mentioned above etc. should be submitted in one lot in one envelope.

3.4.2.4 Any Technical/Pre-qualification Bid not conforming to the above list of documents will be rejected.

3.4.2.5 The Technical/Pre-qualification Bid should not contain any price information. Such bid, if received, will be rejected.

3.4.3 Price / Commercial Bid

Each Bidder is required to complete a Price/Commercial Bid Envelope, comprising of the Price/Commercial Bid Form as per **Annexure - H** on the letter head of the Bidder.

3.4.4 Bid Form

The Bidder shall complete both the aforesaid Envelopes containing the Technical/Pre-qualification and Price/Commercial Bids, along with the requisite documents wherever mentioned and submit them simultaneously to the Company. Bids are liable to be rejected if all Bids (Technical/Pre-qualification Bid and Price/Commercial Bid) are not received together and in separate envelopes.

3.4.5 Bid Prices

3.4.5.1 Prices are to be quoted in Indian Rupees only and the quotation shall be in figures as well as words.

3.4.5.2 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.

3.4.6 Documentary Evidence Establishing Bidder's Eligibility and Qualifications

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.

3.4.7 Partial bids

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

3.4.8 Period of Validity of Bids

3.4.8.1 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.

3.4.8.2 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.

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

3.4.9 Format and Signing of Bid

3.4.9.1 Each Bid shall be in two parts:

Part I – Technical/Pre-qualification Bid.

Part II – Price/Commercial Bid.

Both parts should be in two separate sealed NON-WINDOW envelopes bearing the Bidder's name and address (return address), each super-scribed with

Office Interior Furnishing, Electrical, HVAC and allied Civil Works, Office Space Area 10633 sft, Fourth Floor, NBCC Place, South Tower, Pragati Vihar, Bhishma Pitamah Marg, New Delhi 110003 as well as "Technical/Pre-qualification Bid" and "Price/Commercial Bid" as the case may be.

3.4.9.2 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.

3.4.9.3 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.

3.4.9.4 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.

3.4.9.5 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.

3.4.9.6 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.

3.5 Submission of bids

3.5.1 Sealing and Marking of Bids

3.5.1.1 The Bidder(s) shall seal the NON-WINDOW envelopes containing one copy of “Technical/Pre-qualification Bid” and one copy of “Price/Commercial Bid” separately and both these NON-WINDOW envelopes shall be enclosed and sealed in a single outer NON-WINDOW envelope bearing the Bidder’s name and address (return address). The Cover envelope shall further contain:

- Demand Draft from a scheduled bank, payable at New Delhi towards Earnest Money (EMD) as prescribed in the NIT.

3.5.1.2 The inner envelopes shall be addressed to the Company at the address given for submission of Bids in Section 1 above and marked as described in Clauses above or to be submitted physically at ECGC Limited, New Delhi Branch, 3rd floor Hansalaya Building, 15 Barakhamba Road, New Dehi-110001

3.5.1.3 The outer envelope shall:

- Be addressed to the Company at the said address
- Bear the Project Name

3.5.1.4 All envelopes should indicate the name and address of the Bidder on the cover.

3.5.1.5 If the envelope is not sealed and marked, the Company will assume no responsibility for the Bid’s misplacement or its premature opening.

3.6 Deadline for Submission of Bids

3.6.1 Bids must be received by the Company at the address specified, no later than the date & time specified in the “Schedule of Events” in Clause 1.2.

3.6.2 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.

3.6.3 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.

3.7 Late Bids:

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

3.8 Modification and Withdrawal of Bids

3.8.1 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.

3.8.2 No Bid shall be modified after the deadline for submission of Bids.

3.8.3 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.

3.8.4 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.

3.8.5 Bids once received shall not be returned after deadline for submission of Bids.

3.9 Preliminary Evaluation

3.9.1 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.

3.9.2 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.

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

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

3.10 Evaluation of Technical Bids

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

3.10.2 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.

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

3.10.4 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 & G.

3.10.5 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.

3.11 Evaluation of Price Bids and Finalization

3.11.1 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.

3.11.2 Company may waive off any minor infirmity or non-conformity or irregularity in a Bid, which does not constitute a material deviation, provided such a waiving does not prejudice or affect the relative ranking of any Bidder. Bidder(s) having any doubt/ queries/ concerns with any clause of this document or selection process shall raise their concern within 7 days of release of TENDER Document. ECGC will not be liable to accept or provide any explanation towards any doubt/ concerns later on whatever the same may be.

3.11.3 The queries may be communicated only through the e-mail id provided, which is newdelhi@ecgc.in

3.11.4 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.

3.12 Contacting the Company

3.12.1 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.

3.12.2 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.

3.13 Award Criteria

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 working days of receipt of the communication.

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. The successful Bidder will have to execute a Service agreement within 10 working days of the acceptance of tender award letter, which will be valid for the tenure as mentioned in this TENDER Document

3.14 Company's Right to Accept Any Bid and to reject any or All Bids

3.14.1 Notwithstanding anything mentioned above, the Company reserves the right to accept or reject any Bid or to cancel the Bidding process and reject all Bids 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.

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

3.15 Earnest Money Deposit (EMD) & Performance Bank Guarantee

3.15.1 Earnest Money may be deposited through (a.) Demand Draft (DD) issued from any schedule bank in favour of "ECGC Limited" payable at New Delhi. 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.

3.15.2 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.

3.15.3 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.

3.15.4 The Vendor shall furnish Performance Bank Guarantee of 3% of the value of the contract within 07 days of acceptance of tender award letter. The Performance Bank Guarantee will be released after successful completion of the project duly certified by the Architect. The Company may terminate the contract in the event the successful bidder fails to furnish the Performance Bank Guarantee for an amount equal to 3% of the value of the contract or fails to execute the agreement within specified period.

SECTION - 4

4. Terms and Conditions of Contract (TCC)

4.1 Definitions:

In this Contract, the following terms shall be interpreted as indicated:

- 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 ECGC 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. "TCC" means the Terms and Conditions of Contract;
- viii. "The Project" means Office Interior furnishing, Electrical, Heating Ventilation Air Conditioning (HVAC) and allied works at ECGC LTD, 4 th floor, NBCC Place, South Tower, Pragati Vihar, Bhishma Pitamah Marg, New Delhi 110003
- ix. "The Project Site" means designated locations of ECGC Limited as may be specified in Purchase Order / Contract.

4.2 Scope of Work

Office Interior furnishing , Electrical, Heating Ventilation Air Conditioning (HVAC) and allied works at ECGC LTD, 4 th floor, NBCC Place, South Tower, Pragati Vihar, Bhisham Pitamah Marg, New Delhi 110003 as per details given at **Annexure I**.

4.3 Duration

The project, as per the scope of work should be completed within 150 days from the commencement of work as mentioned in Clause 4.5.21.

4.4 General Conditions

- i. Earnest Money Deposit (EMD) amounting to Rs. 10,00,000/- is to be deposited in the form of Demand Draft payable at New Delhi and drawn in favor of, **ECGC Ltd.**, Delhi along with Tender.
- ii. The Vendor shall furnish Performance Bank Guarantee of 3% of the value of the contract within 07 days of acceptance of tender award letter.
- iii. All taxes or any other statutory obligation / tax on material or on finished works or any other additional tax etc. in respect of this contract, as applicable, shall be payable by Vendor including transportation and TA / DA of the workers at site and the Company shall not entertain any claim whatsoever in this respect.
- iv. Time is the essence of the contract. The Interior furnishing, electrical, HVAC and allied civil work, of office space as per the Scope of Work for 10643 sft, shall be completed within **150 days** from the commencement of work.
- v. The Vendor shall comply with applicable laws, policies and regulations as stipulated by the center/state/local government.
- vi. No advance payment will be granted for the works proposed.
- vii. Vendor shall raise their Invoice on a monthly basis along with their expenditure claim duly certified by the Architect. The Company shall release the payment within 15 days of submission of the Invoice and the necessary documents and clarifications, if any. On completion of work, the accounts of the works shall be closed and a final statement shall be submitted for settlement along with refund/adjustment of excess payment received, if any, duly certified by the Architect.
- viii. The successful Bidder or 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.

4.5 SPECIAL TERMS AND CONDITIONS

4.5.1 Vendor to comply with Company's rule and guidelines

Complying with 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 Agreement, the terms set out in the Agreement shall prevail;

4.5.2 Co-operation with other agencies and damages and safety of road users

All works are to be carried out in close co-ordination with the Architect and Company and contractor those may be working in the area of work. 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 to guard against chances of injury or accidents to workers, road users, occupants of the adjacent locality etc. 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 Transportation arrangement

The Vendor shall arrange for all means of transport required for carriage and supply of materials and also the materials required for the construction work. The Vendor will have to arrange at his own initiative so that progress of work does not get hampered and no claim whatever on this ground will be entertained under any circumstances. The Vendor must consider this aspect while quoting rate.

4.5.4 Incidental and other charges

The cost of all materials, hire charges to Tools and plants, labour, Company / Municipal Fees for water supply, Royalty on road materials (if any), electricity and other charges of Municipalities or statutory local bodies, ferry charges, Toll charges, loading and unloading charges, handling chargers, overhead charges, etc. will be deemed to have been covered by the rates quoted by the Vendor inclusive of all statutory and levy/ cess will have to be borne by Vendor or bidder and his/ her quoted rate should be quoted after considering all these charges. All other charges for the execution of the specified work, including supply of materials and related carriage, complete or finished in all respect up to the entire satisfaction of the

Architect of the work. No extra claim in this regard beyond the specified rate as per work schedule whatsoever in this respect will be entertained.

4.5.5 Authorized Representative of Vendor

The Vendor shall not assign the agreement or subcontract any portion of the work. The contractor, may however, appoint and authorize representative in respect of one or more of the following purpose 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 and the Vendor shall in writing seek such approval of the Architect giving therein the name of work, Tender No., the Name, Address and the specimen signature of the representative he wants to appoint and the specific purposes as specified herein-above, which the representative will be authorized for. Even after first approval, the Architect may issue at any subsequent date, revised directions about such authorized representative and the contractor shall be bound to abide by such directions. The Architect shall not be bound to assign any reason for his revised directions. Any notice correspondence etc. issued to the authorized representative or left at his address, will be deemed to have been issued to the Vendor.

4.5.6 Completion of the Project

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.

4.5.7 Royalty

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.

4.5.8 Supplementary / Additional items of Works

No Additional/supplementary work/item, other than work/items mentioned in the printed tender be carried out by the contractor. Prior approval of the Architect and Company is to be obtained, if any additional/supplementary work/item arises during execution of the work, which was not mentioned in the printed tender. Rates for such additional/supplementary work will be approved by the Company and shall be binding on the Vendor.

4.5.9 Approval of Sample

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 prior to utilization in the work.

4.5.10 Drawings

All works shall be carried out in conformity with the scope of work and in consultation of the project architect.

4.5.11 Serviceable Materials

The responsibility for stacking the serviceable materials (as per decision of the Company/ Architect) obtained during dismantling of existing structures/walls/tiles (except frames that required to be retained) and ~~reads~~ except those for disposing off under salvage value item & property/ materials of NBCC which are required to be handed over to NBCC and/or 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 and/or NBCC, full value will be recovered from the Vendor's bill at rates as will be assessed by the Architect.

4.5.12 Unserviceable Materials

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.

4.5.13 Idle labour & additional cost

Whatever may be the reason no claim on idle labour, enhancement of labour rate additional establishment cost, cost of Toll and hire and labour charges of tools and machines etc. would be entertained under any circumstances.

4.5.14 Charges and fees payable by Vendor

a) 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.

b) 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 or 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.

4.5.15 Tools and machines

All Tools and machines required for the work will have to be supplied by the Vendor at his own cost; all cost of fuel and stores for proper running of the Tools and machines must be borne by the Vendor.

4.5.16 Realization of ECGC's claims

Any sum of money due and payable to the Vendor (including any EMD returnable to him) under this contract may be appropriated by ECGC and set off against any claim of ECGC for the payment of sum of money arising out of this tender or under any other contract made by the Vendor with ECGC.

4.5.17 Intellectual Property Law

All the manuals, guidelines, documents, drawings etc. provided by company shall be treated as Confidential information by the Vendor and existing intellectual property rights of the Company therein shall continue to vest with the Company.

4.5.18 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.

4.5.19 Compliance of different Acts

The vendor shall comply with all applicable laws, rules and regulations including, but not limited to the provisions of the Apprentices Act, 1961, Minimum Wages Act, 1848. Contract Labour (Regulation and Abolition) Act 1970 and the rules and orders issued thereunder from time to time. If he fails to do so, Architect may at his discretions, take necessary measure over the contract. 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). The Vendor must obtain necessary certificate and license from the concerned Registering Office under the Contract Labour (Regulation & Abolition) Act, 1970. The Vendor shall be bound to furnish the Architect all the

returns, particulars or date as are called for from time to time in connection with implementation of the provisions of the above Acts and Rules and timely submission of the same, failing which the Vendor will be liable for breach of contract and the Architect may at his discretion take necessary measures over the contract.

4.5.20 Safety, Security and Protection of the Environment

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.

4.5.21 Commencement of work

The work must be taken up within 15 days from acceptance of tender award letter.

4.5.22 Programme of work

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.

4.5.23 Setting out of the work

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.

4.5.24 Precautions during works

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.

4.5.25 Testing of qualities of materials & workmanship

All materials and workmanship shall be in accordance with the specifications laid down in the contract 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.

4.5.26 Timely completion of work

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.

4.5.27 Procurement of materials

All materials required to complete execution of the work shall be supplied by the Vendor after procurement from authorized and approved source.

4.5.28 Rejection of materials

All materials brought to the site must be approved by the Architect. Rejected materials must be removed by the Contractor from the site within 24 hours of the issue of order to that effect. In case of non-compliance of such order, the Architect shall have the authority to cause such removal at the cost and expense of the contractor and the Vendor shall not be entitled to claim for any loss or damage on that account.

4.5.29 Implied elements of work in items

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.

4.5.30 Damaged cement / equipment / basic materials.

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 removed from the site by the Vendor or disposed of as directed by Architect at the costs and expenses of the Vendor.

4.5.31 Delay due to modification of drawing and design

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.

4.5.32 Additional Conditions

A few additional conditions under special terms and conditions:

1. Rate quoted shall be inclusive of clearing site including removal of surplus (both serviceable & unserviceable) earth, rubbish, materials, debris etc. as per direction of the Architect.
2. Rate quoted shall be inclusive of all Statutory taxes and cess etc and all other duties except GST. GST shall be added at the end of total of amount quoted. TDS deduction shall be applicable as per government regulation applicable for contractor payment.
6. Labour welfare CESS and all other cess are to be borne by the contractor.
7. The whole work will have to be executed as per Annexure H available in this connection at the tender rate.

4.5.33 Payments

- a. 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.
- b. No payment shall be made in advance on award of the contract.
- c. The payment shall be released on proper submission of the Invoice together with the measurements of the work carried out. The retention money, other statutory deductions and any other amounts as may be deductible / recoverable as per the terms and conditions of contract shall be deducted from the running bills.
- d. 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.
- e. 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. The Vendor has to submit Insurance policy (Contractor All Risk Policy valid till Defect Liability Period (DLP) from IRDA approved Insurance company.
- f. All payments shall be subject to TDS and any other taxes as per the tax rules prevalent at the time of payment.
- g. 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.
- h. Any decrease in taxes must be passed on to ECGC.
- i. No adjustment of Price or Price escalation of any kind will be allowed.

j. No mobilization Advance and secured Advance will be allowed.

4.5.34 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.

4.5.35 Termination

ECGC may terminate the Contract with at least 15 days prior written notice to the Vendor on account of any material breaches committed by the Vendor in breach of its obligations under the Contract.

ECGC shall not be obligated to pay the Vendor for any such terminated services performed or expenses incurred after the effective date of such termination.

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

- i. During the course of Defect Liability Period the Vendor has to rectify all the defects noticed free of charge.
- i. In case the Vendor fails to attend the rectification work within 7 days of reporting the same in writing, Company will have the liberty to carry out the said work through any other means at the cost & risk of the Vendor . Such expenditure, shall be recovered from the Retention Money Deposit 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.
- i. 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.

4.5.37 Indemnity

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.

4.5.38 Governing Law and Jurisdiction

The Courts in New Delhi, 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.

4.5.39 Survival

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

4.5.40 Force Majeure

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. 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.

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.

4.5.41 Entire Agreement

It is expressly agreed between the parties that the bid received from successful bidder 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.

4.5.42 Rights of the Company:

a. ECGC does not bind itself to accept the lowest quotation and reserves the right to reject any or all the quotations received, without assigning any reason thereof.

b. While processing the Bids, ECGC further reserves the right to delete or reduce any item or section contained the Tender Document or in the Scope of Work without assigning any reason thereof.

4.5.43 Royalties and Patents

Any royalties or patents or the charges for the use or infringement thereof that may be involved in the contract shall be included in the price. Bidder shall protect the Company against any claims thereof.

4.5.44 Confidentiality: -

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

4.5.45 Representation and Warranties

- i. 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 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.
- ii. Successful Bidder shall be required to obtain valid Registration Certificate & Labour License from respective Regional Labour Offices where construction work by them are proposed to be carried out.
- iii. 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 10 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 certification of satisfactory completion of work duly certified by the Architect. The value of the work to be insured would be 125% of the contract value for CAR Policy.
- iv. The CAR policy should have additional coverage under 3rd party liabilities. The liabilities should be one lakh rupees per accident. The premium receipt and the policies should be submitted to 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 WORKMENS' COMPENSATION ACT or any STATUTE in force during the currency of this contract or at common law in respect of any employee of the Vendor or any sub- contractor. The Vendor shall be responsible for anything which may be excluded from the insurance policies above referred to.

- v. 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.
- vi. The Company shall be at liberty and is hereby empowered to deduct fully the amount of any damages, compensation costs, charges and expenses arising or accruing any such claim or damage from any sum or sums due or to become due to the contractor.
- vii. Successful Bidder or Vendor shall be required to observe the following conditions strictly:
 - a. Employees' Provident Fund and Miscellaneous Provisions Act, 1952 and Employees State Insurance Act, 1948 should be strictly adhered to wherever such Acts become applicable.
 - b. Minimum wages to the workers shall be paid according to the rates notified and/or revised by the State Government from time to time under the Minimum Wages Act, 1948 in respect of scheduled employments, within the specified time as per law. Payment of bonus, wherever applicable, has to be made.
 - c. Adequate safety and welfare measures must be provided as per the provisions of the Building and other Construction acts applicable in Delhi
 - d. All liabilities arising out of engagement of workers are duly met before submission of bills for payment. If there is any violation of any or all the relevant above criteria during execution of the job, it will render the concerned agencies ineligible for the work then and there or at any subsequent stage as may be found convenient.

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 should be provided along with the bid >
14	Annual turnover for the last five financial years	< IT returns acknowledgments and / or Audited Financial Statements / statements

		certified by Chartered Accountants to be provided for last five financial years ending on 31.03.2021.
15	Power of Attorney/authorization for signing the bid documents	
16	The Bidder should not have been blacklisted / barred / disqualified by any Govt. Financial Institutions / Banks / Government / Semi-Government departments/ regulator / statutory body/ judicial or any other authority in India.	< A self-declaration by the Bidder on its letter head>
17	The Bidder's Firm should not be owned or controlled by any Director or Employee of ECGC Ltd.	< A self-declaration by the Bidder on its letter head>
18	Projects taken up and completed during last 5 years	Details
19	Any project not completed due to any reason in last 5 years	Details
20	Any penalty imposed for delay or no-completion in past 5 years	Details
21	Status of ongoing/ completed litigation & arbitration related to projects	Details

.....

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

Name :

Date:

Designation :

Contact No (Mobile)

Fax No.:

Email Id

ANNEXURE-B

ANNUAL TURNOVERS FOR THE LAST FIVE FINANCIAL YEARS

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

S.No.	Financial Year	Turnover from renovation and repairing work [Rs in Lakhs]	Turnover from all other sources (Rs in Lakhs)	Remarks
1	2016-17			
2	2017-18			
3	2018-19			
4	2019-20			
5	2020-21			

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 tenderee 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.
- i. 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**DATE:**

ANNEXURE – D

BANK DETAILS OF THE BIDDER

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

.....

Signature of the authorized Signatory of Company/Firm/Proprietor

(Company Seal)

Name :

Designation :

Contact No (Mobile)

Email Id

ANNEXURE – E

ACKNOWLEDGEMENT

To,
ECGC Limited,
New Delhi Branch,
3rd Floor, Hansalaya Building, 15 Barakhamba Road,
New Delhi 110001.

Dear Sir/Madam,

SUBJECT: RESPONSE TO THE REQUEST FOR PROPOSAL FOR “OFFICE INTERIOR FURNISHING , ELECTRICAL, HEATING VENTILATION & AIR CONDITIONING (HVAC) AND ALLIED CIVIL WORKS”, AT ECGC LTD, 4 TH FLOOR, NBCC PLACE, SOUTH TOWER, PRAGATI VIHAR, BHISHMA PITAMAH MARG, NEW DELHI 110003.

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

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

.....
Signature of the authorized Signatory of Company/firm/Proprietor

(Company Seal)

Name:

Designation:

Contact No (Mobile):

Email ID:

ANNEXURE F

FORMAT FOR LETTER OF AUTHORIZATION

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

To

ECGC Limited,

New Delhi Branch,

3rd Floor, Hansalaya Building, 15 Barakhamba Road,

New Delhi 110001.

Letter of Authorisation For Attending Bid Opening for Tender

Any one of the following persons is hereby authorized to attend the bid opening on _____(date) in the tender for work: **“OFFICE INTERIOR FURNISHING , ELECTRICAL, HEATING VENTILATION & AIR CONDITIONING (HVAC) AND ALLIED CIVIL WORKS”**, at the following address: ECGC Ltd., New Delhi Branch, 3rd Floor, Hansalaya Building, 15 Barakhamba Road, New Delhi 110001 mentioned on behalf of M/s. _____ (Name of the Bidder) in the order of preference given below:

Order of Preference Name Designation Specimen Signature

I

II

(Authorized Signatory of the Bidder)

Date_____

(Company Seal)

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

ANNEXURE G

AFFIDAVIT

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

1. I, _____
_____ the under-signed do certify that all the statements made in the attached documents for the work “**OFFICE INTERIOR FURNISHING , ELECTRICAL, HEATING VENTILATION & AIR CONDITIONING (HVAC) AND ALLIED CIVIL WORKS**”, at ECGC LTD, 4 th floor, NBCC Place, South Tower, Pragati Vihar, Bhishma Pitamah Marg, New Delhi 110003 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	44 - 72
2	PART-B	ELECTRICAL	73 - 118
3	PART-C	HVAC	119 - 143

BILL OF QUANTITY

S.NO	DESCRIPTION		PAGE NO.
1	PART-A	INTERIOR FURNISHING	144 - 223
2	PART-B	ELECTRICAL	224 - 284
3	PART-C	HVAC	285 - 298
4	PART-D	SUMMARY- A + B + C	299 - 301

SPECIFICATIONS – PART A

INTERIOR FURNISHING

1. GENERAL DATA

GENERAL

The work under this tender shall be executed strictly in accordance with constructional and material requirements defined under these specifications. The contractor shall carefully acquaint himself with these specifications to determine his contractual obligations for work. Architect instruction shall be binding over and above specification described in BOQ, in writing only with CC to Owner.

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

CO-ORDINATION OF DRAWINGS

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

Any discrepancy shall be brought to notice for timely rectifications for architect response if any, that may take up to 15 days. Communication shall be done in advance, no time extension is available to contractor in this response time and shall not be entertained as hindrance.

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

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.

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 P.O.P. (PLASTER OF PARIS)

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

2.1 PREPARATION OF SURFACE

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

2.3 PLASTER OF PARIS

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

2.4 APPLICATION

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

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

3.0 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.

4.0 WALL FINISHES

4.1 EXTENT AND INTENT

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

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

4.2 GENERAL

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

4.3 PLASTER WORK

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

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

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

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

4.4 CHASING

All chasing, installation of conduits, boxes etc. to be completed before any plastering or other wall finish is commenced on a surface. Chasing or cutting of plaster or other finish will not be

permitted. Broken corners shall be cut back not less than 150mm on both sides and patched with plaster of Paris as directed. All corners shall be rounded plaster of Paris as directed. All corners shall be rounded to a radius of 8mm or provided with suitable galvanized iron E.P.M. corner beads as directed by the Architect.

4.5 SAMPLES

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

4.6 PREPARATION OF SURFACE

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

4.7 INTERNAL PLASTER TO WALLS

Plaster to internal faces of walls shall be 12mm/15mm/20mm thick as called for, consisting of 1 part cement and 4-part clean sand. (Fine and Coarse sand in equal proportions). As approved by the Architect

4.8 MORTAR MIXING

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

4.9 APPLICATION

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

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

4.10 CHICKEN MESH ON WALLS

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

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

4.11 CURING

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

4.12 CEILING PLASTER

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

4.13 PREPARATION OF SURFACE

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

4.14 APPLICATION

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

4.15 GROOVES

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

5.0 UPVC/ ALUMINUM WORK

5.1 SHOP DRAWINGS

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

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

Metal thickness

Arrangement of components

Jointing

Details of site connections

Fastening

Flashing

Metal finishes

Glazing

Weather stripping

Sub framing

Hardware (including preparation)

Sealant

Other pertinent information.

5.2 INSPECTION:

All material brought to site by the contractor for used in the work shall be subjected to inspection and approval by the Architect and shall be required to get necessary tests carried

out on material and work from approved laboratory/test house, the cost of which shall be borne by the Contractor.

5.3 ALUMINUM SECTIONS:

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

5.4 FABRICATION:

All frames shall be square and flat, and the frames being fabricated to a true right angle, and shall confirm to IS 1948. These shall be fabricated as per approved shop drawing. Both fixed and operable frames shall be fabricated out of a section which has been machine cut to length and mechanically jointed with hardened nickel, zinc plate steel screws and joining accessories such as cleat, fixture, machine bolt made of such material as not to cause 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.

5.5 ANODIZING:

All aluminum section shall be anodized as per IS 7088 and electro-colored to matt bronze finish as per IS 1868 grading as specified in item schedule. Anodizing to confirm specified grade with minimum average thickness of 25 microns meter when measured as per IS 6012. The anodized coating shall be properly sealed by steam 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.

5.6 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.

5.7 PRECAUTIONS:

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

5.8 FITTINGS:

The contractor shall fix aluminum doors, windows etc. in prepared opening. Aluminum door frames, wherever possible, shall be fixed in place before erecting partitions. Where this is not possible, prepared opening shall be left for hold fasts. Breaking of partitions or walls for inserting hold fasts will not be permitted. Where the frames are to be fixed to column/wall faces they shall be fixed with rawl bolts/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.

5.9 MANUFACTURER'S ATTENDANCE

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

6.0 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).

7.0 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.

7.1 ADHESIVES

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

7.2 NAILS, SPIKES, SCREWS & BOLTS

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

7.3 WORKMANSHIP

All carpenter's work shall be done by skilled workmen using proper tools. All joints shall as far as possible, be mortised and tenoned and glued with best quality approved waterproof glue. Where mortise tenon joints are not possible, the joints shall 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.

8.0 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.

8.1 PRESERVATIVE TREATMENT

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

8.2 PAINTING AND POLISHING

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

8.3 PROTECTION OF WORK

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

8.4 HARDWARE

8.4.1 EXTENT AND INTENT

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

8.4.2 GENERAL

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

8.4.3 SAMPLES

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

8.4.4 QUALITY

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

8.4.5 GUARANTEE

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

8.5 PAINTING

8.5.1 EXTENT AND INTENT

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

8.5.2 MATERIALS

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

8.5.3 COLOR

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

8.5.4 COMMENCEMENT OF WORK

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

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

Building where painting work is to be commenced shall be thoroughly swept and cleaned up before commencement of painting. other materials of colors sharp and clean, without overlapping.

8.6 ENAMEL PAINT

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

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

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

8.7 PLASTIC EMULSION PAINT

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

8.8 SPIRIT POLISHING

Polish: Polishing material shall be prepared by dissolving pure shellac, varying in shade from pale orange to lemon yellow, free from direct and other materials, in methylated 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 spirit. The surface shall again be rubbed down perfectly smooth with fine sandpaper and wiped clean.

Application: There or more coats of polish shall be applied over the above surface, to achieve a finish as approved by the Architect. The polish shall be applied with a pad of wooden cloth covered by a fine cloth. The 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 spirit and applied by light rubbing. The finished surface shall have a uniform texture and high gloss.

8.9 WAX POLISHING

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

Preparation of Surface: The surface to be polished shall have been finished smooth. Knots, cracks and holes on the surface shall be cleaned and filled with wood putty (fine saw dust mixed with bee's wax). The filling when dry shall be rubbed down with a 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.

8.10 FIRE RESISTANT COATINGS ON WOODWORK

8.10.1 General:

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

8.10.2 Application:

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

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

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

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

8.10.3 SPECIAL NOTES

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

8.10.4 SPECIFICATIONS/BRAND NAMES

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

9.0 UPVC DOOR AND WINDOW

9.1 COMPOSITION:

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

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

9.3 DURABILITY:

The Systems shall be resistant to chemicals and be fungal and vermin proof. The profiles must be colorfast, being able to withstand weather and light resistance test of 4000 hours on

xenon and weathering apparatus. COLOUR The Systems color should be uniform and consistent.

9.4 FIRE RESISTANCE:

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

9.5 QUALITY CONTROL:

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

9.6 PROFILE CONSTRUCTION:

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

9.7 INTERNAL PROFILE DRAINAGE:

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

9.8 PRESSURE EQUALIZATION:

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

9.9 WINDOW PERFORMANCE:

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

9.10 STRENGTH AND SAFETY OF MOVING PARTS:

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

9.11 GLAZING BEADS:

Glazing beads shall be of the one-foot snap in design and shall be extruded U PVC mitred at the corners. All glazing beads shall be with a co-extruded gasket of a multi-fin design to

maintain security and weather performance. Gasket material shall be thermo Plastic Elastomer.

9.12 GLAZING GASKETS:

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

9.13 WEATHER SEALS:

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

9.14 GLAZING:

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

9.15 WELDED JOINTS:

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

9.16 REINFORCEMENT:

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

9.17 MECHANICAL JOINTS:

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

9.18 HARDWARE GENERAL:

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

9.19 FRICTION HINGES:

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

9.20 BUTT HINGES:

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

9.21 ESPAGNOLETTE HANDLES:

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

9.21.1 Touch Lock:

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

9.22 Pop Up handle:

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

9.23 Sliding Handle:

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

9.24 Sliding Handle with Lock:

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

9.25 D Type Handle:

9.26 Single Roller:

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

9.27 Double Roller:

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

9.28 Door Roller:

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

9.29 Sliding Gear:

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

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

9.30 Single Point Lock Handle:

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

9.31 Open able Handle:

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

9.32 Open able Handle with Lock:

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

9.33 Single Side Door Handle:

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

9.34 Single Side Door with Lock:

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

9.35 Both Side Door Handle with cylinder:

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

9.36 Both Side Door Handle:

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

9.37 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

9.38 75 mm Window Hinge:

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

9.39 100 mm Door Hinge:

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

9.40 Door Hinges:

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

9.41 3D Hinges:

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

9.42 2D Hinges:

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

9.43 Single plate gear:

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

9.44 Multi Point Door Gear:

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

9.45 Multi Point Gear with Mortice Lock:

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

9.46 Cylinder both side key:

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

9.47 Double sash door bolt:

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

9.48 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.

9.49 HANDING AND TRANSPORT:

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

9.50 WARRANTY:

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

9.51 TECHNICAL SPECIFICATIONS

S.NO	TECHNICAL SPECIFICATION	
I	Impact strength down to 400C	No breakage
ii	Notch impact strength	> 30 kJ/m ²
iii	Ball impact hardness	100 N/mm ²
iv	Tensile strength	> 40 N/mm ²
v	E module	> 2500 N/mm ²
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/m ² irradiation energy better than authenticity grade 4 of grey scale
xii		

10.0 POP AND FALSE CEILING ITEMS

10.1 Plain Gypsum board False Ceiling

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

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

10.2 Location:

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

10.3 Material:

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

10.4 GENERAL NOTES FOR FALSE CEILING WORK:

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

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

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

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

10.5 Gypsum False Ceiling:

Plain gypsum board MR/FR grade ceiling: 12 mm thick Plain gypsum MR/FR grade false ceiling Suspension (considering all levels with require all fabrication work and fitting from RCC slab to false ceiling level & The rate shall be considered in sqm for all floors and at all heights, offsets whether cove light or fixed gypsum board size up to 100 mm to 1200 mm in the false ceilings including all costs) . Work complete as per the

manufacturers specification of Saint Gobain or approved make- M/F Suspended Ceiling 1 hour fire rated.

Providing and fixing Suspended ceiling using Gypsum or equivalent of Ultra G. I. Perimeter Channels of size 0.55mm thick having one flange of 20mm and another flange of 30mm and web 27mm along with perimeter of ceiling, 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 fastener, cleats, screws, angles, packing, etc. complete work. Work complete including all type of tools, tackles, finishing etc. complete as per approved sample & instruction of Architect/ Client/ PMC. sample mock shall be approved from Architect/ Client.

10.6 Mineral Fiber Ceiling

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

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

10.7 Material specifications:

Size: 600 mm x 600 mm and 15 mm thick. Sound absorption (NRC): 0.55 Light reflectance of > 84% (WT) Thermal conductivity $k = 0.052 - 0.057 \text{ W/M0k}$ 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.

10.8 GENERAL NOTES FOR FALSE CEILING WORK

MODULAR CEILING: Providing and fixing modular false ceiling tiles of 600 mm x 600 mm Centre to center and 13 mm thick square mineral fibre board to be fixed on frame work of Aluminium sections for suspended false ceiling consisting of Aluminium T 2” X 1 1/2” (50 mm X 40 mm) weighing 0.39 kg/m at 60 cms center to 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

10.9 EXTERNAL ACP CLADDING WORK

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

Size: as mentioned in the drawing.

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

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

10.10 SPECIFICATIONS FOR ACP CLADDING

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

hardware, silicon sealant (Dow Corning 789) masking tape scaffolding if required and the same shall not be marked extra.

11.0 LIST OF APPROVED MAKE:

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 or equivalent
29.	Adhesive	Fevicol, Araldite, Anchor or equivalent
30	Solid Surfaces (Curion)	DUPOINT/HI-MAC/ STARON OR equivalent
31	Automated Rolling Shutter	Gandhi Automation/Toshi Automatic Systems/Akash Rolling Shutter
32.	False ceiling Gypsum Board	India Gypsum / Saint Gobin / Asia
33.	False Ceilings: Grid (As Approved)	Armstrong/ AMF With Micro Look Edges or as approved.
34.	Acoustical False Ceilings: Mineral fiber board	Armstrong, Hunter Douglas / Peritex or equivalent
35.	GI Sections	India Gypsum / Saint Gobin / Jindal or equivalent

36.	Aluminium Skirting	Jindal or equivalent
37.	Anti-Termite	Thiddan (35 E.C.), Dursban-20tc, Trishul,
38.	Rolling and vertical Blinds	Vista , Peritex , MAC or equivalent
39.	Heat Reflective Film and frosted film	Garware Or Approved Eq.
40.	CP Fittings	Jaquar /Hindware/ Kohlar or equivalent
41.	Sanitary Ware	Hindware / Cera / Parryware or equivalent
42.	Sanitary Fittings	Jaquar /Hindware
43.	Geyser	Bajaj / Sphere Hot / Crompton /Racold / Havells
44.	Stainless Steel Sink	Nirali, Nilkanth, Orient.
45.	C.I.Pipe / RWP	Bengal Iron Corporation or equivalent ISI make Rif, Sif, Bis.
46.	G.I. Pipe	Tata, Jindal,Zenith
47.	Cpvc pipe	(Ajay/ Ashirwad/Astral/Supreme)
48.	C.I Brass La Pips	Electro Steel, Kesoram Or Approved Equilent.
49.	U.P.V.C Pipe	Astral, Finolex, Prince, Supreme. Supreme Make (Is Type " B' Is 13592 Swr Range
50.	Stone Ware Pipe	Bhaskar, Anand, ISI Marked Of Approved Quality.

51.	Gun Metal Valve (Full Way Check) 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 approved
63.	Auto Sanitizer Dispenser	Puremist / Equivalent Make/Range

SPECIFICATIONS – PART B

ELECTRICAL

SCOPE OF WORK:

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

Drawing shall be submitted for records, and confirmation about mutual placement of items. All layout drawings shall be presented to team, joint meeting for understanding of items for installation, to the satisfaction of all 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 of 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 and 2 mm wall thickness for conduits above 25 mm diameter. The accessories used for M.S. conduits shall conform to Indian Standards IS : 3837-1966-(Specification for fittings for Rigid steel conduits with the latest amendments ,The conduits shall be delivered to the site in original bundles and each length of conduit shall bear the label of the manufacturer. The number of insulated copper conductor wires that may be drawn in the conduits of various sizes are given below and the conduit fill shall not exceed 40%. The minimum size of conduits shall be 25mm diameter for lighting and outlets and conduit size shall be increased as per relevant IS code depending on the number of wires. Wires shall be PVC insulated copper conductor and ISI marked.

1.2 CONDUIT FILL

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

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

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

6	-	6	6	8	
10			3	4	
16				3	5
25				2	3
35				1	1

1.4 M.S. CONDUIT CONNECTIONS:

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

1.5 BENDS IN CONDUITS:

Where necessary, bends may be carried out by means of conduit bends and/or circular inspection boxes with adequate and suitable inlet and outlet screwed joints. In case of recessed system, each junction box shall be provided with a cover properly secured and flushed with the finished wall/ceiling surface, so that the conductors inside the conduit are accessible. No bends shall have radius less than 2.5 times the outside diameter of the conduit. Use Special spring for bending the conduit. Heating to soften the conduit for bending is not allowed.

1.6 FIXING OF CONDUITS

Conduits and junction boxes shall be kept in position with the help of proper hold fasts while the walls, slabs and floor are under construction. Fixing of standard bends or elbows shall be avoided as far as practicable and all curves maintained by bending the conduit pipe itself with a large 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 25mm x 3 mm copper strips.

3.4. CONNECTION OF EARTHING CONDUCTORS

Main earthing conductors shall be taken from the earth connections at the main switchboards to an earth electrode with which the connection is to be made. Sub main

earthing conductors shall run from the main switchboard to the sub-distribution boards. Final distribution boards earthing conductors shall run from sub-distribution boards.

3.5. PROHIBITED CONNECTIONS

Neutral conductor, sprinkler pipes, or pipes conveying gas, water, or inflammable liquid, structural steel work, metallic enclosures or cables and conductors, metallic conduits and lightning protection system conductors shall not be used as a means of earthing an installation or even as a link in an earthing system.

The electrical resistance of metallic enclosures for cables and conductors measured between earth connections at the main switchboard and any other point on the completed installation shall be low enough to permit the passage of current necessary to operate fuse or circuit breakers and shall not exceed 1 ohm.

3.6. PROTECTION FROM CORROSION

Connections between copper and galvanized equipment shall be made on vertical face and protected with paint and grease. Galvanized fixing clamps shall not be used for fixing earth conductors. Only copper fixing clamps shall be used for fixing earth conductors. When there is evidence that the soil is aggressive to copper, buried earthing conductors shall be protected by suitable serving and sheathing.

3.7. EARTHING STATION

Plate Electrode Earthing: Earthing electrode shall consist of a tinned copper plate not less than 300mm x 300mm x 3mm thick as called for in the Schedule. The plate electrode shall be buried as far as practicable below permanent moisture level but, in any case, not less than 4.2 meters below ground level. Wherever possible earth electrodes shall be located as near the water tap, water drain or a down take pipe as possible.

Earth electrodes shall not be installed in proximity to a metal fence. It shall be kept clear of the buildings foundations and in no case shall it be nearer than 2 meters from the outer face of the wall.

The earth plate shall be set vertically and surrounded with 150mm thick layer of charcoal, dust and salt mixture. 20mm GI pipe shall run from the top edge of the plate to the ground level. The top of the pipe shall be provided with a funnel and a mesh for watering the earth through a pipe. The funnel over the GI Pipe shall be housed in a

masonry chamber, approximately 300mm x 300mm x 300mm deep. The masonry chamber shall be provided with a cast iron cover resting over a GI frame embedded in masonry. Refer Sketch for additional details.

Pipe Electrode Earthing: Earthing electrode shall consist of a Pipe specified in BOQ item, Indian Tube Company make or approved equal not less than 40mm dia and 4.5 meters long, (pipe wall thickness as manufacture) GI Pipe electrode shall be cut tapered at the bottom and provided with holes of 12mm dia drilled at 75mm interval up to 2.5 meters length from bottom.

The electrode shall be buried vertically in the ground as far as practicable below permanent moisture level with its top not less than 1.25 M below ground level. The electrode shall be in one piece and no joints shall be allowed in the electrode. Wherever possible earth electrodes shall be located as near water tap, water drain or a down take pipe. Earth electrodes shall not be located in proximity to a metal fence. It shall be kept clear of the building foundations and in no case shall be nearer than 2 meters from the outer face of the wall. Refer Sketch for additional details.

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

3.8. EARTH CONNECTION

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

Earthing conductors outside the building shall be laid 600mm below the finished ground level. The over lapping in copper strips at joints where required, shall be minimum

75mm. The joints shall be riveted and brazed with copper rivets and greased in approved manner. Sweated lugs of adequate capacity and size shall be used for all termination of wires above 1 Sq.m size and bare copper wire above 2.0mm dia. Lugs shall be bolted to the equipment body after the metal body is cleaned of paint and other oily substance and properly tinned.

The earth wires entering the Final Distribution Boards shall be terminated with copper sockets crimped to its ends and tightened to the terminal with the help of flat end brass screws.

3.9. EARTH RESISTANCE

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

3.10. RESISTANCE TO EARTH

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

4 TESTING.

4.1. GENERAL

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

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

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

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

4.2. TESTING OF WIRING

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

4.3. INSULATION RESISTANCE TEST

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

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

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

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

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

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

4.5. EARTH RESISTIVITY TEST

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

4.6 TEST CERTIFICATES

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

5.0 SAFETY REQUIREMENTS

5.1 SCOPE

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

5.2 REQUIREMENTS

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

(a)Insulation Mats

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

(b)First Aid Charts and First Aid Box

Charts (one in English, one in Hindi, one in regional language), displaying methods of giving artificial respiration to a recipient of electrical shock shall be prominently provided.

ed at appropriate place. Standard First Aid Boxes containing materials as prescribed by St. John Ambulance brigade or Indian Red Cross should be provided in each sub-station.

(c) Danger Plate

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

(d) Fire Extinguishers

Portable CO₂ conforming to IS: 2878-1976 dry chemical conforming to IS 2171-1976 extinguishers shall be installed in the sub-station at suitable places as specified.

(e) Fire Buckets

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

(f) Tool Box

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

(g) Caution Board

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

(h) Key Board

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

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

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

The MV Panel, SDBs & FDBs shall comply with the latest edition of relevant Indian Standards and Indian Electricity Rules and Regulations. All Panels and Distribution

Boards shall be fabricated by the contractor by using specified components as per the specifications given below:

6.1. CONSTRUCTION FEATURES

The Distribution Boards and Panels shall be metal enclosed sheet steel cubical, indoor, dead front, floor mounting type. The distribution boards shall be totally enclosed, completely dust and vermin proof. Gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust proof. Panels and Distribution boards shall be preferably arranged in multitier formation.

All doors and covers shall be fully gasketed with foam rubber and/or rubber strips and shall be lockable. All MS sheet steel used in the construction of distribution boards and Panels shall be 2mm thick and shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet metal shall be seam welded, all welding slag grounded off and welding pits wiped smooth with plumber metal.

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

Knockout holes of appropriate size and number shall be provided in the Distribution Board and Panels in conformity with the location of incoming and outgoing cables. Panels and distribution boards shall be provided with removable sheet steel plates at top and bottom to drill holes for cable entry at site. MV Panel shall be of Extendible type.

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

6.2. CIRCUIT COMPARTMENTS

Each circuit breaker, MCCB and switch fuse units shall be housed in separate compartments and shall be enclosed on all sides. Sheet steel hinged lockable door shall be duly interlocked with the ACB/MCCB/switch fuse unit in 'on' and 'off' position. Safety

interlocks shall be provided for air circuit breakers to prevent the breaker from being drawn out when the breaker is in 'on' position.

The door shall not form an integral part of the draw out position of the ACB. All instruments and indicating lamps shall not be mounted on the ACB compartment door. Sheet steel barriers shall be provided between the tiers in a vertical section. The Knobs for holding the cubicle door in closed position shall be spring operating rotating type and not screwed type.

6.3. INSTRUMENT ACCOMMODATION

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

6.4. BUS BARS & BUS BAR CONNECTION

The bus bar and interconnections shall be of electrolytic Copper of 99.9 % purity of rectangular cross sections suitable for full load current for phase bus bars and full rated current for neutral bus bar and shall be extendible on either side. Minimum 200 Amps capacity bus bars shall be provided in the distribution boards.

The bus bars and interconnections shall be insulated with PVC heat shrinking sleeves and color coded. The bus bars shall be supported on unbreakable, non-hygroscopic insulated SMC supports at regular intervals to withstand the forces arising from short circuit in the system. All bus bars shall be provided in a separate chamber and properly ventilated. The current density of copper shall be 1.6 Amps per sq.mm cross sectional area of Bus bar.

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

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

All connections between bus bars and switches and between switches and cable alley terminals shall be through solid copper strips of proper size to carry full rated current and insulated with PVC heat shrinking sleeves.

All the M V Panels and SDBs shall be completely factory wired, ready for connection. All the terminals shall have adequate current rating and size to suit individual feeder requirements. Each feeder shall be clearly numbered from left to right to correspond with wiring diagram. All the switches and feeders shall be distinctly marked with a small description of the service installed. Minimum width of busbar Alley shall be 300 mm and that of cable alley shall be 450 mm.

6.5. TERMINALS

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

6.6. WIREWAYS

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

6.7. CABLE COMPARTMENTS

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

6.8. METERS

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

6.9. CURRENT TRANSFORMERS

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

6.10. INDICATING PANEL AND METERING EQUIPMENT

All meters and indicating instruments shall be 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 \pm 10%, 50 Hz \pm 1% and shall in turn provide all necessary power of the FACP.
- It shall provide a battery charger for 24 hours for standby power using dual-rate charging technique for fast battery recharge.
- It shall provide a very low frequency sweep earth fault detect circuit, capable of detecting earth faults on sensitive addressable modules.
- It shall be power-limiting using Positive Temperature Coefficient (PTC) resistor.
- It shall provide indication for battery voltage and charging current.

DETECTORS & ADDRESSABLE DEVICES

General features common to all detectors:

- Compatibility: All automatic fire detectors shall be interchangeable without requiring different mounting bases or alterations in the signal panel.
- Sensitivity: On average 30 mgs of burned material per cu.m. (As measured in a 1 cu.m. chamber) shall release an alarm sensitivity which shall be adjustable according to the use of the space.
- Power Consumption: Each detector shall use the minimum of power, for economic circuits, so that it shall have capacity to connect at least 99 detectors, 50 modules and 20 fault isolator modules in one loop.
- Built-in-response indicator: Each detector shall incorporate indicator "LED" at the detector which shall blink during normal condition and light up on actuation of the detector to locate the detector which is operated. The detector shall not be affected by the failure of the response indicator lamp.
- Maintenance: All detectors shall be fitted either with plug-in system or bayonet type connections only, from the maintenance and compatibility point of view.
- Construction: The detector shall be vibration and shock proof. When disassembling for cleaning purposes, its components must not be damaged by static over voltage.

- Atmospheric and Thermal Disturbance: The detector shall so designed as to be practically immune to environmental criteria such as air currents, humidity, temperature fluctuations, and pressure and shall not trigger false alarm, due to the above conditions.
- Continuous Operation: An alarm release shall not effect a detector's functioning. After resetting the alarm, the detector shall resume operation without any readjustment.
- Adaptability to ambient conditions: Detectors shall be designed for adaptability to humid locations. No performance deterioration shall be acceptable.
- The monitor module shall provide address-setting and shall also store an internal identifying code which the Fire Alarm Control Panel shall use to identify the type of device.
- The control module shall provide address-setting and shall also store an internal identifying code which the control panel shall use to identify the type of device.
- All field hooters should preferably be addressable and software configurable. All hooters should be able to provide at least a minimum of 3 different tones, which should be user configurable. The minimum decibel level of each hooter should be 90db. All hooters should be UL/FM listed. All hooters shall have coupled strobe lights of 110Cd intensity.

EMERGENCY VOICE EVACUATION (EVAC) & TALK BACKFIREMAN PHONE SYSTEM

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

Function: The EVAC system equipment shall perform following functions:

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

FIRE ALARM GRAPHICS SOFTWARE (FAS)

- The status of each detector shall be monitored by the FAS.
- Using the FAS, the operator shall be able to adjust the sensitivity of any detector.

- Using the FAS, the operator shall be able to define the entire database for the fire 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 I_r ($I_r = X I_n$) OFF 0.4 to 1.0 in steps of 0.1

li	Time delay, tr(Inverse) 10 sec at 6/r
lii	Over Load (Neutral)
lv	Current setting In (Intrl =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 -CO₂ 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 type at UPS and Electrical junction 2 /3 kgs or approved

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



9.4 BATTERY

Suitable rating ampere Hours 24 Volts DC sealed maintenance free batteries shall be provided for Fire Detection and Alarm System. The battery rating is indicative only.

It shall be sized by bidder to cater to all momentary and short time loads in addition to supplying the continuously rated loads for 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 conductor cables of 1100 V/ 11000-volt grade	Polycab/ESC /Havells /Bonton
12	FRLS PVC insulated Twisted / shielded Copper L.V. Cable	Finolex/Excel / Skytone /Havells / Bonton/KEI

13	Cable Glands Chromium plated Brass heavy-duty glands	double compression, weatherproof with rubber washers and gaskets of Comet make
14	Cable Lugs	Dowells crimping type
15	Light fixtures	Philips /Wipro/ Havells/Divinity
16	Special light fixtures	As per BOQ
17	Day light/Occupancy Sensor	Schneider/Wipro/ Philips/Keselec
18	Indicating Lamps	L & T/Schneider/ seimens
19	Terminal Blocks	Elmex
20	Energy meter	Schneider / L & T / HPL /Socomec/Procom
21	SPD	Mersen/OBO
22	Industrial socket outlet	Legrand / Bals/Clipsal/Hensel/ ABB socket and top
23	Earth Leakage Circuit	Legrand /ABB/ Legrand/ Schneider Breaker
24	Maintenance Free Earthing	Alltec / Teksai /Duval Messien
25	Telephone Tag Block	Krone
26	Cable Tray	KME/ Era Control System
27	Raceway – with sheet steel	KME/ Era Control System
28	Special Cable Tray	OBO Batterman /Applicam Industries
29	Wire Mesh Tray	Legrand – Cablofil
30	Floor Access Box	M.K / Legrand

31	SDB's and Panels	Supretech Control system/EVA/ Era Control System/Application Control
32	Fire Alarm system	Morley/Edwards/Ravel
33	P A System	Bosch
34	CCTV IP Based	Hikvision/ Honeywell
35	Any other items	Sample to be approved by Client/engineer in-charge
36	Fire extinguishers	Ceasefire, Firestone, Kanex, Lifeguard, Minimax, Nitin, Omex, Safex, Safe zone, Supermax, Swastik, Zenith and Equivalent.
37	NETWORKIG	Make AMPS / D- Link

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

SPECIFICATIONS – PART C

HVAC

TECHNICAL SPECIFICATION AIR-CONDITIONING

Part 1:

1. GENERAL DATA

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

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

2. SCOPE OF WORK

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

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

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

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

6.INSPECTION:

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

7.SUPERVISION

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

8.SECURITY

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

9. TEST

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

10. MAINTANENCE

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

11. CIVIL WORKS

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

Part 2: TECHNICAL SPECIFICATION

1.0 OUTDOOR UNIT

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

- a)** All outdoor units shall consist of inverter scroll compressors.
- b)** Outdoor units when consisting of more than 1 module (e.g. 22 HP = 10 HP +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 aluminium fins. The fins shall be spaced by collars forming an integral part. The tubes shall be staggered in the direction of airflow. The tubes shall be hydraulically/ mechanically expanded for minimum thermal contact resistance with fins. Each coil shall be factory tested at 21 kg/sq.m air pressure under water.
- vi.) Indoor unit shall have cleanable type filter fixed to an integrally moulded/moulded plastic frame. The filter shall be slide in and neatly insertable type. It shall be possible to clean the filters either with compressed air or water.

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

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

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

6.0 HIGH WALL INDOOR TYPE UNIT

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

7.0 CENTRALIZED TYPE REMOTE CONTROLLER:

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

i) Starting/ stopping of Air Conditioners as a zone or group or individual unit.

ii) Temperature setting for each indoor unit or zone.

iii) Switching between temperature control modes, switching of fan speed and direction of airflow, enabling/disabling of individual remote controller operation.

iv) Monitoring of operation status such as operation mode and temperature setting of individual indoor units, maintenance information and troubleshooting information.

v) Display of air conditioner operation history.

vi) Daily management automation through yearly schedule function with possibility of various schedules. The controller shall have wide screen user friendly and can be wired by a non-polar 2-wire transmission cable to a distance of 1 K.M away from indoor unit. The cables shall be as per prevailing practice adopted by the manufacturers but shall have minimum rating of

2 core, 1.5 sq. mm shielded cables suitable for outdoor application. Cordless/corded remote having star and feature as per standard design of manufacturer IS acceptable to the Department.

8.0 REFERIGERANT PIPING

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

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

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

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

9.0 DRAIN PIPING

Shall be UPVC.

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

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

10. PIPE INSULATION

Refrigerant Pipe Insulation:

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

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

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

Drain Pipe Insulation

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

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

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

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

Part 3: TECHNICAL SPECIFICATION

AIR DISTRIBUTION SYSTEM)

1.0 Scope

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

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

2.0 Duct Materials

RAW MATERIALS

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

3.0 GAUGES, BRACING BY SIZE OF DUCTS

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

4.0 RECTUNGULARS DUCT:

Dimensions of duct	Gauge G. I	Aluminium	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	40 x40 x 5 mm MS angles bracing at 1200 mm from joints. Or 40 x 40 x

			mm dia nuts& bolts at 125 centers.	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 then duct should be supported by wall mounted brackets of 40 x 40 x 5 mm angle.

v. Ducting over furred ceiling shall be supported from the slab above, or from beams, after obtaining approval of Owner's site representative. In no case shall any duct be supported from false ceiling hangers or be permitted to rest on false ceiling. All metal work in dead or furred down spaces shall be erected in time to occasion

no delay to other contractors on the building.

vi. Where metal ducts or sleeves terminate in woodwork, tight joints shall be made by means of closely fitted heavy flanged collars. Where ducts pass through brick or masonry opening and wooden frame work shall be provided within the opening and crossing ducts provided with heavy flanged collars on each side of wooden frame work, so that duct crossing is made leak-proof.

vii. All ducts shall be totally free from vibration under all conditions of operation. Whenever duct work is connected to fans, air handling units or blower coil units that may cause vibrations in the ducts, ducts shall be provided of closely woven, rubber impregnated double layer asbestos/canvas or neoprene coated fibre glass fire resistant flexible connection. The flexible connections located close to the unit, in mutually perpendicular directions. The flexible sleeve at least 10cm long securely bonded and bolted on both sides. Sleeve shall be made smooth and the connecting duct work rigidly

held by independent supports on both ends. The flexible connection shall be suitable for pressures at the point of installation.

viii. Air conditioning unit and exhaust fans shall be connected to duct work by inserting at air inlet and air outlet a double 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 240VAC supply. This control panel shall be suitable for spring return actuator and shall have at least the following features:

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

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

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

Power Supply On Alarm

Damper open and close position

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

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

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

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

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

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

10.0 FIRE DAMPER:

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

Fire damper blades shall be one piece folded high strength 16 gage galvanized steel construction. In normal position, these blades shall be gathered and stacked at the frame head providing maximum air passage and preventing passing air currents from creating noise or chatter. The blades shall be held in position through fusible link of temp 70o C. In case of fire, the intrinsic energy of the folded blades shall be utilized to close the opening. The thrust of the suddenly released tension shall instantly drive the blades down and keep it down without the use of springs, weights or other devices subject to failure.

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

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

11.0 SUPPLY AND RETURN AIR GRILLES:

Supply and return air grilles shall be M.S. or anodized extruded aluminium construction with individually adjustable bars as shown on drawings and indicated in schedule of quantities. Supply air grilles shall be generally double deflection type, with removable key operated volume control dampers. Return air grilles shall be generally double deflection type similar to supply air grilles but without dampers.

All supply and return air grilles behind wooden frame shall be single deflection type with one way bars only, the supply air grilles being provided with removable key operated volume control dampers. Mild steel supply and return air grilles shall be factory coated with rust resistant primer and shall be finished with two coats of paint as per client's choice. 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 provide 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.

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

i. Round or Rectangular Diffusers:

Supply/return air linear diffuser shall be M.S. or Extruded aluminium construction, square, rectangular, or round diffusers with flush fixed pattern or adjustable flow pattern. Diffusers for different spaces shall be selected in consultation with the Architect/Consultants. Supply air diffusers may be equipped with fixed 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 deg 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 velocity 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	Aluminium
a) Frame	20-gauge	18 gauge
b) Louvers	20-gauge	18 gauge

Grills:

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

V.C. Damper:

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

v. Fresh air intake and extract louvers:

All the louvers shall be rain protection type and shall be fabricated from extruded aluminium section. The louvers shall additionally be provided with heavy duty expanded

metal (aluminium –alloy) bird screed. 50 mm x 75 mm wooden frame made out of kail wood to be provided by HVAC contractor free of cost for fixing of louvers.

vi. Testing & Balancing:

After the installation of the entire air distribution system is completed in all respects, all ducts shall be tested for air leaks before painting the interiors of conditioned spaces air distribution system shall be allowed to run continuously for

48 hours for driving away any dust or foreign material logged within ducts during installation.

Part 4: TECHNICAL SPECIFICATION

THERMAL/ACOUSTIC INSULATION:

GENERAL:

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

1.0 DUCT INSULATION:

Scope

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

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

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

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

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

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

2.0 Fibre Glass Insulation

Resin bonded, glass wool, pre-laminated with aluminium foil. The thermal conductivity of glass wool shall not exceed 0.024 Kcal/hr. sqm deg C (0.19 BTU in/Hr. Sq. ft deg F at 10 deg C - mean temperature and density shall not be less than 48 kg/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 3/4" G I chicken wire mesh around the insulation. Prevent any damage or tear to the insulation facing.

4.0 Application: (For exposed duct)

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

1 5.0 Nitrile rubber class 'O'

Insulation material for ducts shall be close cell elastomeric nitrile rubber class 'O'. Thermal conductivity of nitrile rubber shall not exceed 0.036 w / m 0 C. Density of material shall not be less than 0.04 gm / cm³.

2 6.0 The insulation shall be applied as follows:

Duct Insulation – Thermal

- A. Clean all duct surfaces thoroughly to remove grease, dirt etc.
- B. The measurement of surface dimension shall have to be taken properly to cut nitrile rubber sheets
- C. The rubber sheets size to cut with sufficient allowance in dimension. A single sheet should be cut, so as to provide only one seam at the top of the duct. No small patches shall be allowed.
- D. Apply a thin coat of non-flammable adhesive recommended by manufacturer on ducts and on the insulation material
- E. When adhesive is tack dry, insulation shall be placed in position with compression and no stretching of insulation shall be permitted to achieve a good bond.
- F. All longitudinal and transverse joints shall be sealed with 3mm thick and 25mm width self- adhesive Arm flex class 'O' tape.

3 7.0 Acoustical Insulation

Acoustical Insulation for Ducts

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

Acoustical insulation shall be 50 mm thick 32 Kg/cum 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 screwed with the duct and making size as per requirement.

Apply a cold setting adhesive compound over the frame/duct.

The adhesive shall be nonflammable vapor proof, odorless type.

Fixing insulation material of specified thickness overlapped with R P Tissue paper over it and then covering the material with 24 gauge perforated 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

4 1.0 LIST OF APPROVED MAKES/AGENCIES:

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

S. No	Description of Item	Approved Makes
1.	<u>High side Equipment</u>	
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 with Earthing Links	Power/Grip well /Baliga Lighting Ltd.
4.5	PVC Insulated Copper Conductor Stranded Flexible Wires	Finolex/ National Cables – NC/ polycab/ Sky tone Havells
4.6	PVC Conduit & Accessories (ISI Approved)	BEC/ Precision/ D Plast/ Polypack
4.7	MS/ GI Conduit (ISI Approved)	BEC/ AKG/ STEEL KRAFT
4.8	Accessories for MS/GI Conduit (ISI Approved)	Sharma Sales Corporation/ Super Sales Corporation
4.9	Bi-metallic 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-in single-phase preventer	L&T/ Minlec/Siemens/ Group Schneider (MG) France
6.	Pipes & Fittings	
6.1	UPVC pipe for Drain	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 Polyester (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

BILL OF QUANTITY – PART A

INTERIOR FURNISHING

ITEM. NO	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
1	DISMANTLING WORK				
	Note: Dismantling to be done in parts as per the instructions with proper support and covering of other areas from dust and falling debris, coordinating with other contractors/ agencies.				
	Item includes removing, cleaning, stacking the usable material at designated place and disposing off unserviceable material from the premises up to all leads and lift to space / dumping yard area marked by local authority. Item also includes taking permissions from the concerned departments/ building authority or MCD as required.				
	Including costs of all necessary measures, safety features, nets, scaffolding, lead, lift, cleaning after disposal etc.				
	All material obtained from dismantling or demolition shall be the property of the owner unless otherwise specified and shall be kept in safe custody until they				

	are handed over to the engineer -in charge.				
	Any damage to property, structure, expansion joint, shall be repaired/made good by the contractor at his own cost no payment shall be made in this regard to contractor. The measurement to be on sq. mt. basis of the clear plan area of floor.				
1.1	Carefully Dismantling/ Removing of existing furnishing, furniture, false ceiling, wooden partitions, paneling, electrical work, door, windows as specified, cabinet, Ducting etc. complete in all respect And disposing the unserviceable malba from site on day-to-day basis and stacking serviceable items , Complete as per attached existing and proposed plan /as per instructions of Engineer / Architect for office area.	720.00	Sq.Mt		
1.2	Dismantling of Existing AHU AREA. Item to include brick wall of AHU, complete HVAC system inside, removing all pipes etc. complete in all respect as per proposed plan / as per instruction of Architect /Engineer. Item also includes stacking of serviceable materials and disposal of unserviceable material as specified above. Measurement is area gained by dismantling AHU, on plan.	52.00	Sq.Mt		

1.3	Dismantling of stone slab flooring, tile flooring / carpet etc. as per site laid in cement mortar including disposal of unserviceable material as specified above.	720.00	Sq.Mt		
1.4	Dismantling of Existing toilet block /pantry area from inside, complete including wall tiles, floor tiles, sanitary fittings and fixtures, old G.I and CI work, mirror, doors, woodwork, electrical fittings and fixtures, brick work as per proposed plan / as per instruction of Architect /Engineer. Including stacking of serviceable materials and disposal of unserviceable material as specified above.	48.00	Sq.Mt		
	SUB TOTAL: 1.0: DISMANTLING WORK		RS,		
2	FLOORING AND WALL TILES.				
	NOTE:				
	The measurement to be on sq. mt. basis of the plan area of flooring, Rates are including the pattern in two or more colour.				
	Rates to include , Protection of newly laid floor during interior work: Rate shall include Providing and laying polythene and layer of 12 mm thick Plaster Of Paris in two layers on new flooring surface (For the protection of floor surface during other activities). Rate should be inclusive of the cost of removing this protective layer, (after the work is completed) carrying all debris out of site and dumping it to municipal				

	authorized dumping ground, cleaning the entire covered flooring area. complete in all aspect.				
2.1	Verified tile (double Charged)				
	Providing and laying premium double glazed/ charged Vitrified Tiles of different sizes (with water absorption less than 0.08% and conforming to IS : 15622) of approved make, and shade having thickness as per manufacturer's specifications in two or more colour/ shade flooring pattern/ design. The tiles to be fixed after levelling of the existing floor as may be required with cement mortar bed 1:4 (one part cement & 4 parts coarse sand) and then fixing the tiles with compound/ adhesives, including grouting the joints with white cement and matching pigments of approved shade to the full depth, complete as per direction of Engineer-in-charge.				
	Quoted (without GST) Rate of tile -Rs. 65 /sq. ft.	395.00	Sq.Mt		
2.2	Tile size 600 x600 mm (Quoted Base price of tiles to be used to be Rs. 60 /- sq.ft.). Complete in all respect as specified in item 2.1	65.00	Sq.Mt		
2.3	Engineers marble/ composite marble				

	<p>Providing and laying machine cut, mirror polished Engineered marble/ composite Marble stone flooring laid in required pattern, of different colours, shades , in linear portion of the building all complete as per architectural drawings, with 16 mm thick stone slab laid over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) or actual found at site, laid and jointed with 2mm spacer / white cement slurry ,</p> <p>@ 4.4 kg/sqm including pointing/grouting with white cement slurry admixed with pigment to match the marble shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge. quoted base (without GST)Rate - 280/sq. Ft.</p>				
	16 mm thick Marble stone slab, Perlato, Ultima beige Dark Emperadore. Traventino. Botti chino etc.	365.00	Sq.Mt		
2.4	Wall Cladding				
	Providing and fixing machine cut, full polished , Engineered marble/ composite Marble stone work for wall cladding work including dado, skirting, etc., in required design and pattern wherever required, stones of different finished surface texture/ colour laid on 12 mm (average) thick cement mortar				

	1:3 (1 cement : 3 coarse sand) and jointed using laticrete epoxy grout of approved shade to the full depth, including rubbing, curing, polishing etc. all complete as per Architectural drawings, and as directed by the Engineer-in-Charge. "a. 16 mm thick stone slab, Perlato, Royal Satvario, Dark Emperadore etc. Rates to include the temporary supports to the cladded stone as directed. hand buffing/ cleaning on surface etc. complete. quoted (without GST) price 260/-sq. ft. Rate shall include the 1-3 mm spacers between the stone as required, filled with laticrete epoxy grout.	10.00	Sq.Mt		
2.5	SKIRTING				
	Providing and laying vitrified tile skirting (100mm high) thickness as per manufacturer specification, with water absorption less than 0.08%, and conforming to IS: 15622, of approved make, in all colours and shades, laid on 20mm thick cement mortar 1:4 (1 cement: 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete	86.00	R.mt		
2.6	Outdoor terrace tile				
	Providing and laying Vitrified Tiles (600x600mm) full body for outdoor, of approved shade having thickness as per manufacturer's specifications in two	75.00	Sq.Mt		

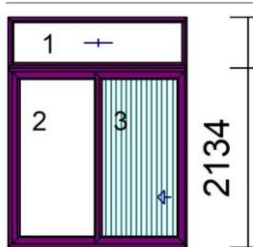
	<p>or more shade flooring pattern/ design.</p> <p>The tiles to be fixed after levelling of the existing floor as may be required with cement mortar 1:3 (one part cement & 3 parts coarse sand) including grouting the joints using laticrete epoxy grout of approved shade to the full depth, including filling /grouting and finishing complete as per direction of Engineer-in- charge. quoted (without GST) base price of tile RS. 60/- SQ.FT.</p>				
2.7	Granite stone				
	<p>Providing & fixing 18 mm thick. pre-polished pre moulded , machine cut Granite Stone for counter, parapet top , etc. edge moulding as per approval on one side complete with all details as per drawings The stone to be fixed with cement mortar 1:3 (1 cement: 3 coarse sand) as per design .Joints treated with white cement, mixed with matching pigment , epoxy touch up including high gloss polishing the stone after finishing work, complete to the satisfaction of Architect/Engineer.</p> <p>(quoted (without GST) Base price of granite to be used to be Rs. 180/- sq.ft.)</p>	12.00	Sq.Mt		
2.8	WALL TILE: (toilet /pantry/kitchen/dining)				
	Providing and laying vitrified gloss finish decorative type tiles of different sizes thickness to match manufacturers	280.00	Sq.Mt		

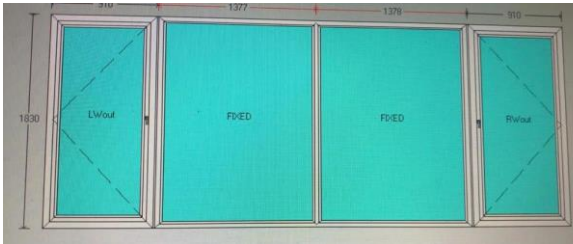
	specifications of approved make, shade and pattern having water absorption between 0.08% to 2.0% for dado in required position laid on a bed of 1:4 cement mortar including neat cement float, Rate shall include the 1-3 mm spacers between the tiles filled with laticrete epoxy grout. complete in all respects as directed by the Architect. (Quoted (without GST) Base price of tile to be used to be Rs. 55 /- sq.ft.)				
	Note: Fixing of tile at toilet partition using high polymer modified tile adhesive (GOLD star) of Endura / equivalent and cement mortar (1:4) over wall area.				
	SUB TOTAL: 2.0: FLOORING		RS,		
3	BRICK WORK/PLASTER/ CONCRETE WORK				
3.1	BRICK WORK 230 MM				
	P/L Brick work 230 mm or above thick using First quality burnt clay FPS Brick F.P.S. bricks of class designation 7.5 in super structure with cement mortar 1:6(1 cement :6 coarse sand) including all shape and size, lead, lift, wastage, scaffolding etc. complete.	3.00	CUM		
3.2	HALF BRICK WORK:				
	Providing/laying half brick Masonry in partition wall with common burnt clay F.P.S(non-modular) bricks of class	60.00	Sq.Mt		

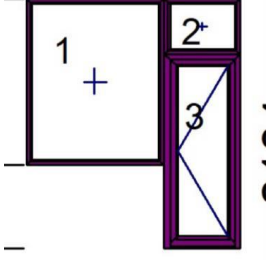
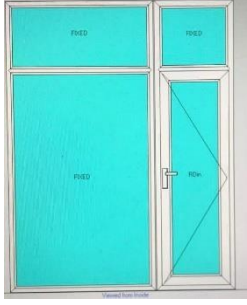
	designation 7.5 in superstructure including with cement mortar 1:4(1 cement :4 coarse sand) including laying of two nos. 6 mm Dia M.S. Bars at every 3rd course, lead, lift, wastage etc. Complete in all respect.				
3.3	PLASTER:				
	P/Applying cement plaster 15 mm thick. in 1:4 (1 cement, 4 fine sand) on new or old work including lead, lift, scaffolding, wastage, cleaning etc. completes in all respect wherever required.	150.00	Sq.Mt		
3.4	CUT OUT/PATCH REPAIR with water proofing				
	P/L repairing Carefully existing cut out /patches, terrace/shaft with 1:2:3(1 cement :2 c. sand:3 aggregate) including following operations.	1.40	Sq.mt		
	Cleaning RCC /brick wall surfaces and laying concrete 1:2:3(1 cement :2 course sand:3 aggregate)				
	Three coats of tape Crete - (first layer of tape Crete to be @0.253kg/sqm, the second & third layer to be @ 0.126kg/sqm) each admixed with grey cement over a coat of neat cement slurry admixed with chemical CH - 9 and sealing all corners, joints, junction of pipes and masonry etc. with Epoxy putty all complete as per manufacturer's specification and drawing.				

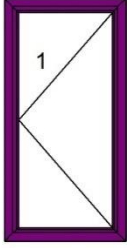
	12mm thick protective plaster 1:4 (1 cement: 4 coarse sand) over treated surface etc. complete. (Quoted rate to include grouting of RCC surface for any cracks/ fissures)				
	measurement taken in sqm floor plan area basis only. (Nothing extra paid for, Gola, etc.)				
	SUB TOTAL :3.0:		Rs.		
4	PVC SPOUTS at balcony:				
	Providing and fixing uPVC spout pipe 37.5 mm dia as detailed drawing in balcony parapet wall, rate including core cutting, joint sealing by epoxy putty and making same as existing look, lead, lift, scaffolding, grating, wastage etc. complete. as per instructions of Architect/ Engineer.	14	Nos		
	SUB TOTAL :4.0:		RS,		
5	UPVC: OUTER PROFILE WINDOWS				
	Note 1: clear area will measure for Measurement purposes. Quoted rate including all shape, size, lead lift, scaffolding, wastage etc. complete in all respect wherever required.				
	Note 2: Rates to include: 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.				
	<p>Providing and fixing factory-made uPVC Steel grey or approved colour. Glazed door/window (according to drawing) size comprising of uPVC multi-chambered frame with inbuilt roller track and sash extruded profiles duly reinforced with 2.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), appropriate dimension of uPVC extruded glazing beads and uPVC extruded interlocks, EPDM gasket, wool pile, zinc alloy (powder coated of approved colour) touch locks with hook, zinc alloy body with single/ double nylon rollers (weight bearing capacity to be 40 kg), G.I fasteners for fixing frame to finished wall and necessary stainless-steel screws etc. Profile</p> <p>of frame & sash shall be mitred cut and Finished at all corners, including drilling of holes for fixing hardware's and drainage of water etc. After fixing</p> <p>frame the gap between frame and adjacent finished wall shall be filled with weatherproof silicon sealant</p> <p>Single / double glass panes, noise, dust proof, lead lift, scaffolding, protection, etc. all complete as per approved</p>				

	drawing & direction of Engineer-in-Charge.				
5.1	DINING AREA (Terrace entry sliding door)				
	<p>Providing and fixing in position of 2 track sliding door in UPVC frame as per drawing attached (fitting sliding door up to 7' and above fixed sash) (section of size appx. 74* 64 mm or as required) wall thickness 2.8 mm, used in this system is a Two Track Frame in which use 2 Sash on two track which run horizontally on Two Separate Tracks, including 12 mm toughened security glass (5mm CLT+1.52 CLEAR PVB+ 5MMCLT), roller, lock, handle, sash, hinges, cylinder etc. whatever required at canteen area outer side, complete in all respect as / design and manufacture specifications, Sourced from approved make .</p>	6.0	Sq.Mt		
					
5.2	DINING AREA (fixed glass)				

	Providing and fixing in position of fixed glass window in UPVC frame (section of size 74* 64 mm or as required) wall thickness 2.8 mm, including 12 mm toughened security glass (5mm CLT+1.52 Clear PVB+ 5mm CLT) , complete in all respect as / design. And manufactures specification of approved make.	5.0	Sq.Mt		
5.3	Courtyard side window				
	Providing and fixing in position courtyard side window (fixed + openable) in UPVC frame sections as specified above, including 6 mm thk. toughened glass, lock, handle, sash, hinges, etc. complete in all respect as per approved make and manufacturer specifications.				
					
a	Window size appx. (15'-6"x 6') variation 3" +- as per site.	6	Nos		
b	Window size appx. (16'-6"x 6') variation 3" +- as per site.	2	Nos.		
c	Window size appx. (11'-7"x 6') variation 3" +- as per site.	6	Nos.		

d	Window size appx. (10'-6"x 6') variation 3" as per site at corner junction of court yard .	6	Nos		
5.4	Balcony side Door and window in double glass				
	Providing & fixing in position balcony side openable door and fix glass windows (DW1) in UPVC frame sections as per requirement including double glass (6mm CLT+ 12mm AG+ 6mm CLT) clear toughen, lock, handle, sash, hinges, noise proof etc. complete in all respect as per approval.				
A	 <p>Size appx. 6'-6" x 9' with window part cill at 3'-0" AND DOOR SIZE 2'-9", for each unit.</p>	36	Sq.Mt		
B	<p>Size appx. 6'-6" x 9' with Fixed glass cill at floor level and DOOR SIZE 2'-9" for Each unit.(DW2)</p> 	25	Sq.Mt		
5.5	Single openable window				

	Providing & fixing in position single openable window in UPVC frame as specified above with openable shutter, including 6 mm clear toughened glass, lock, handle, sash, hinges, etc. complete in all respect.(window size 3'-1"x 6'-0" appx. with variation of 2"+-)	28	NOS		
					
5.6	Fix glass ventilator				
	Providing & fixing in position fix glass ventilator at toilet in UPVC frame sections frame sections size 74* 64 mm wall thickness 2.8 mm of approved colour as specified above with 6 mm clear toughen glass. Complete in all respect.	2	Sq.Mt		
5.7	Louver shutter in lift lobby /shaft				
	P/F of aluminium louvered shutter front of electrical panel at lift lobby comprising of aluminium frame of approved section appx. 2" x 2", 14-gauge, powder coated 60-65 micron of approved shade, with aluminium louvered shutters of size appx. 40mm. complete in all respect including all hardware, handle fixing arrangement	22	Sq.Mt		

	etc. as per instructions of project incharge.				
5.8	Existing ventilator				
	Repairing, Removing and P/F new clear glass thickness as per existing at place of broken glass in existing ventilators. Rates to include all fitting fixture required to complete the same.	4	Sq.Mt		
	SUB TOTAL: 5.0: UPVC WINDOWS		RS,		
6	PARTITIONS AND DOORS				
	Measurement of height shall be taken from finished floor level, up to the level of false ceiling, i.e., finish area of partition. In case of varying heights on either side of partition, average height shall consider. The Main framework of partition should be fixed to RCC ceiling. but payment to be considered up to bottom of false ceiling only. The rate to include provision of extra framework as necessary for skirting and making cut-outs for electrical switch plates, switch boxes, light fittings light etc. making provision for laying conduits as per drawings & directions. All woodwork if used to be applied with 2 coats of fire-retardant paint and 1 coat of wood				



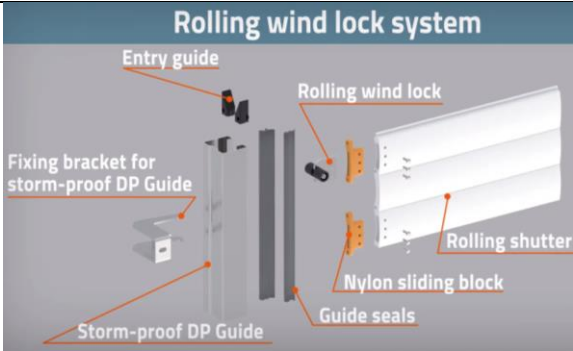
	<p>preservative with anti-termite treatment properties. Centre to center spacing of partition framework may vary to make provision for fixing dado rail / to adjust the level of glass or for fixing counter / storage units or otherwise as per site requirement. Laminate sheet used should be 1mm thick of plain / wood grain in gloss / matt/ suede finish with high density protective surface layer and reverse side of adhesive bonding quality conforming to IS: 2046 Type S, including cost of adhesive of approved quality.</p>				
6.1	Solid Full Height partition				
	<p>Providing and fixing in position solid Full Height partition appx.75 mm thk. in Aluminium anodized Box Sections of JINDAL or approved make. Frame 50 mm x 50 mm clear size heavy duty with 16 gauge placed at framework of 600 X 600 mm grid (horizontally and vertically) fixed rigidly at floor lvl. With fasteners, other end fixed to top RCC roof. Completing partition by fixing 12 mm thick fire retardant plywood conforming to IS: 5509 (with one side coat of approved primer) fixed both sides of aluminium frame and then covering outer face of ply at both sides with 1mm thick Laminated (approved shade), including 3 mm laminated groove as per design.</p>	170	Sq.Mt .		

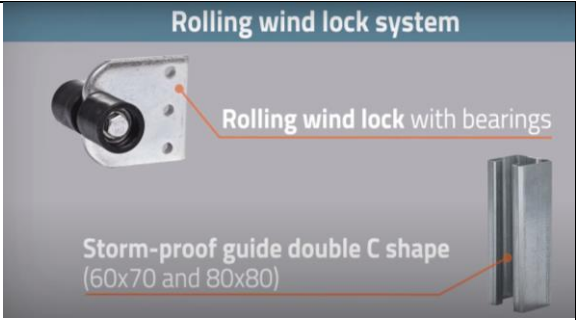


	<p>Rates to include all fittings fixtures hardware, complete in all respect. Door in partition shall be measured as partition, Including door frame (75X40mm) for shutter Of steam beech /teak wood with single leaf shutter (3'x8') made with wooden laminated flush door with glass slit as per design and handles on both sides of shutter ((hardware, fittings, fixtures etc. in heavy duty SS such as lock of 6 lever of Godrej or Dorset make with SS mortise handle of approved make and model. The rate shall be inclusive of duco paint /polish on door frame/ exposed wooden surface, 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 to the complete satisfaction of the Architect.</p>				
6.2	Partially glazed Full height partition				
	<p>Providing & fixing Partly Glazed Full Height Partition approx. 75 mm thk with framework and ply/ lamination as per item no. 6.1.</p> <p>Here item to include 8 mm thick. clear toughen Modi float glass above 3'-0"upto 8'-0 fixed with aluminium glass profile. Rest of specifications same as of item no 6.1, complete to the satisfaction of the Architect / Engineer.</p>	40	Sq.Mt .		

6.3	FULLY GLAZED PARTITION: (toughen glass)				
	P/F Glass Partitions of 12 mm thick. toughen glass Polished edge. The Fixed glass to be fixed using slimline aluminium frame of approved make (glass partition profile) frame partition with 25x25MM/ 25x25mm to be fixed on to the floor/wall/ ceiling as per frame, will be on four sides with I & T and L for glass joint along with required gasket etc. complete as per Architectural drawings and direction of Engg-in-charge. The item includes toughen glass 2.4 m height maximum, Rates to include all fittings fixtures, complete in all respect as per item no. 6.1	50	Sq.Mt .		
6.4	Toughen Glass door				
A	P/F Single leaf TOUGHEN GLASS DOORS: Installation of fully glazed frameless glazed door (appx. 3'-0"x 8'-0") made out of 12 mm thick. Toughened glass and the door shall be fixed with Dorma, Hafele, Enox or approved make floor springs, lock , with SS finish patch fittings on top, bottom. The door shall have lock in the mid of shutter as per approval with 450 mm to 600 mm long SS handle of 25 mm dia. (for internal doors) and 900 mm long SS handles of 25 mm dia. (for main entry doors) to be fitted horizontally/ vertically as per instructions of the Architect. The	7	NOS		

	Rate shall be including the making of necessary holes in glass for Access control locks, complete in all respect with all hardware, fittings, fixtures etc. complete in all respects. All necessary hardware, fittings, fixtures to be approved from the Architect before actual application of the same. Any change in the specifications must be first approved from the Architect.				
B	P/F TOUGHEN GLASS double leaf doors: Installation of fully glazed frameless glazed door Double leaf of size as mentioned in drawing with specifications same as above of 6.4A.				
i	Opening size appx. (5'-0"x 7'-6")	3	NOS		
ii	OPENING SIZE APPX. 6'X 8'	1	NOS		
6.5	Low Height Partition:				
	Providing & fixing Low Height laminated Partition 1200/1500 mm high with same specifications for framing as item no. 6.1. Item to have part 12mm toughened glass above 900 mm / soft board with fabric mounted above /white board fixed as per design/ details. Item to include 3" x 1" wooden moulding on top complete with PU polished finish / Duco Paint including base preparation as per manufacturer specifications. Complete to the satisfaction of the Architect. Rates to include, making provision for electrical conduits, switches and	116	Sq.mt		

	junction boxes. complete in all respect as per instructions from Architect.				
6.6	Sliding folding partition: Meeting room				
	<p>Providing, Fixing, Testing and commissioning of Motorized high speed aluminum Rolling Shutters conference room divider, Exterior grade, heavy duty industrial, designed for wind load protection up to wind class 3, 750 N/sq.mtr., Designed for thermal insulation and protection from dirt and water. Noiseless roll up and down, with electric motor, that shall roll up to ceiling, fixed to RCC roof, above false ceiling, shutter shall include following.</p> <p>Sliding bracket to let shutter get into the guide from vertical position, On both motor and bearing ends.</p> <p>Including rolling wind lock system, fixing bracket with stormproof DP Guide, Entry Guide, rolling wind lock, Guide seals, Nylon Sliding block, Aluminum shutter slats fixed with screws. Image 3.</p> <p>Including Lintel gasket mounted directly on the shutter curtain. Gasket for end slat. Elastic strap for protection during rolling.</p> <p>Mounted inside ceiling partition, between ceiling and false ceiling,</p>				

	separating two meeting rooms from noise travel.				
					
					
	Sliding bracket				
					

	 <p>Rolling wind lock system</p> <p>Rolling wind lock with bearings</p> <p>Storm-proof guide double C shape (60x70 and 80x80)</p>				
	Storm guide with sound insulation.				
	 <p>Seals</p> <p><u>Advantages:</u> Shutter perfectly sealed protected from dirt and</p> <p>Lintel gasket mounted directly on the shutter curtain</p> <p>Gasket for end slat</p>				
	Lintel gasket mounted directly on the shutter curtain.				
	 <p>Elastic strap for protection from scratches</p> <p>The shutter curtain is protected during rolli</p>				
	Shutter size 13'6" room width partition to partition, height 8' from floor to false ceiling. Operating switch push button installed at partition. Auto stop at both ends/positions.	1	NOS		
	Powder coated, matching to room surface.				
6.7	Toilet partition				
	Providing and fixing in position solid Full Height partition in Aluminium anodized	38.90	Sq.Mt		

	Box Sections of approved make 50 mm x 50 mm clear size heavy duty with 16 gauge placed at framework of 600 X 600 mm grid (horizontally and vertically) fixed rigidly at floor lvl. With fasteners, other end fixed to top RCC roof. Complete with 12 mm thick. Fibre Cement bounded EVEREST board both side , complete in all respect, as per design. Rates to include conduit provision/ WATER SUPPLY PIPES inside partition if required. Complete in all respect as per instructions of Architect/Engineer INCHARGE.				
6.8	Flush Doors:				
	Providing & fixing 35mm thick ISI marked Flush Doors shutter conforming to IS: 2202 (Part I) non-decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters. The item to includes, providing and pressing of 1mm thick. decorative/plain laminate on both sides as per design. Providing and fixing door frame made from 100mmx50mm teak wood members. Each Doors to have complete duco paint / Melamine polish on exposed wooden surfaces i.e., Frame of shutter, all hardware fittings such as 125mm SS hinges, SS				

	handles, SS tower bolts, mortice locks (Dorma/ Hettich/ Godrej) etc. complete in all respect as per Architectural drawings and direction of Engg-in-charge				
	(Base price of laminate to be used to be Rs. 40/ sq.ft.)				
A	Flush door size 2'-6"x 7'-0" AT TOILETS	7	NOS		
B	Door size 3'-3"x 7'-0"	7	NOS		
C	Double leaf door (opening appx. 6'x7')	1	Nos.		
6.9	Repairing of existing doors				
	Removing and refixing after repairing existing door shutters (of double leaf door), by replacing existing laminate with new laminate and complete repainting of exposed wooden surface and door frames, replacing all hardware's with new hardware, latches, locks as approved. complete in all respect.	8	Sq.Mt		
	SUB TOTAL: 6.0: PARTITIONS AND DOORS		RS,		
7	PANELLING				
7.1	Paneling (Laminated)				
	Providing & fixing Paneling (Laminated) with framework of 45 x 25 mm GI sections (India Gypsum) @ 600 mm c/c in both directions, finished with 12 mm	350	Sq.mt		

	thick fire retardant plywood conforming to IS: 5509. With one side painted with approved primer and fixing of 1.0mm thick. decorative, High gloss laminate in two or more colour on other side. Paneling to have 50x25mm teak wood molding on top, finish with Duco paint. Paneling to include provision of extra framework as necessary for skirting and making cut-outs for electrical switch plates, switch boxes, etc. making provision for laying conduits as per drawings & directions etc. complete to the satisfaction of the Architect /direction of Engg-in-charge.				
	(Quoted (without GST) Base price of laminate to be used to be Rs. 40/ sq.ft.).				
7.2	Paneling (PU Paint)				
	Providing & fixing Panelling (PU Paint) with G.I. framework of 45 x 25 mm GI sections (India Gypsum) @ 600 mm c/c in both directions with 12 mm thick. exterior grade MDF board fixed on frame. Item includes finishing Panelling MDF board surface with high gloss PU paint (Asian/ Berger/ ICI) with gun spray after preparation of surface as per manufacturer's specification etc. complete to the satisfaction of Architect /direction of Engg-in-charge.	20	Sq.Mt .		
7.3	Digital Printing on Sun Film				

	Providing and fixing Digital Printing on Sun Film as per approved material/pictures, mounted between two 6mm clear toughened float glass fixed with S.S spacers and other associated hardware fittings on wall etc. complete to the satisfaction of Architect/direction of Engg-in-charge.	4	Sq.Mt .		
7.4	WALLPAPER paneling				
	Providing & fixing Paneling with framework of 45 x 25 mm GI sections (India Gypsum) @ 600 mm c/c in both directions, finished with 12 mm thick BWR plywood conforming to IS: 5509. With one side painted with approved primer and other exposed side to have base preparation for wall paper. Paneling to include provision of extra framework as necessary for skirting and making cut-outs for electrical switch plates, switch boxes, etc. making provision for laying conduits as per drawings & directions etc. Paneling shall be finish with by Providing and fixing approved high quality decorative, completely strippable, non- woven, environment friendly wallpaper/wall covering of minimum weight 250 gms as per selected design, model, shade, colour, steady and good impact resistance, good breathability, washable, no deformation, no shrinkage and no air gap after decor.	10.00	Sq.mt .		

	(Quoted (without GST) Base Price of wall paper to be used to be Rs. 150/sq.ft.).				
7.5	Wall paper				
	Providing and fixing approved high quality decorative, completely strippable, non- woven, environment friendly wall paper/wall covering of minimum weight 250 gsm as per selected design, model , shade, colour, steady and good impact resistance, good breathability, washable, no deformation, no shrinkage and no air gap after decor. (Quoted (without GST) Base Price of wall paper to be used to be Rs. 150/sq.ft.).	30.00	Sq.mt		
7.6	Lacquer Glass panelling				
	Providing & fixing Panelling (Lacquer Glass) with frame work with 45 x 25 mm GI sections (India Gypsum) @ 600 mm c/c in both directions, finished with 8mm thick. MDF board. The board to be covered with 6mm thick extra clear glass with back painted lacquered paint of Saint Gobin or equivalent approved make , of approved shade complete as per detail drawing and to the satisfaction of the Architect /direction of Engg-in-charge	40	Sq.mt		

	(Quoted (without GST) Base Price of lacquered glass to be used to be Rs. 275/ sq.ft.				
7.7	ACOUSTIC WALL PANELS				
	<p>Acoustic Wall Panel A, Akutex FT 1200 x 2700 mm with 40 mm natural square edge, demountable panels with standard approved fabric wrapped around in concealed system with grippers, option of Daily dusting, vacuum cleaning. Panel is manufactured from high density glass wool utilizing the 3RD technology. Tiles classified under absorption class A with "alpha w " value of 0.9 at minimum 40mm O.D.S..</p> <p>Classification according to EN ISO 11654, & single value ratings for NRC value 0.9 & SAA according to ASTM C 423. Panels withstand a permanent ambient RH up to 95% at 30°C & RH upto 75% at 30°C without sagging, warping or delaminating (EN13964). Certified by the Indoor Climate labeling, emission class M1 for building materials & recommended by Swedish Asthma & Allergy Association. Granted The Nordic Swan eco-label. Fully recyclable. The glass wool core of the tiles should be tested and classified as noncombustible according to EN ISO 1182 with reaction to fire classification</p>	30	Sq.mt		

	class A2 s1 d0 according to EN 13501 - 1 - European Standard.				
7.8	Aluminium skirting				
	Supply of Aluminum Skirting Designed to be installed on wall, partitions and paneling on top of all kinds of flooring Installed using screws, to camouflage the rivet points. A capping strip is provided either in PVC of matching colour or aluminum. Supplied with pre-drilled holes and protection tape, which is removed after completion, Matching corner guards are provided with the profiles	100	R.MT		
	SUB TOTAL: 7.0: PANELLING		RS,		
8	PAINT& P.O.P.				
8.1	POP (plaster of Paris)				
	P/A P.O.P. punning 12 mm thick. On internal wall, with line, plumb and level surfaces for the smooth base of paint work. Rates to including, groove in P.O.P at as required complete.	400	Sq.Mt .		
8.2	Plastic emulsion paint				
	P/A plastic emulsion paint (premium quality) on wall of approved make and shade complete three or more coats, as per manufacturer's specification. Including preparation of base with Birla putty priming with Roller finish.	800	Sq.Mt .		

8.3	Texture paint at exterior				
	Providing and fixing Texture paint exterior grade at balcony area. Complete in all respect as per manufacture specifications. (Quoted (without GST) Basic rate for texture is 50/- sq.ft.)	120	Sq.Mt .		
	SUB TOTAL: 8.0: PAINTING		RS,		
9	FALSE CEILING				
	Note: Item includes providing False Ceiling in plane, curve, any shape, and design. Suspending system and framework shall match layout of A.C. ducts / grills, electrical / fire protection wiring / fixtures, return air grills etc. Rate to include provision of extra framework, necessary scaffolding needed due to layout of other utilities referred above and fixtures etc.				
	(Measurement shall be taken of the plan area only)				
	Rates are inclusive of:				
	a.3 or more coats of plastic emulsion paint.				
	b. Provision for lighting and light fittings etc.				
	c. Cutouts must be made with the frame of perimeter channels extra supported as suitably				

9.1	Gypsum Board False Ceiling				
	Providing and fixing Gypsum Board False Ceiling with INDIA GYPSUM ULTRA main ceiling sections at 1200 c/c and cross members at 450 c/c of INDIAN GYPSUM. The grid work to be suspended from ceiling with hangers at every 1200 c/c in both directions. The Framework to be as per manufacturer's specifications. 12.5 mm thick. Tapered edge gypsum plain board. GYPBOARD to be screwed to the frame, including jointing and finishing to a flush finish of tapered and square edges of the board with recommended jointing compound, jointing tapes , finishing with jointing compound in 3 layers covering up to 150 mm on both sides of joint and two coats of primer suitable for board, all as per manufacturer's specification along with final finish 3 or more coats of plastic emulsion paint. Rates to include provision of all necessary cut outs for electrical / air conditioning grills and necessary frame work including curve, pelmet for roller blinds on windows, designs, lift, scaffolding etc. complete as per drawings, specification and direction of the Engineer in Charge	450	Sq.Mt .		
9.2	Same as above but providing, making and fixing Gypsum cove in false ceiling to hide strip/cove light in ceiling , As per satisfaction of engineer in charge.	230	RM		

	(Measurement shall be taken of the plan area only nothing extra for vertical sections)				
9.3	Mineral Fibre Acoustic False ceiling:				
	Providing and fixing False Ceiling with Mineral Fiber Acoustic Ceiling Tiles of Armstrong/ USG/ Boral with MICROLOOK edges and having noise reduction properties laid on exposed grid system with 15mm wide Silhouette type T-section flanges of white colour, main runners spaced at 1200 mm c/c securely fixed to the soffit of structure with approved hangers at 1200 mm maximum c/c. Flush fitting 1200 mm crossed tees to be interlocked between main runners at 600 mm c/c to form 1200 x 600 modules. 1200 mm cross tees to be crimped. 600 x 600 module to be formed by fixing 600 mm long flush fitting cross tees centrally between the 1200 cross tees. Ceiling tiles of Dune Supreme of size 600 x 600 x 15 mm (thick.) to be placed in the grid. Rate to include making necessary cut-outs or openings for light fixtures, air conditioners and other utilities etc. complete to the satisfaction of Architect/ Engineer.	300	Sq.Mt .		
9.4	WOODEN CEILING				

	Providing and fixing false ceiling consisting of Armstrong wood heaven wood look ceiling planks of approved shade, Complete in all respect as per manufacture's specifications, designs and architect's approval.	40	Sq.Mt		
9.5	Trap doors				
	Providing and fixing trap doors in the false ceiling made out of lightweight aluminium with T-frame (25x20 mm) all around and white baked enamel painted finish . Complete in all respect including locks, stainless steel cam latch, piano hinge and weather resistant Gasket all around.	12	Sq.mt		
9.6	“L” SHAPED WOODEN PELMET				
	Providing and fixing L shaped wooden pelmet 4”-6” height in 18 mm thick. Fire proof ply, complete laminated of approved shade .	80	Rmt		
	SUB TOTAL: 9.0: FALSE CEILING		RS,		
10	PLUMBING AND WATER SUPPLY				
	Plumbing works includes cleaning of surface & removing old connections from site as per instructions. Item also includes all necessary connections with existing pipes, manholes and service lines and necessary lesioning with building authorities.				
10A	UPVC PIPES:				

	Providing and laying Heavy Duty UPVC pipes of approved make in floor, vertical/horizontal position including covering the same with concrete having 1:2:4 mix (1 cement: 2 coarse sand: 4 stone aggregate 12mm nominal size) along with water proof. The item includes all other accessories such as floor traps, bends, socket, tees, junctions, clamp, etc. complete .as may be required with all joints to be sealed with solution, necessary digging/ chasing /holes and covering the same properly, joint testing, etc. complete as per instructions of Architect/ Engineer.				
I	Same as above but for 110mm Dia nominal bore pipe.(with 6 Kg/cm2 pressure	41.00	R.mt.		
ii	Same as above but for 75mm Dia nominal bore pipe.(with 6 Kg/cm2 pressure	25.00	R.mt.		
iii	Same as above but for 50mm Dia nominal bore pipe.	9.00	R.mt.		
10B	CPVC PIPE:				
	Clear length will be measure (meter basis) for measurement purposes.				
	Providing and laying Chlorinated Polyvinyl Chloride (CPVC) pipes of approved make having thermal stability for hot & cold-water supply including all CPVC plain & brass threaded fittings				

	and fixing the pipe with clamps at 1.00m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement including the cost of cutting chases, wastage, socket, bend etc. complete in all respect. Making good the same and including testing of joints at 7 Kg/ Sq.Mt. pressure with pressure pump.				
	(Internal Hot water supply pipe) Providing and fixing thermal insulation over hot water pipes in chase with 6mm thick thermal insulation tubing, using elastomeric flexible material having hermetic blister closed cell structure of expanded synthetic rubber having density of 60-90Kg/m ³ over pipes of following sizes including all required accessories complete as per Manufacturer's specifications and finishing it as per site requirement with Cement Plaster. (Internal Hot water supply pipe.				
I	COLD WATER SUPPLY				
ia	Same as above but for 20 mm dia nominal bore for concealed internal piping.	10.52	R.mt.		
lb	Same as above but for 25mm dia nominal bore for shaft to toilet piping.	93.00	R.mt.		
ii	HOT WATER SUPPLY. (Internal Hot water supply pipe)				

	Same as above but for 20 mm dia nominal bore for concealed internal piping.	19.97	R.mt.		
10C	Nahani Trap:				
	Providing and fixing approved quality UPVC Nahani Trap of approved make and having self-cleaning design with C.P. pressed steel grating with or without vent arm of the below mentioned sizes for inlet and outlet including cost of cutting/ chasing and making good the floors wherever required etc. complete as per instructions of Architect/ Engineer.				
	100mm dia nominal bore for inlet and 75mm dia nominal bore for outlet.	2	Nos		
	SUB TOTAL: 10.0: PLUMBING		RS,		
11	SANITARY WORK				
11.1	WALL MOUNTED WC				
	Providing / fixing, testing and commissioning, star-white glazed vitreous China European type water closet, wall mounted, manufacture (Hind- ware Italian collection ,ELEGANCE cat. 20109 / or equivalent make /range) with all fitting, fixtures, soft closer seat cover, uPVC Connector, Rubber Seal etc. complete including cutting and making good wall, floors wherever required.	6	NOS		

11.2	Concealed cistern				
	P/F, testing and commissioning of concealed flushing cistern of Hind ware, "Concealo Neo(80mm) or equivalent make/range, with flush plate Model "CUTE", including wall mounted frame, complete in all respect, as per requirement.	8	NOS		
11.3	Squatting pan (Indian type)				
	Providing / fixing, testing and commissioning, star-white glazed vitreous China Squatting pan (water closet) manufacture (Hind- ware cat. No. 20076 or equivalent approved make /range) with all fitting, fixtures, trap etc. complete including cutting and making good wall, floors wherever required.	2	NOS		
11.4	WASH BASIN: countertop mounted				
	Providing and fixing vitreous China countertop mounted Wash Basin (Hind ware round starlet cat. No. 10052 model or equivalent make /range) 49 cm dia. With C.I./ M.S. brackets if required, 32 mm C.P. brass waste of standard pattern, bottle trap, etc. including cutting and making good at counter/vanity /stone top wherever required etc. complete as per instructions of Architect/ Engineer.	9	NOS		
11.5	BASIN MIXER:				

	Providing, fixing, testing and commissioning Wash Basin mixer with Sensor of (Jaquar model SNR-35019PMPK kubix prime or equivalent make /range) as per approval along with all necessary fittings /stainless steel connection pipes for angle valve to make it workable as may be required, complete as per instructions of Architect/ Engineer. (Make - Kohler/jaguar)	9	NOS		
11.6	Urinal with in-built automatic flushing sensor:				
	Providing and fixing, testing vitreous China flat back type Urinal with in-built automatic flushing sensor (Hind ware Italian collection flow cat. No. 60021 or equivalent approved make/ range) model having standard size C.P. brass pipe and clamps with bottle trap & waste fittings including brackets,	4	Nos		
	cutting and making good the walls and floors wherever required etc. complete as per instructions of Architect/ Engineer.				
11.7	URINAL PARTITION				
	Providing and fixing frameless urinal partition rectangular shaped 10 mm thick of toughen frosted glass (size-height=900, width=450), fitted with	2	NOS		

	required SS fittings at wall, between urinals complete in all respect.				
11.8	Providing and fixing frameless urinal partition side of basin counter rectangular shaped 10 mm thick with toughen frosted glass (size-height=1950, width=750), fitted with SS fittings at wall and floor, complete in all respect.	1	NOS		
11.9	ANGLE VALVE:				
	Providing & fixing CP brass Angle Valve with flange (Jaguar/Kohler/ Equivalent) of approved model along with all accessories as may be required complete as per instructions of Architect/ Engineer. Quoted (without GST) price to be Rs 900/-	30	NOS		
11.10	KITCHEN SINK (stainless steel)				
	Providing and fixing Stainless Steel Kitchen Sink (Jayna, Nirali) single bowl 510 x510mm glossy as per I.S. 13983 with C.I. brackets, waste jali, down take pipe, bottle trap etc. including painting of fittings and brackets, cutting and making good the walls and counter wherever required etc. complete as per instructions of Architect/ Engineer in charge.	2	NOS		
11.11	LONG BODY TAP AT SINK (bib coke)				

	Providing and fixing long body Bib cock with wall flange for sink (Jaquar model COP-107PM/ or equivalent approved make/range) along with all accessories as may be required complete in all respect.	2	NOS		
11.12	TOILET PAPER HOLDER				
	Providing & fixing wall mounted Toilet Roll Holder Jaquar model I-1151N/ or equivalent approved make/range) complete in all respect.	8	NOS		
11.13	PAPER TOWEL DISPENSER				
	Providing and fixing wall mounted paper towel dispenser of stainless steel, capacity 400-600 C/Z towels, complete in all respect, model PTD-SAP-DT0106CS of Jaquar or approved equivalent make/range)	6	NOS		
11.14	GYSER:				
	Providing, fixing, testing and commissioning of ISI mark vertical geyser 20 liter capacity (Crompton / L.G make/ equivalent make) Rates to include stainless steel connection pipes from angle valve to geyser, complete in all respect.	2	NOS		
11.15	HEALTH FAUCET:				

	Providing, fixing, testing, Health Faucet along with one-meter-long flexible tube chrome finish and hanging hook of Jaquar allied series ALD579 or equivalent make/ range)	8	NOS		
11.16	TOILET MIRROR: (toilet and pantry)				
	Providing and fixing Toilet Mirror on wall with 6mm thick. Mirror with beveled edges fixed over 6mm waterproof ply with wooden frame 50x25mm teak wood all around, finished in duco paint, along with C.P. brass screws and washers, all accessories as may be required complete as per instructions of Architect/ Engineer.	15	Sq.mt		
11.17	HAND DRIER:				
	Providing and fixing Sensor operated hand drier (ABS finish) to be operated with 220 volts, single phase, with fully hygienic condition, with all accessories including cutting and making good the walls, wherever required complete as per instructions of the engineer-in-charge. Jaquar model HDR-WHT-M04A or equivalent make /range.	6	NOS		
11.18	AUTOMATIC SOAP DISPENSER				
	P/F liquid automatic soap dispenser complete in all respect. Jaquar model SDR-BLC-DJ0160AS or equivalent make /range	6	NOS		

11.19	CP GRATING:				
	Providing, fixing C.P. Grating complete. (Chilly, Camry Make) Including cutting hole in stone, including grouting's, 125/100 mm dia. Weight not less than 100grams.	14	NOS		
11.20	GRAB BAR:				
	Providing and fixing S. S grab bar 600 mm long (jaguar/Kohler/ Equivalent) as per approved model from Architect/Engineer in charge.	1	NOS		
11.21	ROBE HOOK				
	Providing and fixing robe hook (TWIN TYPE) complete in all respect. Jaquar model AQN-7761 or equivalent make /range.	8	NOS		
11.22	Concealed Stop Cock,				
	Regular Body with Wall Flange Concealed Stop Cock, Regular Body with Adjustable Wall Flange, Size 20mm – Jaquar COP-083KPM or Equivalent make/ range as approved.	4	Nos		
	SUB TOTAL: 11.0: SANITARY WORK		RS,		
12	TABLES AND COUNTERS				
	Tables/ Counters/Workstations to have 25 mm thick. Commercial ply at sides, modesty laminate finish on exposed				



	vertical surfaces both sides, including laminate on inside surface.				
	<p>Tabletop shall be made from minimum 25mm thick post form laminated MDF board (with Flex by Luvih is a 0.7 mm postforming laminate and edge moulding as per approval) of Marino or equivalent. Side edges shall have machine-applied minimum 2mm thick PVC edge lipping. Top should have ivory /matching to top powder coated wire manager.</p> <p>One true unit sample set at site with manufactures test certificate and again tested for work-men-ship and specification at site, as described procedure in drawing dimension and procedure.</p>				
	<p>The Modesty panel will be of 19 mm commercial ply with laminate both sides as per pattern. All exposed edges shall be lipped with minimum 2.0mm thick machine pressed PVC edge banding. These shall be fitted in the region between Drawer Pedestal and Side Unit.</p>				
	<p>Drawer unit: Drawer unit consist of Three drawer two small at top and one big for files at bottom, running on heavy duty telescopic sliding channels with all around boxing made of 19mm thick. Plywood with vertical support of the</p>				


	<p>table as one side. Drawer shall be made of 12mm marine grade plywood and front fascia of drawer should be 19 mm thick. With 1.0 mm thick laminate of approved shade and make all inside and outside the drawer. All exposed edges shall be sealed with minimum 2mm thick. Edge binding tape. The back and sides of drawer shall be of same height as front. Each drawer unit will be provided with a centralized locking mechanism comprising of a multi-drawer lock fitted in the uppermost drawer fascia (of Godrej/equivalent). All three-drawer fascia shall be provided with handles as per approval.</p>				
	<p>Key board tray: Providing and installing 2'-6"/2'-9" wide, 16" deep wooden laminated all sides, keyboard, with heavy duty telescopic channels of Hettich make or equivalent as specified, made out 19 mm thick. Comm. Ply having 1 ¼" laminated edge at front and sides.</p> <p>One true unit sample set at site with manufactures test certificate and again tested for work-men-ship and specification at site, as described procedure in drawing dimension and procedure.</p>				
	<p>CPU trolley: Providing and placing heavy duty CPU trolley, (125mm to 240mm adjustable, trolley made from</p>				

	MS with white powder coating and lockable castors)				
	Side storage unit: Outer casing shall be made from minimum 19mm thick commercial ply, complete laminated inside and outside, with top in 25 mm post form laminated MDF. All exposed edges shall be lipped with minimum 2.0mm thick PVC edge banding. The unit to have one 19mm thick. Horizontal shelf inside of commercial ply laminated with 1 mm laminate. The unit will be provided with lockable shutters. Shutter to have soft closing and anti-slam mechanism. Shutters shall be having stainless steel handles of minimum 96mm length and locks for security, complete including all hardware, latches, hinges etc. as per drawing and instructions from project engineer.				
12.1	DGM table				
	P/f Table of size (2100 x900 x 750) and side credenza / side units (600 x450 x750)as per design , shall be made of 19 mm commercial ply with readymade CPU trolley, storage unit and keyboard provision including all hardware's. Table and side rack to have 4mm thick veneer (Basic rate Rs.100/- sq.ft.), at all exposed surfaces (modesty both sides), veneer finished with high gloss polyster. Table top is 42 mm thick (19 mm ply +	1	NOS		

	19 mm ply batons + 4 mm Natural Veneer). The table shall be having drawer unit (as specified above) but drawer fronts / and side storage front should be of natural veneer coated with High gloss Polyster Table complete in all respect as specified above and as per detail drawing / instruction of engineers incharge.				
12.2	REAR UNIT DGM				
	P/F DGM rear units (3300 x 450), 750 height storage top to have 4 mm thick. Veneer finished with high gloss polyster, rest specification specified above item no. 12.1 complete in all respect as / drawing including all hardware's, hinges, locks.	1	NOS		
12.3	AGM TABLE				
	P/F AGM table size (1950 x 900 x 750) and side credenza /storage units (1050 X 450 x750) with readymade CPU trolley, storage unit and keyboard provision complete in all respect as specified in item description above and as per detail.	3	NOS		
12.4	SENIOR MANAGER TABLE				
	P/F table (1800 x 750 x750) with side storage unit (900 x450 x 750) with CPU trolley, storage and keyboard provision complete in all respect as specified above and as per detail	4	Nos		

12.5	MANAGER TABLE				
	P/F Manager table left side (1900 x 750 x 750) and side credenza /storage units (600 x 450x 750 height) with readymade CPU trolley, chest of drawer and keyboard provision complete in all respect as specified above and as per detail.	6	NOS		
12.7	OFFICER TABLE T1				
	P/F Officer table left side T1 (1950 x 750 x 750) with side storage unit (600 x 450x750) with CPU, storage keyboard provision completes in all respect as specified above.	13	NOS		
12.8	OFFICER TABLE T3				
	P/F Officer table right side T3 (1800 x 750 x 750) with side storage unit (900 x 450x 750) with CPU, storage, keyboard provision completes in all respect as specified above.	11	NOS		
12.9	CLERICAL TABLE				
	P/F sub staff table T-4 (4'x 2') with storage chest of drawers and keyboard provision, complete in all respect as specified above.	5	NOS		
12.10	SIDE TABLE				
a	Providing and placing of furniture side Table with All Car-case panel shall be of 19mm ply wood laminated with 1 mm decorative / high gloss laminate at	3	NOS		


	vertical surface and 1.5 mm laminate at top, with edge banding 1.5mm thickness. The overall dimensions of the table shall be 600 x 600 x 500mm. Table to have PVC buffer at base of frame.				
					
B	Providing and placing in position readymade Glass table of Godrej size 2'x2'appx. Model (Glaze) / or equivalent As per attachment	1	Nos		
					
12.11	SECURITY GUARD TABLE AT LIFT LOBBY				

	Providing and placing table of size appx. 1200 x 550 x750 with chest of drawer of size 400 x 550 and 750 high. Basic structure of table in 19 mm thick. Commercial ply Finished with high gloss / decorative laminate. Complete in all aspect as per design.	1	NOS		
12.12	CENTER TABLE				
	Providing and placing in position Gayle Coffee Table of size 1.09 M X 0.60 Manufacture as per Godrej interio furniture / equivalent make /range. Complete in all respect including toughen glass top.	1	NOS		
					
12.13	RECEPTION TABLE				
	P/F two level table size (2400 x 650) height 750 of work top and additional apron of height 1050 and depth 230 and width 1500mm. complete in 19 mm comm. Ply. Front, top and exposed side of work top to be finished with 12 mm thick. Flexi Corian solid surface (make	1	NOS		

	Dupoint / LG/Marino) white colour with gloss finished. Rest internal area to be finished with white laminate 1 mm thick. The additional apron to be finished with 1mm laminate of high gloss / decorative laminate as per design of approved shade, complete in all respect including drawer unit, keyboard provision inclusive of hardware, latches, handles, locks, etc. as above specified / as per Detail drawing and as approved by Architect. Rates to include the cost of 10 mm thick. Toughen glass size (1000 x 230 mm) fixed at top of front appern with SS Studs.				
12.14	MEETING TABLE				
	Providing /Placing meeting table of size 2100x 1050 with height 750 of required shape, in 19 mm commercial ply box under table. Table top in 25 mm thick ply with 4 mm thick. Veneer (basic rate Rs. 110/- sq.ft. of Duro Nature Signature) At all exposed surfaces i.e., top side and front modesty panel. Table to have teak/SBW wood moulding of 1.5" x 1" all around as per design and veneer to be finished with high gloss polyster. Complete in all respect including making provision of all electrical connection at table top	2	NOS		
12.15	DINING TABLE (4SEATER)				

	Providing & placing in position DINING TABLE (Godrej-TOPO MODEL/ Steelcase/equivalent make/range) . complete as per selection and choice of Architect/ owner.				
	(The owner reserves the right select any model/ series of base price mentioned against each item from any of the above makes)				
	The overall dimensions of the top shall be 900mm x 900mm x 740mm for square and 900 mm dia. For round table.				
I	Round table, quoted (without GST) price Rs. 16500/-	3	NOS		
ii	Square table quoted (without GST) price Rs. 16500/-	5	NOS		
	SUB TOTAL: 12.0: TABLE AND COUNTER		RS,		
13	STORAGE CUPBOARDS UNIT:				
13.1	FULL HEIGHT STORAGE CUPBOARD				
	Providing & fixing Full Height Storage Cupboard as per site appx. 450 mm deep with frame, all sides, shelves to be made with 19 mm thick. Commercial ply and 6mm thick. Commercial ply fixed at the back. The shutters to be made with 19mm thick. Commercial ply. Shutters, front and cabinet sides to be finish with	24.00	Sq.mt		

	1.0 mm thick. Decorative/ texture laminate and inside finished with 0.8 mm thk. White laminate finish. All edges to have 2mm thick. Edge binding tapes as per details, all shutters to be made overlapping the frame, including S.S. long handles, magnetic catchers, self-closing hinges, locks (Godrej/ Hettich/Haffele) etc. complete to the satisfaction of Architect/Engineer. (Only front elevation will be considered for area calculation) (Quoted (without GST) Base price of laminate to be used to be Rs. 40/ sq.ft.).				
13.2	PIGEONHOLE				
	Providing and fixing pigeonhole cabinet complete laminate with 1mm thk. Laminate, exposed edge to have 2mm pvc edge binding tape. Cabinet to have hole size 8"x10" 197pprox., and 12 " deep in 19 mm thick commercial board and 6mm thick ply atback. Front elevation area shall be considered for payment.	9.30	Sq.mt		
13.3	GLASS DOOR STORE WELL				
	Glass door Store well (of Godrej or equivalent approved)shall have an overall size of 916 mm(W)486mm (D)1980mm (H) with welded construction. It should have shelf thickness of 0.7mm, back thickness of 0.8 mm, Door thickness of 0.8 mm (high	6	NOS		

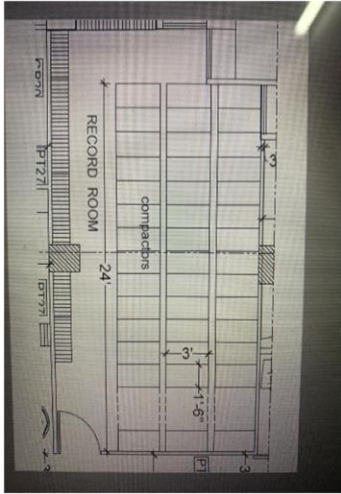

	<p>yield strength) and all other components shall have a thickness 0.9 mm. These components shall be made of RCCA 'D' grade high yield strength as per IS 513. The glass door store well shall have a brass handle and a 2way locking mechanism with shooting bolt. It should have a height wise adjustable shelf mounting which shall have a uniformly distributed load capacity of max 40 kg. It should also have a M10 screw type leveller with hex plastic base. The finishing shall include epoxy powder coated to the thickness of 50 microns (+/-10). Plenty of colour options and shelving options shall be available.</p>				
					
13.4	LOW HEIGHT STORAGE CUPBOARD				

	Providing & fixing Low Height Storage Cupboard depth 450 mm, with same specification as mentioned in item 13.1, above for full height storage cupboard but height of 750-1200mm and top of cabinet should be in 25 mm thick. Post form laminated MDF. All exposed and inside surfaces to be laminated i.e., sides, front etc. complete to the satisfaction of Architect/Engineer.				
	(Only front elevation to be considered for measurement purposes) (quoted (without GST) Base price of laminate to be used to be Rs. 40/ sq.ft.)	83.20	Sq.mt		
13.5	CABINET AT DINNING /PANTRY AREA				
	P/F pantry cabinet 600 deep and 800 high, in 19 mm thick. BWR Waterproof ply with 19 mm thick. Granite/ equivalent at top with edge moulding (quoted (without GST) price Rs. 180/-sq.ft. Cabinet to have top row of drawer with cutlery tray of 550 mm width in one and bottom shutter with provision of shelf inside, complete laminated inside with 0.8 mm thick laminate and outside with 1 mm thick. High gloss laminate of approved shade, complete in all respect including 2 mm PVC edge binding tape of matching shade at exposed edge, hinges, Hardware, latches, magnetic	4.00	Sq.Mt .		

	catchers, telescopic channel, provision of Dish washer etc. of approved make.				
	The Front elevation area shall be considered for payment.				
13.6	OVER HEAD STORAGE:				
	Providing and fixing Over Head Storage 300 mm deep made of fire safe plywood 19 mm thick. At car case finished with 1mm thick. High gloss laminate off approved shade outside and 0.8 mm thick. Plain laminate inside. Shutter should be provided with soft closing hinges (Hettich/ Haffle/ Dorma) & glass shelves inside. Item to be inclusive of 2 mm PVC edge binding tape of matching shade at exposed edge, all accessories/hardwares, locks, soft close hinges etc. complete. Complete to the satisfaction of Architect/Engineer. (Quoted (without GST) Base price of laminate to be used to be Rs. 40/ sq.ft.). The Front elevation area shall be considered for payment.	3.02	Sq.mt		
13.7	VANITY UNITS FOR WASH BASIN				
	P/F cabinet 600 deep in 19 mm thick. BWR Waterproof ply with 18 mm thick. Granite, pre polished and pre moulded/ equivalent at top (quoted (without GST) price Rs. 180/-sq.ft. Joints to be sealed with epoxy with matching pigment up to complete depth. Cabinet to have shutter with provision of shelf	5.80	Sq.mt		

	inside, complete laminated inside with 0.8 mm thick laminate and outside with 1 mm thick. High gloss laminate of approved shade, complete in all respect including 2 mm PVC edge binding tape of matching shade at exposed edge, hinges, Hardware, latches, magnetic catchers, etc. of approved make. The Front elevation area shall be considered for payment.				
13.8	Providing and fixing 6mm thk acrylic solid surface thermoformed and (corian, LG, Merino) for table top and corners.All Acrylic Solid Surface thermoformed surfaces to be buffered.as/ design and specification	20	Sq.mt		
13.9	MOBILE COMPACTORS STORAGE				
	Providing & Fixing in position Mobile compactor storage (Godrej model Optimizer plus / steel case / equivalent) . It consists of storage units 457 mm deep– fixed or movable – bolted to Undercarriage which rolls onto the channels, which, are firmly fixed to the ground. Construction shall be made out of 0.8 thk. CRCA Steel conforming to IS: 513 Gr.D. Each body block consists of 1 Main unit & then Add-on units as per layout plan attached. Body block are attached back to back. Each unit has 5 loading levels formed by 4 nos. adjustable shelves. Body units are bolted to undercarriage. Optimizer	1.00	Nos		

	<p>Height from ground is 2080 mm (1980 body + 65 under-structure + 35 channel system). Width shall be 915mm. The bodies including shelves are given anti-rust surface treatment & are powder coated with epoxy polyester powder. Final finishing is done by a Dry Film Thickness of minimum 45 (+\ - 5) microns. Shelves are having 10 bends & its max load bearing capacity is 80 Kg uniformly distributed per shelf. The Undercarriage is a welded frame made of HR sheet 2 & 3.15 mm thk conforming to IS:1079 suitably fabricated to take the loads based on configuration. The movement of units is achieved mechanically through a PU Drive wheel and 'Sprocket-Chain-Tensioner' arrangement mounted rigidly onto body side. The torque from hand wheel is transfer to drive shaft via sprocket chain arrangement. , each movable undercarriage is provided with 3 rollers on the shaft for driving, 3 anti-friction ball bearings for rolling and 4 anti-friction ball bearings for guiding between rails. A Centralized locking arrangement is provided 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 nuts & bolts are galvanized / blackodized / Zn Plated. It consists of 'J' section 2 mm thk HR</p>				
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	<p>sheet & 25 mm Square bright bar - both connected by screws.</p> <p>Complete in all respect as per manufactures details and approval from Architect/Engineers incharge.</p>				
	 <p>Layout plan</p>				
					
13.10	LOCER CABINATE: (for LADIES TOILET)				

	Providing and fixing locker cabinet for lady's toilet in 19 mm thick. BWR Ply with complete lamination inside and outside high gloss / decorative laminate as per approved shade. Edge binding to be done with 2mm PVC tape of matching shade to laminate. Cabinet to have multiple sections of size 12"x 18". Each section has separate lock and shutter fitted with handle. complete in all respect as per drawing and instructions of project engineer.	5	Sq.mt		
	SUB TOTAL: 13.0: STORAGE CUPBOARDS		RS,		
14	SOFA				
	Providing & placing in position Sofa (Godrej/ Featherlight/ Wipro/ equivalent) having stainless steel frame, chrome plated legs, leatherite tapestry/ Fabric upholstery etc. complete as per selection and choice of Architect/ owner.				
	(The owner reserves the right select any model/ series of base price mentioned against each item from any of the above makes)				
14.1	THREE-SEATER SOFA (DGM ROOM):				


	Providing and placing in place of Three-seater sofa (Godrej - PISA model / Featherlight-/ Wipro-equivalent make / range) (quoted (without GST) price to be Rs. 36000/ sofa).	1	Nos.		
14.2	SINGLE SEATER SOFA				
	Providing and placing single seater sofa of (Godrej - PISA model / Featherlight-/ Wipro-equivalent make / range) (quoted (without GST) price to be Rs. 21000/ sofa).	9	Nos.		
14.3	3-SEATER SOFA (CUSTOMER LOUNG)				
	Providing and placing in place, three-seater sofa (Godrej -Parto model / featherlight/ Wipro-equivalent make / range) (quoted (without GST) price to be Rs. 30000/- sofa).	1	Nos.		
14.4	Providing and placing in place, Single seater sofa (Godrej -Parto model / Featherlite/ Wipro-equivalent make / range) (quoted (without GST) price to be Rs. 18000/- sofa).	2	Nos.		
	SUB TOTAL: 14.0: SOFA		RS,		
15	CHAIRS:				

	Providing & placing in position Officer Chairs (Godrej/ Featherlight/ steel case/ Polo/ Equivalent) Executive Seating and Visitor Seating series, with chrome plated base, 5 nos. of castors, tilting, push back arrangement, handles, arms, multiple locking gas lift & net upholstery/ latherite tapestry etc. complete as per selection and choice of Architect/ Bank's Engineer. (The owner reserves the right to select any model/ series of base price mentioned against each item from any of the above makes).				
15.1	High Back Executive chair for DGM				
	(Quoted (without GST) price to be Rs. 45000 / chair)	1	Nos.		
15.2	High back for AGM and DGM visitors chair				
	(Quoted (without GST) price to be Rs. 18000 / chair)	6	Nos.		
15.3	Mid Back chairs for officers/ meeting				
	(Quoted (without GST) price to be Rs.10500 / chair)	66	Nos.		
15.4	SUB STAFF CHAIR				
	(Quoted (without GST) price to be Rs. 3000 / chair)	6	Nos.		
15.5	CAFETERIA CHAIR (model UNWind OF GODREJ)				

	Stackable chair, with Chrome base, Polymer shell back.	32	Nos.		
	(Quoted (without GST) price to be Rs. 3500 / chair)				
	SUB TOTAL: 15.0: CHAIR				
16	MISCELLANEOUS				
16.1	NOTICE BOARD				
	Providing and fixing Box Notice Board with 19mm thick. commercial ply with frame & sides finished with 1.0 mm thick. decorative texture laminate. Box to have 75x35mm teak wood shutters with 6mm thick. clear float glass. The back to have 6mm thick. commercial ply and 12mm thick. soft ply covered with cloth of approved shade and fabric. The item includes polishing the wood surfaces with melamine polish etc. complete to the satisfaction of Architect/Engineer. Size of the Box Notice Board shall be 1200x600x150(D)mm.	1	Nos.		
16.2	COMPANY LOGO				
	Providing & fixing Company Logo with acrylic sheet and S.S. 304 grade 16 gauge base. Logo to be provided with LED lights (Phillips/ Havells/ Wipro) The logo to be fixed on wall / panelling partition as per details and instructions etc. complete to the satisfaction	1	Nos.		

	architect/ Engineer. Size of Logo will be Appx. 600 wides.				
16.3	DIGITAL GLASS FROSTING FILM (3M)				
	Providing and fixing Digital Glass Frosting Film (3M) for frosting as per design in all shapes/size including curve shapes etc. complete to the satisfaction of Architect/ Engineer.	100	Sq.mt .		
16.4	HONEYCOMB SHADES				
	Supply of Honeycomb Shades having The HEADRAIL extruded from 5005 H-6 alu. alloy & shall be powder coated to a smooth finish with a thickness of 15-25 microns. FABRIC shall be constructed from spun-bonded polyester fibre, precision manufactured to form a hexagonally shaped, dual pleat, cellular construction. All cords & cord holes shall be fully concealed inside the fabric structure. As each of the hexagonal cells is formed individually, pleats operate independent of each other providing superior pleat retention & structure strength. INSTALLATION BRACKETS shall be of high-tension spring steel suitable for overhead & wall mounting & for use in conjunction with extension bracket.	51	Sq.mt .		
16.5	ROLLAR BLINDS				


	Providing & fixing of Blackout Roller Blinds (Vista Levelor / MAC/ DACK) of approved shade, texture and fabric including all associated accessories, heavy duty chain driver pulley etc. complete in all respect as per manufacture specifications and to the satisfaction of Architect/Bank's Engineer. (quoted (without GST) Base price of the fabric be used Rs. 140/- sq.ft.).	264.0	Sq.mt		
16.6	PHOTO FRAMES/CUSTOMIZED PAINTINGS				
	Providing and fixing of painting on canvas, mounted on canvas frame and to be hung on wall/partition with suitable accessories. average size of 48"x 30"(30" x 24") wooden polished frame appx. 2 "thick. /as approved				
	size 48"x 30" frame 1.25"	4	Nos.		
	size 30"x 24" frame 1.25"	2	Nos.		
16.7	ARTIFICIAL PLANT				
	Providing and fixing in wire-mesh substrate, Artificial Plants of size height not less than 1000 mm. as approved and of first quality. (Plants can be Dieffenbachia plant, Areca plant, Aglaonema plant, Monstera, four wall Bamboo, Croton plant etc.) Item inclusive of all accessories, planter pot of plastic or wooden, as approved by	15	Nos		


	Architect, protecting installation by avg. 20-micron polythene sheet till handover of facility etc. complete. Rate also to include polished stone pebbles of different colour of appx. 2"size or as require to cover base of plant at pot top. The type and height will be decided after evaluating the various mock-up plants provided by the vendor from various professional sources in New Delhi, complete to the satisfaction of Architect/ Engineer.				
					
16.8	STAINLESS STEEL DUSTBINS				
16.8a	Providing and Supplying S.S. Dustbins (Dry) , avg. 300 mm dia. Foot Pedal Bin of avg. height appx.400 mm perforated matt finish, with all turned, well-formed and moulded edges at the bucket rim. Item to include sample approval from Architect/Bank's Engineer.	25	Nos.		
16.8b	Dustbin for toilet in SS solid matt finish with rest specifications same as item no. 16.10.	5	Nos.		

16.8c	Plastic Dustbin for pantry (Foot Pedal Bin) size approx. 400 mm dia and 450-500 mm high.	2	Nos.		
16.9	Company name "Export Credit Guarantee Corporation" cut in SS brush 3d letter (SS304) of text ht. 400 mm and of depth 1.5" font to be cut to sizes and directly installed on available base as per instructions, with approved acrylic fixture with provision to change the plate whenever deemed necessary, including necessary hardware, substructure, extra, as specified and directed by Engineer in charge	1	Nos.		
16.10	GRASS TRUFF				
	P/Laying high density (16800 (Stitches/M2) artificial 30mm thick. grass truffe, for balcony made of high-quality polypropylene material and polyethylene yarns, superior resilience and durability. It should be long lasting UV resistant, Lush Green colour gives a soothing look to eyes in every weather. Grass backing should be woven polypropylene with fibre locked fleece and latex compound. complete in all respect as per instructions.	34.40	Sq.mt .		
16.11	OUTDOOR ROOF COVER (AWNING)				
	P/Fixing of canopy, of Tensile fabric (strong polyester weave base cloth, coated with strong PVC coatings, provide resistance to different weather	37.20	Sq.mt .		

	<p>conditions. In addition , it should be finished with PVDF lacquers to add extra durability and performance) covering , on terrace sitting area , fixed to two side building structure , only beams to beams above 9'-0" above floor, on existing building brams (fixed fasteners 19 mm dia , 150 mm, inside beam with rebar holding plate thickness and size as per structure design and assumptions of IS codes and equivalent for structure for space at site requirement fabricated with , pipes angle channels , clips wires , and fabric accessories) shop drawing and structure approval from architect . Rectangular Canopy structure fixed only on two sides of rectangle, and rest two side are open, no support on floor. Vertical surface above 9' shall be covered with same tensile fabric. Top tensile fabric with slope min 1:20.</p> <p>1. Covering with tensile fabric, measures on plan area covered, inclusive of all flashing, sides, folds, wires accessories in SS, anti orrosion treated, Complete in all respect. Min thickness of MS members 4 mm. SS members 1.5 mm. 2. Inclusive of metal structure, weight of metal finally installed not less than 3 kg/sq.ft. Inclusive of acrylic primer, acrylic enamel paint three costs.</p>				
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16.12	GREEN WALL (OUT DOOR WALL)				
	Note: Plant variety will be decided after evaluating the various mock-up plants provided by the vendor from various professional sources in New Delhi , Quoted rate is included with six months of maintenance.				
	Providing and fixing (vertical garden) green plant on the wall including M.s. frame (rectangular tube sizes 25mmx50mm and 2 mm thick painted with primer and final 3 coats of enamel paint), irrigation system, coco peat, Fertilizer, soil, plastic pots, plants, bottom drain/gutter, hanging arrangements, required design, complete in all respect. to the satisfaction of the Architect/Engineer.	17	Sq.mt .		
16.13	NATURAL GREEN PLANTS (WITH POTS)				
	Providing and fixing natural green outdoor plants with pots. Height of plant not less than 1050 mm and dense foilage, Plants can be Dieffenbachia plant, Areca plant, Aglaonema plant, Monstera, etc. including fertilizer, soil, cocopeat, and terracotta/ceramic pot of size appx. 18" complete in all respect as per approval.	30	Nos.		
16.14	ANTI BIRDS NET				


	Providing and fixing anti bird net of high-quality transparent polymer 0.8 mm thick. superior resilience and durability, UV resistant. Sizes of holes in net should be 25mmx25mm, complete with fixing arrangement inclusive of S.S. WIRE 1.5 MM, SS Turn Buckles, SS Hooks, SS farrul etc. complete in all respect as per manufacturer specifications of SK PEST CONTROL / Hi care / equivalent. Rates to include 3 years warranty for same. Finished area should be considered for measurement.	75.00	Sq.mt		
16.15	AUTO SENITIZER DISPENSER				
	Providing and fixing auto hand sanitizer Dispenser, with built in sensor of capacity 5 liters make Puremist / equivalent make/range	1	Nos.		
					
16.16	REFRIGERATOR				
	Providing and placing in position 327 L double door frost free refrigerator of (BOSCH model KDN42UN30I or	1	Nos.		

	equivalent in other makes, L.G., WHIRLPOOL,) with SS FINISH, or as approved by Architect/ Engineer incharge. Quoted (without GST) base price 28000/- per unit				
16.17	WATER DISPENSER				
	Providing in position Providing and placing floor mounted bottle water dispenser of Voltas /or approved equivalent make / range.	2	Nos.		
16.18	MICROWAVE				
	Providing and placing 20 L, solo microwave oven with glass door of LG (MS2043BP 20L Solo) / Equivalent make/range.	1	Nos.		
16.19	HOTCASE				
	Providing and placing Automatic Electric Hot Case with Thermostatic Control Toughened Sliding Glass Door Large Commercial Size with 3 Shelves Tubular, size Height: 22.5", Length: 28.5", Width: 15.5". Made of M.S heavy duty, Body Stoving enamel finish. (Make Bajaj, osham, Olympus)	2	Nos.		
16.20	ROLLING SHUTTER (perforated)				
					

a	MANUAL SHUTTER:				
	Size: width -5'-6"x9' approx.				
	Material: The shutters shall consist of M.S. lath sections conforming to IS 513-1986, 2 mm thick and 80mm wide. Providing, fixing and installing manual rolling shutter having made out of 2mm interlocking lenses either of honeycomb or perforated profile coupled together with horizontal aluminium section tubes complete with M.S. Guide complete with bottom rails and brackets made from M.S. sheet, with fitting accessories in best workmanship. complete up to the satisfaction of the Architect. Rate including all the tools, tackles, hardware and consumable items etc.	9.20	Sq.mt		
b	MOTORISED ROLLING SHUTTER				
	Size: width -7'-5"x9' approx.				
	Clear opening, [plaster line over brickwork opening] shall be measured for billing. Side top and bottom overlaps are inclusive in rates.				

	Material: The shutters shall consist of M.S. lath sections conforming to IS 513-1986, 2 mm thick and 80mm wide.				
	Providing, fixing and installing motorized rolling shutter having made out of 2mm interlocking lenses either of honeycomb or perforated profile coupled together with horizontal aluminums section tubes complete with M.S. Guide complete with bottom rails and brackets made from M.S. sheet, with fitting accessories in best workmanship. The Automation system comprising of compact gear motor with advanced technology having patented safety mechanism with control panel (manual in case of power failure) and key selector with remote control complete up to the satisfaction of the Architect. Rate including all the tools, tackles, hardware and consumable items etc. Rate excluding motor due to motor rate paid separately. (16.20.3) but motor installation included.	12.54	SQM		
C	Shutter electric Motor capacity 1.5 times to weight of shutter, Motor Make: GE, Kirloskar, Crompton. On dining area shutter.	2	NOS		
16.21	COLLAPSIBLE SHUTTER				
A	Providing and fixing in position Collapsible Steel Shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with	8.00	SQM		

	top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts, locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer as per manufacturer's specifications and then final coat of approved enamel paint etc. complete to the satisfaction of the Architect /Engineer.				
B	Repairing and repainting existing COLLAPSIBLE M.S SHUTTER				
	Repairing Existing collapsible steel shutter with required fittings, repairing, primer, paint, etc. to make it run smooth and workable. Complete in all respect. approved by architect /engineer.	1.00	JOB		
16.22	DISWASHER:				
	Providing and placing 13 place setting Dishwasher of Bosch model SMS66GI01I / Silver inox or equivalent makes LG/ faber. Rates to include complete installation and commissioning. Quoted (without GST) base price 35000/- per unit	1.00	Nos.		
16.23	INDUCTION STOVE				
	Providing / placing 2000-Watt Induction Cooktop with touch panel, digital display and auto cut off, black colour as approved make by architect	2.00	Nos.		

	engineer of approved make (Prestige / Glen/ Faber)				
16.24	WALL CLOCK				
	Providing wall clock of Seiko equivalent with white border.				
	QXA786W WITH QUIET SWEEP SECONDS HAND 	6	Nos.		
16.25	SIGNAGE				
	Various Direction signages of exit and washroom identification with LED glow panel and proper fixture for installation and connection 20"x9"size.	6	Nos.		
	SUB TOTAL: 16.0: MISCELLANEOUS		RS,		
17	SALVAGE/BUY BACK (Rebate for Salvage Value of old items)				
	Removal of the following items including the cost of loading, unloading and transportation etc. complete. It is advised to, survey and assess the condition of various salvage items before quoting the rates. Claims on account of over assessment of the cost				

	of various salvage items without examination of the actual condition of the various salvage items shall not be entertained at a later stage. Reserve price Rs. 450000/- for total of salvage value.				
	Note: If any contractor quotes below than the reserved price, minimum reserved price Rs. 450000/- shall be deducted for salvage items for calculation of lowest bid. Contractor can quote more but not less than this amount.				
	1. The amount derived from above items would be reduced from overall value of tender.				
	2.Amount should be quoted item wise; Owner is at liberty on which item to be retained.				
17.1	125amp-switch with housing	2	NOS		
17.2	36u rack for computer modem-sme	1	NOS		
17.3	Cash box	1	NOS		
17.4	Chair (model:3204) - 1 sme	40	NOS		
17.5	Chair (model:3230) - 1 sme	1	NOS		
17.6	Chair (model:3231) - 1 sme	3	NOS		
17.7	Cisco ip phone7940(fcn1210a03b)-sme	1	NOS		

17.8	Electrical fittings	1	BULK ITEM S		
17.9	Electrical scale-sme	1	BULK ITEM S		
17.10	Fire extinguisher	27	NOS		
17.11	Fire ALARM SYSTEM DRY	1	BULK ITEM S		
17.12	Glass mate films	1	NOS		
17.13	Iron rack-i	8	NOS		
17.14	Mobile storage system	1	NOS		
17.15	Rack for modems at it room	1	NOS		
17.16	Rack for router/modems	1	NOS		
17.17	Rack/table/chair etc.	1	NOS		
17.18	Roller blinds	1	NOS		
17.19	Round table	1	NOS		
17.20	Server stabilizer 15 kva	1	NOS		
17.21	Sign boards - 1	2	NOS		
17.22	Stabilizer (voltage protector)-sme	1	NOS		
17.23	Store well for it dept.	1	NOS		
17.24	Structured cabling	1	NOS		
17.25	Sun mica top-round table	1	NOS		
17.26	Wall fans/exhaust fans (32+3)	35	NOS		

17.27	Window ac(Hitachi)-sme	3	NOS		
17.28	Wooden board	1	NOS		
17.29	Wooden chairs (1)	5	NOS		
17.30	Wooden show-windows (1)	1	NOS		
17.31	Foot rest (11)	11	NOS		
17.32	Wooden showcase	1	NOS		
17.33	Store well	1	NOS		
17.34	Chair - 1	1	NOS		
17.35	Side rack (storage)-16 /	16	NOS		
17.36	Centre table-1	1	NOS		
17.37	Table/ sofa /racks etc.	38	BULK ITEM S		
17.38	Cash box	1	NOS		
17.39	Rack (steel) -filing (8)	8	NOS		
17.40	Air conditioners	2	NOS		
17.41	Split ac	1	NOS		
17.42	Stabilizer	2	NOS		
17.43	Fax	1	NOS		
17.44	Air conditioner	1	NOS		
17.45	Room cooler (bm resi)	2	NOS		
17.46	Ceiling fans	1	NOS		
17.47	Ip phone	1	NOS		

17.48	Bio metric attendance reader	1	NOS		
17.49	Induction cooker(bajaj)-1	1	NOS		
17.50	Air conditioner Hitachi	1	NOS		
17.51	Microteach stabilizer	3	NOS		
17.52	Square light-1'x1	28	NOS		
17.53	Ceiling light-1'x4	4	NOS		
17.54	Tube light-4'	66	NOS		
17.55	Tube light -2'	7	NOS		
17.56	Circular-light	80	NOS		
17.57	Watch	7	NOS		
17.58	Window-aluminium	24	NOS		
17.59	Cabinet below window	17	NOS		
17.60	Flush door	5	NOS		
17.61	Door with glass vision	1	NOS		
17.62	Door - alum small size	9	NOS		
17.63	Door - wood	15	NOS		
17.64	Door - alum big size	3	NOS		
17.65	Ups d.b	2	NOS		
17.67	Partition wall- partly glazed/full	2655.6	SQF T		
17.68	Partition- low height	345	SQF T		
17.69	False ceiling- gypsum- sqft-5900 approx.	1	LUM SUM		

17.70	False ceiling with M.s. sheet in sq. ft - 1500 approx.	1	LUM SUM		
17.71	Wc- Indian	4	NOS		
17.72	Wc European	3	NOS		
17.73	Mirror	7	NOS		
17.74	Wash basin	5	NOS		
17.75	Urinal	5	NOS		
17.76	Urinal partition	3	NOS		
17.78	Sink	2	NOS		
17.79	Rolling shutter +collapsible shutter	3	NOS		
17.80	Roller blend	8	NOS		
	TOTAL		RS.	deduc	(4,50,000)

BILL OF QUANTITY – PART B**ELECTRICAL**

ITEM.NO	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
1	SUB DISTRIBUTION PANELS				
1.1	Sub Distribution Panels				
	Design, manufacture, supplying & installing at site in positioning, connecting, testing and commissioning of the following cubical type, dead front, 2mm thick sheet (Jindal or equivalent), steel enclosed, free standing indoor type extendible Sub Distribution Panel with vermin proof hinged lockable doors for each compartment provide bus bar interconnections for incoming and outgoing including feeders earthing and painting and as per specifications.				
1.1a	THE UPS OUTPUT PANEL - SHALL CONSISTS OF:				
	MAIN INCOMER				
	1 Nos. 80 A DP MCB (10KA/1 sec) Terminals suitable to receive 2x 1c x 25 sq. mm Cu. Flexible cable connection on one side and Busbar connection on the other side.				
	INDICATING PANELS				
	1 nos phase indicating lamps (LED type, high rated brand) each backed up				

	with MCB and switch shall be provided for incomer				
	Provide Intelligent Panel Meter - multifunctional meter with RS485 for all incoming feeder				
	BUSBARS SECTION				
	150 amps Double pole Copper busbar chamber of suitable length with copper busbars (99.55 % copper) . All busbars and interconnections shall be of suitable size copper busbar, current density of copper shall not be more than 1.6 Amps/ sq.mm cross sectional area of Bus Bar provide 100% capacity for neutral bus bar. The Bus Bar shall be suitable for max temperature rise of 30°C above ambient of 45°C				
	OUTGOINGS				
	4 Nos. 63 A DP MCB (10 kA) terminals suitable to receive cable on one side and wire connection to Bus bars.				
	3 Nos. 40A DP MCB (10 kA) terminals suitable to receive cable on one side and wire connection to Bus bars.				
	The SDB UPS as described above and specifications complete	1	Set		
1.2	The Main Panel shall consist of:				
	MAIN INCOMER				

	1 No. 200 A 4 P manual change over switch + 1no. 200 A TPN MCCB (25KA/1 sec) (O/C, S/C, E/F) and neutral isolation link 50% of rated current. Terminals suitable to receive 1 x 3.5c x120 sq. mm Al cable connection on one side and Busbar connection on the other side.				
	1 No. 200 A 4 P manual change over switch + 1no. 200 A TPN MCCB (25KA/1 sec) (O/C, S/C, E/F) and neutral isolation link 50% of rated current. Terminals suitable to receive 1 x 3.5c x120 sq. mm Al cable connection on one side and Busbar connection on the other side.				
	250 amps TPN busbar chamber of suitable length with aluminium busbars. All busbars and interconnections shall be of suitable size aluminium strips current density of copper shall not be more than 0.8 Amps/ sq.mm. Provide 50% capacity for neutral bus bar.				
	INDICATING PANELS				
	3 nos phase indicating lamps (LED type) each backed up with MCB and switch shall be provided for each incomer.				
	Provide on/off indication lamp on incomer				

	Provide Intelligent Panel Meter -with RS485 for all incoming feeder				
	OUTGOINGS				
	5 Nos 63 A TP MCCB (25 kA), terminals suitable to receive AR Cable on one side and Busbar connection on the other side.				
	4Nos 63 A FP MCB (10 kA), terminals suitable to receive AR Cable on one side and Busbar connection on the other side.				
	5 Nos 40 A 4 P MCB (10 kA) terminals suitable to receive AR Cable on one side and Busbar connection on the other side.				
	3 Nos 32 A DP MCB (10kA) terminal suitable to receive AR Cable on one side and Busbar connection on the other side.				
	The SDB panel as described above and specifications complete	1	Set		
1.3	Providing & fixing in position 1000 mm wide, Electrical Insulating Mats as per IS 15652:2006, 2mm thick, suitable up to 3.3 KV, fire retardant, no effect of acids, alkalies and transformer oils, moisture proof, high tensile strength and texture finish / cloth impression (Anti slip, marking on top).	2	RM		

1.4	Supply & fixing in position approved shock treatment chart written in English, Hindi and Local language. These charts shall be framed in wooden frame & covered with clear glass.	1	No		
1.5	Supply & fixing in position the best quality danger notice boards of approved shape & size as reqd. by the local Electrical Inspecting Authority written in English, Hindi & local language.	1	No		
1.6	Supply & fixing in position the Electrical A 3 Size SLD chart in the Panel cabinet. These charts shall be framed in wooden frame & covered with clear glass.	1	No		
	TOTAL ITEM NO - 1				
ITEM.NO	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
2	DISTRIBUTION BOARDS				
	Supply, in installing, connecting testing and commissioning of the following double door 1/4 rows vertical type 1.4 mm thick and 1. 2 thick door sheet steel enclosed fully recessed type, TPN Miniature Circuit Breakers Distribution Boards dust proof, vermin proof, with hinged and lockable doors complete with DP MCB's and inter-connection with copper wire, insulated copper bus bar, cable glands/conduit entry bushes, bonding to earth and painting. Also provide separate neutral busbar for				

	each phase. Provide separate Earth Links for each phase. Use brass thimbles for connections of all wires. 1 row for single phase and 4 rows for 3 phases. Provide separate 4-way 63 A main neutral link also. The phase busbar links shall be factory pre insulated.				
2.1	Light & Power Distribution Board				
2.1a	8+2 Way TPN DB, each phase consisting of 8 Nos. 10/20 AMP SP MCB's and controlled by one number 100 mA sensitivity 40 AMPS DP RCCB backed up with 1 no 40 Amps 4 pole MCB. (L&P DB)	3	No		
2.1b	12+2 Way TPN DB, each phase consisting of 10 Nos. 10/20 AMP SP MCB's and controlled by one number 100 mA sensitivity 63 AMPS DP RCCB backed up with 1 no 63 Amps 4 pole MCB. (L DB/LPD)	2	NO		
2.1c	12 Way SPN DB, consisting of 8 Nos. 10/20 AMP SP MCB's and controlled by one number 100 MA sensitivity 40 AMPS DP RCCB backed up with 40 Amps DP MCB.	1	NO		
2.2	UPS DISTRIBUTION BOARDS (ALL MCB'S IN UPS DB'S SHOULD BE D CURVE)				

2.2a	12+2 Way SPN DB, consisting of 10 Nos. 10/20 AMP SP MCB's and controlled by one number 100 mA sensitivity 63 AMPS DP RCCB backed up with 63 Amps DP MCB.	3	No		
2.2b	10 Way SPN DB, consisting of 3 Nos. 20/32 AMP DP MCB's and controlled by one number 100 mA sensitivity 40 AMPS DP RCCB (100 mA) for backed up with 40 Amps 4P MCB. The bus bar shall be Twin bus bar. (Server DB)	1	No		
2.3	Supply, installation, testing and commissioning of sheet metal weather proof enclosure with 63 A 4P MCB with Earth Leakage Relay with CBCTs (300mA). This shall include cable entry boxes both for incoming and outgoing cable) For VRF Out Door Units.	3	No		
2.4	Supply, installation, testing and commissioning of sheet metal weather proof enclosure with 40 A 4P MCB with Earth Leakage Relay with CBCTs (300mA). This shall include cable entry boxes both for incoming and outgoing cable) For VRF Out Door Units.	2	No		
2.5	Supply, installation, testing and commissioning of sheet metal enclosure with 63 A TPN MCCB. This shall include cable entry boxes both for incoming cables) For 20 KVA UPS.	1	No		

2.6	Supply, installation, testing and commissioning of weather proof enclosure with 32 A DP MCB. This shall include cable entry boxes both for incoming and outgoing cable)	2	No		
	TOTAL OF ITEM NO - 2				
ITEM.NO	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
3	RACEWAYS AND CABLE TRAYS				
3.1	Fabricating supplying to site of installation, installation on ceiling/surface 1.6 mm thick G.I raceways of height 50 mm and 1.6 mm thick openable cover, totally enclosed, the joints between two lengths of channels or between channel and junction box shall be joined together with 3 mm thick G.I coupler plates to make it dust and water proof. The cost shall include all supporting and fixing accessories including dash fasteners. The maximum spacing of the supporting arrangement shall be 1.2 M.				
3.1a	150 mm (wide) x 50 mm (height)	75	RM		
3.1b	100 mm (wide) x 50 mm (height)	50	RM		
3.2	Fabricating supplying to site of installation, Junction boxes for Ceiling raceways made from 1.6 mm thick, with 1.6 mm thick G.I. including providing neoprene gaskets between the cover and the junction box, cadmium plated flat/round head screws, height as per				

	<p>site condition, totally enclosed. Proper cut-outs shall be made in the side walls for raceway entry wherever required. The junction box shall be all side walls should be welded except top cover and all side walls shall have suitable size of rectangular knock out holes for taking raceways / conduits as required and not a complete cut out. The top cover should be sealed with M Seal to make it dust and waterproof complete as required etc.</p>				
3.2a	300 mm x 300 x 60 mm (height)	8	No		
3.2b	200 mm x 200 x 60 mm (height)	12	No		
3.2c	150 mm x 150 x 60 mm (height)	16	No		
3.3	<p>Fabricating supplying to site of installation, in floor including chase cutting of floor, levelling, refilling and making good the same from 1.6 mm thick and 2 mm thick cover Pregel vanished G.I sheet, totally enclosed, height 40 mm. The two lengths of raceways shall be fitted with Collars, 50 mm wide, 3 mm thick, press fit type. The raceways shall be clamped to the floor slab with GI clamps, 3mm thick and shall be screwed to the floor slab. The joint between raceway and junction box will be made with GI flexible strip (3 nos), 3 mm thick, 4 inches long ,15 mm wide which will be nut bolted to the Junction box complete as required etc.</p>				

3.3a	250 mm (wide) x 40 mm (height)	25	RM		
3.3b	150 mm (wide) x 40 mm (height)	100	RM		
3.3c	100 mm (wide) x 40 mm (height)	75	RM		
3.4	Fabricating supplying to site of installation, Junction boxes for floor raceways made from 1.6 mm thick, with 2.0mm thick G.I power coated cover including providing neoprene gaskets between the cover and the junction box, cadmium plated flat/round head screws, height as per site condition, totally enclosed. Proper cut-outs shall be made in the side walls for raceway entry wherever required. The junction box shall be all side walls should be welded except top cover and all side walls shall have suitable size of rectangular knock out holes for taking raceways / conduits as required and not a complete cut out. The top cover should be sealed with M Seal to make it dust and water proof complete as required etc.				
3.4a	300 mm x 300 x 60 mm (height)	4	No		
3.4b	200 mm x 200 x 60 mm (height)	17	No		
3.4c	150 mm x 150 x 60 mm (height)	22	No		
3.4d	50 mm x 50 x 60 mm (height)	4	No		

3.5	<p>Design manufacture, supply and fixing in position the cable trays of the following sizes for supporting 1.1 KV grade armoured/unarmoured aluminium /copper conductor cables. Fabricate the cable trays from perforated 1.6/2mm thick M.S. CRCA sheet duly galvanised with expansion coupler plates duly galvanised, with bolts, washer and nuts. Knock out holes for cable connections as per approved design. The tray should comply with the specification of NEC (National Electric Codes) and NEMA (National Electric Manufacturers Association). The steel should be as per IS:226 and galvanising as per IS :2629/BS 729/ASTM 123. The fixing of cable trays includes necessary ceiling suspended / wall mounted supports fixed in ceiling with Fabricated Ms Angle supports, MS C channel, Base plate etc, the rate shall include bends, angles, Ts, HITECH ROD and all accessories complete Supports Shall be provided at every 1200mm. The cost of supports to be included. Supports must be welded to a square true ceiling base plate with arc welding, the base plate must be fixed to the true ceiling with 04 nos. of HILTI anchor fasteners. Supports must be made out of MS L angle type for cable tray width of 450mm and above. For Less than 450mm width tray support</p>				
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	with hi-tech threaded rods & anchor fasteners. The maximum spacing of the supporting arrangement shall be 1.2 M.				
3.5a	150 mm wide x 40 mm x 1.6 mm thick	125	RM		
3.5b	300 mm wide x 40 mm x 1.6 mm thick	20	RM		
3.5c	450 mm wide x 40 mm x 2.0 mm thick	10	RM		
	TOTAL OF ITEM NO - 3				
ITEM.NO	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
4	CABLES, MAINS & SUBMAINS				
	Supply and laying, effecting proper connections, testing & commissioning of the following sizes of 1.1 KV armoured XLPE / unarmoured Cross linked polyethylene insulated, PVC sheathed (XLPE), conforming to IS: 7098 (Part-1)- 1988 (90 deg C) aluminium /copper conductor cables conforming to IS : 1554 and IS 694 for Flexible copper cable Part I - 1976 with latest amendments laid over MS supports in existing RCC ducts/ laid in ground /laid on Cable Trays including clamping the cables to supports in an approved manner as required complete with all accessories. All cables shall have thermo setting insulation XLPE and low emission of smoke and corrosive gas when affected by fire				

4.1	Armoured Aluminium Cable				
4.1a	3.5 c x 120 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured aluminium conductor cable	60	RM		
4.1b	4 c x 25 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured aluminium conductor cable	90	RM		
4.2	Armoured Copper Cable				
4.2a	4 c x 16 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured copper conductor cable (Light /Power /UPS DBs)	200	RM		
4.2b	4 c x 10 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured copper conductor cable	200	RM		
4.2c	4 c x 6 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured copper conductor cable	150	RM		
4.2d	3c x 4 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured copper conductor cable.	100	RM		
4.2e	3c x 6 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured copper conductor cable.	60	RM		
4.2f	2 c x 10 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured copper conductor cable.	120	RM		
4.2g	1c x 16 sq.mm FRLS XLPE insulated flexible copper conductor cables	50	RM		

4.2h	1c x 25 sq.mm FRLS XLPE insulated flexible copper conductor cables.	20	RM		
4.3	Supplying and making of end termination for the following size of 1.1 KV XLPE insulated copper conductor armoured cables including providing heavy duty copper terminal crimping lugs, solder, insulation tape, approved sealing epoxy compound, double compression brass cable glands, effecting gland connections and effecting terminal connections to the equipment complete as required. Use compression lugs and PG Threaded Nylon Flexible cable glands for single core flexible cables.				
4.3.1	Armoured Aluminium Cable				
4.3a	3.5 c x 120 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured aluminium conductor cable.	2	Set		
4.3b	4 c x 25 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured aluminium conductor cable.	2	Set		
4.4	Armoured Copper Cable				
4.4a	4 c x 16 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured copper conductor cable (Light /Power /UPS DBs)	6	Set		

4.4b	4 c x 10 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured copper conductor cable.	8	Set		
4.4c	4 c x 6 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured copper conductor cable.	4	Set		
4.4d	3c x 4 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured copper conductor cable.	4	Set		
4.4e	3c x 6 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured copper conductor cable.	4	Set		
4.4f	2 c x 10 sq.mm 1.1 KV grade XLPE Insulated FRLS sheathed armoured copper conductor cable.	4	Sets		
4.4g	1c x 16 sq.mm FRLS XLPE insulated flexible copper conductor cables.	8	Sets		
4.4h	1c x 25 sq.mm FRLS XLPE insulated flexible copper conductor cables.	4	Sets		
	TOTAL OF ITEM NO - 4				
ITEM.NO	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
5	EARTHING				
5.1	Providing and fixing, testing & commissioning in position the following copper strips with min 99.95% Purity and wires including providing all fixing accessories and effecting proper connections.				

5.1. a	G.I. tape 25 mm x 6 mm	110	RM		
5.1. b	Copper tape 25mm x 3 mm	10	RM		
5.1.c	Cu wire 8 SWG	500	RM		
5.1. d	Cu wire 12 SWG	100	RM		
5.2	<p>Supply and laying, effecting proper connections, testing & commissioning of the following sizes of 1.1 KV armoured XLPE/ unarmoured Cross linked polyethylene insulated, PVC sheathed (XLPE), conforming to IS: 7098 (Part-1)- 1988 (90 deg C) aluminium /copper conductor cables conforming to IS : 1554 and IS 694 for Flexible copper cable Part I - 1976 with latest amendments laid over MS supports in existing RCC ducts/ laid in ground /laid on Cable Trays including clamping the cables to supports in an approved manner as required complete with all accessories.</p> <p>All cables shall have thermo setting insulation XLPE and low emission of smoke and corrosive gas when affected by fire</p>				
5.2. a	1c x 25 sq.mm FRLS XLPE insulated flexible copper conductor cables,	300	RM		
5.2. b	1c x 16 sq.mm FRLS XLPE insulated flexible copper conductor cables.	20	RM		

5.2.c	1 x 10 Sq. mm FRLS XLPE insulated flexible copper conductor cables (Green Colour for UPS DB Sub-main Earthing) cables.	100	RM		
5.2. d	1 x 6 Sq. mm FRLS XLPE insulated flexible copper conductor cables (Green Colour) cables.	25	RM		
5.3	Supplying and making of end termination for the following size of compression lugs and PG Threaded Nylon Flexible cable glands complete with all fixing accessories as required				
5.3. a	1c x 25 sq.mm FRLS XLPE insulated flexible copper conductor cables.	6	Sets		
5.3. b	1c x 16 sq.mm FRLS XLPE insulated flexible copper conductor cables.	2	Sets		
5.3.c	1 x 10 Sq. mm FRLS XLPE insulated flexible copper conductor cables (Green Colour for UPS DB Sub-main Earthing) cables.	10	Sets		
5.4	Supply, Installation, testing and commissioning of Maintenance Free Earthing of make Electrolytic Earthing comprising of type 'K' copper 2.4 mm wall thickness, hollow tube 10 feet long, 2.625 inches outer diameter completely filled with non-hazardous metallic salts (Terrafill) to achieve an earth resistance of less than 1 ohms. Provide masonry chamber with concrete base, CI manhole cover (cover	3	No		

	to be heavy duty) with frame (300mm x 300mm) and make earth pit sign/ identification no in each earth station for UPS & Server				
5.5	Supply, installation, testing and commissioning of sheet metal enclosed with vision glass door 250 x 150 x 125 (D) mm insulated earth distribution board with 1 no. 32 x 6 mm copper tinned earth bars on SMC insulator suitable for 6/8 nos connections complete with all fixing accessories as required.	2	No		
5.6	Supplying and laying of the following sizes of Heavy-duty PVC Pipes below paved area should be 20 Kg/sq.cm including chase cutting and back filling, and making same as existing for earthing cables and fibre cables, make -supreme or Equilent				
5.6a	100 mm outer dia	12	RM		
	TOTAL OF ITEM NO - 5				
ITEM.NO	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
6	POINT WIRING				
6.1	Supply, installation, testing and commissioning Wiring for the following light points with 3x1.5 Sq.mm FRLS PVC insulated stranded copper conductor wires in concealed MS conduit same as specification in F.				

	ceiling/walls/ceiling as directed including providing and fixing of 6 amps flush type switches, 5 sided G.I. Boxes for housing switches and earthing complete as required. Rates are inclusive of 3 x 1.5 sq.mm FRLS PVC insulated stranded copper conductor wires for circuit				
6.1. a	First point controlled by one no. 6 amp switch.	95	No		
6.1. b	Extra Loop light point in same switch	175	No		
6.2	Supply, installation, testing and commissioning Wiring for the following light points controlled by MCB in DB (Cost of MCB has been taken elsewhere in the tender) with 3x 1.5 sq. mm FRLS PVC insulated copper conductor wires in concealed/exposed MS conduit as called for and earthing.				
6.2. a	First point controlled by existing MCB in D.B. To first light for emergency light & Exit signage	6	No		
6.2. b	Additional light points in the same circuit	55	No		
6.3	Supply, installation, testing and commissioning Wiring for 6/16 amps light plug outlets with 3 x 2.5 sq.mm FRLS PVC insulated copper conductor wires in MS conduit in ceiling/walls/floor as directed including providing 6/16 amps flush type 5 pin socket and 16 amps switch with cover plate, 5 sided	22	No		

	G.I. boxes for housing switches, sockets and earthing complete as required. (For general areas)				
6.4	Supply, installation, testing and commissioning Wiring for inline fan points with 2 x 2.5 sq.mm FRLS PVC insulated stranded copper conductor wires in concealed MS conduit in F. ceiling/ walls/ Ceiling as directed including providing and fixing of 16 amps flush type switches 16 amps 3 pin socket near inline fan, 5 sided G.I. boxes for housing switches and 16 amps 3 pin socket outlet and earthing and complete as required. (Including body earth for GI boxes)	4	No		
6.5	Supply, installation, testing and commissioning Wiring for Geyser points with 3 x 4 sq.mm FRLS PVC insulated copper conductor wires in concealed MS conduit in F. ceiling/ walls/ Ceiling as directed including providing 16 amps flush type switch near the white board and 6/16 amps 6 pin socket near the projector in ceiling, 5 sided G.I. boxes for housing switches and 6/16 A 6 pin socket outlet, earthing and complete as required. (Including body earth for GI boxes) (1 point per circuit)	4	No		
6.6	Supply, installation, testing and commissioning Wiring for VRV Indoor units with 3 x 2.5 sq.mm FRLS PVC	26	No		

	insulated stranded copper conductor wires in concealed MS conduit in F. Ceiling/ walls/ Ceiling as directed including providing and fixing of 6 amps flush type switches 16 amps 3 pin socket near VRV points, 5 sided G.I. boxes for housing switches and 16 amps 3 pin socket outlet and earthing and complete as required. (Including body earth for GI boxes) (4 to 6 points per circuits)				
6.7	Supply, installation, testing and commissioning Wiring for 16 amps power outlet points with 4.0 sq.mm FRLS PVC insulated stranded copper conductor wires in concealed/recessed MS conduit as directed including providing and fixing of 16 amps flush type switch and 6 pin sockets with cover plate 5 sided G.I. boxes for switches and socket and earthing the third pin with 4.0 sq.mm FRLS PVC stranded copper wire complete as required (including body earth for GI boxes).				
6.7. a	One 16 Amps point per circuit	12	No		
6.7. b	2nos 16 Amps point per circuit	6	Sets		
6.8.1	Supply, installation, testing and commissioning Wiring for UPS/Raw plug outlets points with three core, 2.5 sq.mm FRLS PVC Insulated and PVC sheathed flexible cable with bright annealed electrolytic copper conductor,				

	1100-volt grade confirming to IS: 694-1990 with latest amendments, in existing Channels/ conduit in ceiling/walls/floor including all cable termination accessories) Earthing of GI Box to be included. Colour Coding to be followed. For Work station UPS and Raw power wiring				
6.8.1. a	Primary point including circuit cables	22	No		
6.8.1. b	Secondary loop point in same circuit	65	No		
6.8.2	Supply, installation, testing and commissioning Wiring for sprit AC outlet Point With 4.0 Sq. Mm FRLS Pvc Insulated Stranded Copper Conductor Wire In M/S Conduit /Wall/Floor/Ducts as Directed Including 25 Amp Socket with Amps SP MCB (Tiny Trip)5 Sided Pvc Outlet Box for Housing and Socket and MCB And Earthing With 2.5 Sq. Mm FRLS Pvc Insulated Stranded Copper Conductor Wire Complete as Required. (For Ups and Data Switch)	2	No		
6.9	Supply, installation, testing and commissioning Wiring for UPS/Raw plug outlets points with three core, 4 sq.mm FRLS PVC Insulated and PVC sheathed flexible cable with bright annealed electrolytic copper conductor, 1100-volt grade confirming to IS: 694-1990 with latest amendments, in existing Channels/ conduit in ceiling/walls/floor including all cable				


	termination accessories) Earthing of GI Box to be included. Colour Coding to be followed. For Workstation UPS and Raw power wiring				
6.9. a	Primary point including circuit cables	4	No		
6.9. b	Secondary loop point in same circuit	2	No		
6.10	Supply, installation, testing and commissioning Wiring for UPS/Raw plug outlets points with three core, 4.0 sq. mm FRLS PVC Insulated and PVC sheathed flexible cable with bright annealed electrolytic copper conductor, 1100-volt grade confirming to IS: 694-1990 with latest amendments, in existing Channels/ conduit in ceiling/walls/floor including all cable termination accessories) Earthing of GI Box to be included. Colour Coding to be followed	25	RM		
6.11	Providing and fixing of 1 Nos.6-amp flush type 3 pin socket and 1 No. 6 amps switch cover plate, 5 sided G.I. Boxes for housing switches and sockets and earthing complete as required (for Raw/ UPS). GI Box to have earth pin for body earthing	55	No		
6.12	Providing and fixing of 2 Nos.6-amp flush type 3 pin socket and 1 No. 16 amps switch cover plate, 5 sided G.I. Boxes for housing switches and sockets and earthing complete as required (for	22	No		

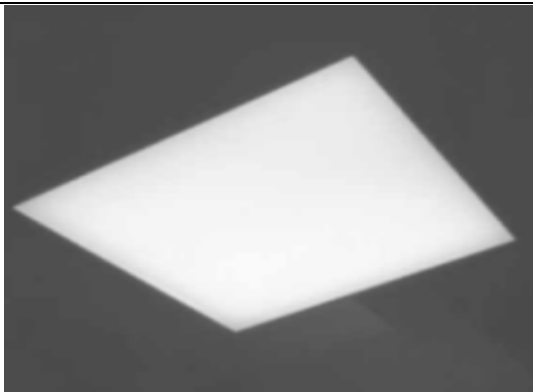
	Raw/UPS). GI Box to have earth pin for body earthing				
6.13	Providing and fixing of 3 Nos.6/13-amp flush type 3 pin socket and 1 No. 16 amps switch cover plate, 5 sided G.I. / PVC moulded Boxes for housing switches and sockets and earthing complete as required (for UPS/RAW). GI Box to have earth pin for body earthing	35	No		
6.14	Providing and fixing of 1 No.16 amps flush type 6 pin socket and 1 No. 16 amps switch with indicator, cover plate, 5 sided G.I. Boxes for housing switches and sockets and earthing complete as required (for UPS & Raw) GI Boxes to have earth pin for body earthing	8	No		
6.15	Providing and fixing Underfloor Access Outlets (250 x 250 x 55 - mm 70 compartments 1Trap including providing 2 Nos 6/13 Amps international sockets and 1 no. 16 Amp's switch (UPS) +1 Nos 6/13 Amps international sockets and 1 no. 16 Amp's switch (RAW) and space for 1 No. data outlet complete as required. Including proving the supporting arrangement in below with fixing accesses the false floor, the under-access outlets box should be flush with finish floor.	2	No		
6.16	Supply and fixing of the following sizes of thermoplastic moulded plug and				


	socket IEC 309 type in PVC Box of suitable size flush / surface and making connections complete as required. The box shall be IP 44.				
6.16. a	3 pin 32 A 1 phase industrial socket plug top	2	No		
6.17	Providing and fixing in position the following MS conduits including all accessories concealed in F. ceiling/wall/floor as required including 2.0 mm thick MS junction or pull boxes with 3mm thick Perspex sheet cover plate complete with 1.6 mm dia. G.I. pull wires in the length of conduit.				
6.17. a	25 mm dia conduit (1.6 mm thick)	225	RM		
6.17.c	32 mm dia conduit (2.0 mm thick)	150	RM		
6.18	Supply, installation, testing and commissioning The Electrical Contractor shall provide sufficient temporary lighting for working in the building total area 10633 sq. ft. divided in 1 Floors and maintain the same till completion of the project. It shall include replacement of all fused/faulty lamps. It shall include providing 4 Sets of Portable power distribution boards with 4 nos 16/32 A single phase plug sockets and 1 no 32 Amps 3 phase plug socket (industrial type with ON/OFF MCB) Provide suitable size of MCB distribution board with 100 mA RCCB. The Contractors will tap off supply from	1	L.S.		



	these plugs for his use. Halogen in the open area and Tube lights provision in the closed room to maintain a lighting level of 150 lux on the floor, each 15 A socket and each Light circuit shall be protected by suitable MCBs. Use three core PVC Insulated PVC sheathed copper conductor cables for wiring. The contractor shall salvage the complete wiring and take it back at the end of the project. All the entry/temporary toilets/ path ways, staircases, vendor store area, material stacking place to be provided with adequate lighting with 4feet Patti fitting on the equal distance.				
	TOTAL OF ITEM NO - 6				
ITEM.NO	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
7	CONDUITING FOR DATA & CONDUITING AND WIRING FOR T.V. SYSTEM.				
	Note: Rate including -cutting, chasing, drilling, hols, lead lift, wastage repair, making same as good existing /.				
7.1	Providing and fixing in position the following MS conduits including all accessories concealed in F. ceiling/wall/floor as required including 1.6 mm thick MS junction or pull boxes with 3mm thick Perspex sheet cover				


	plate complete with 1.6 mm dia. G.I. pull wires in the length of conduit.				
7.1. a	25 mm dia conduit (1.6 mm wall thickness)	225	RM		
7.1.c	32 mm dia conduit (2.0 mm wall thickness)	150	RM		
7.2	Providing and fixing in position suitable 1.2 mm thick G.I./ PVC outlet box for RJ- 45 computer outlet with all fixing accessories as required.	20	No		
7.3	Supply and fixing of 1.2 mm thick G.I Box along with RG 11 TV Co axial socket with Cover Plate	2	No		
7.4	Supply drawing connecting testing and commissioning of TV Coaxial cable RG 6 in existing conduit	100	RM		
7.5	Supply, installation, testing and commissioning Telephone hand set Panasonic KX-TS880MX, Integrated Telephone system, hands free with speaker, caller id compatible, 50 stations phone book, 20 one touch/ 10 speed dialler. (Black)	50	No		
7.6	Supply drawing connecting testing and commissioning of Electronic Private	1	Nos.		


	<p>Exchange (EP-ABX system) including 100 pair line tag box complete in all respect.</p> <p>Make-NECSL2100,</p> <p>SL2100 Communications Server:-1 Chassis, no of slots 4, Number of CPU -1, Total System Ports (Trunk + Extension)-222, Total Legacy Ports (Trunk + Extension) 74,</p> <p>EPABX having 64 Hybrid extensions 3 P&T 1 PRI</p>				
	 <p>Built-in features include:</p> <ul style="list-style-type: none"> > Web-Based Unified Communication Client > VoIP Enabled > Unified Messaging > Music on Hold > Mobility / BYOD / Remote Extension > Auto Attendant > Audio Conferencing > Video Conferencing & Collaboration > And more! 				
7.7	Supply drawing connecting testing and commissioning DSS console with 24 DDS	1	No		
7.8	Supply drawing connecting testing and commissioning HDMI cable with Connector /Terminal. Pieces of 5 mtr, 10 mtr, or as per site requirement.	60	Rmt		
	TOTAL ITEM NO - 7				
ITEM.NO	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT

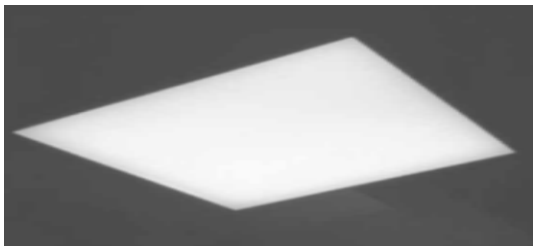

8A	SUPPLY OF LIGHTING FIXTURES				
	Make Divinity/ Bajaj/Havells				
	The colour temperature of the lamps shall be 5700 deg K.				
8A.1	Supply of Recessed ceiling luminaire LED (Light Emitting Diode) system wattage 35W, 5700K, Luminous Flux of luminaire is 2929.5lm, CRI >80, 230V, direct light emission, sheet metal housing, Powder Coated white, opal diffuser in synthetic material, fixation with of support, halogen-free internal wiring, integral electronic control gear Protection class I, IP40, L = 595 mm B = 595mm, H = 75mm. Havells Make - Cat no -Venous 36 Watt LED or equivalent	80	No		
					
8A.2	Supply of Recessed Luminaire Channel LED (Light Emitting Diode) system wattage-25W/4'feet, Luminous Flux of luminaire is 1630l m, 5700K, CRI >80, 230V, Direct Emission, aluminium, Profile in high quality powder coated, Halogen free internal wiring, PMMA Diffuser for Homogenous Light	6	No		

	distribution. Protection Class I, IP 40, Havells Make -Cat no -Veneous 36 Watt LED or equivalent				
					
8A.3	Supply of Divinity Lights Recessed AMIGO ROUND Down light LED with LED (Light Emitting Diode) system power: 15W, luminous flux of luminaire 902lm, 4000K, Neutral White, CRI >80, 230V, direct light emission, housing in Aluminium white, wide beam, with ceiling trim white, ON/OFF, Protection class I, IP40 Outer DAø = 154mm, Cut-out dia =144 mm, H=55mm Havells Make -Cat no -Integra Neo 15 Watt or equivalent	188	No		

					
8A.4	Supply of Cove light flexible strip light 14.5 Watts/mtr (Qty in running metres) Havells Cat no-Indura Flexi strips or equivalent	50	Rm		
					
8A.5	Supply of 15-Watt LED Pendant Light Fixture for Reception Havells cat no - Uneco Pendant 150Watt LED or equivalent	4	No		
8A.6	Supply of SITC of 3 Watts LED Ni Cd Battery backup up to min 90 minutes, emergency Exit light of Prolite Make or equivalent. The sample shall be submitted before ordering.	8	No		
8A.7	Supply of Passive infra-red presence detector for lighting control of entire office (ON/OFF selection of lights) (Lights switch OFF in steps of 1 minute)	20	No		



8A.8	Supply of Ground burial Light fixture as per Havells Make-Adorn 6 Watt LED or equivalent	10	No		
8A.9	Supply of Decorative Light -1 Metal hanging fixture suitable for E27 holder with LED lamp, CRI >80, 230V, direct light emission, housing in Metal, integral electronic control gear, ON/OFF, Protection class I, IP20, Dimension: Dia = 400mm, wattage=18W, Suspension and Built-in Power cable Suspension Height= 1500 mm. For Cafe Basic cost Rs - 7000/	6	No		
					
8A.10	Supply of Hanging light fixture with anodised aluminium frame 24~26W LED down light complete in all respect. Non-dimming with electronic drivers 4000-5700K	5	NO		

					
	TOTAL ITEM 8.A.				
ITEM.N O	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
8B	INSTALLATION, TESTING, COMMISSIONING OF LIGHTING FIXTURES				
	Make Divinity/ Bajaj/Havells				
	The colour temperature of the lamps shall be 5700 deg K.				
8B.1	installation, testing and commissioning Recessed ceiling luminaire LED (Light Emitting Diode) system wattage 35W, 5700K, Luminous Flux of luminaire is 2929.5lm, CRI >80, 230V, direct light emission, sheet metal housing, Powder Coated white, opal diffuser in synthetic material, fixation with of support, halogen-free internal wiring, integral electronic control gear Protection class	80	No		

	I, IP40, L = 595 mm B = 595mm, H = 75mm. Havells Make -Cat no - Veneous 36 Watt LED or equivalent				
					
8B.2	installation, testing and commissioning Recessed Luminaire Channel LED (Light Emitting Diode) system wattage- 25W/4'feet, Luminous Flux of luminaire is 1630lm, 5700K, CRI >80, 230V, Direct Emission, aluminium, Profile in high quality powder coated, Halogen free internal wiring, PMMA Diffuser for Homogenous Light distribution. Protection Class I, IP 40, Havells Make -Cat no -Veneous 36 Watt LED or equivalent	6	No		
					

8B.3	<p>installation, testing and commissioning</p> <p>Divinity Lights Recessed AMIGO ROUND Down light LED with LED (Light Emitting Diode) system power: 15W, luminous flux of luminaire 902lm, 4000K, Neutral White, CRI >80, 230V, direct light emission, housing in Aluminium white, wide beam, with ceiling trim white, ON/OFF, Protection class I, IP40 Outer Dia ø = 154mm, Cut-out dia =144 mm, H=55mm Havells Make -Cat no -Integra Neo 15 Watt or equivalent</p>	188	No		
					
8B.4	<p>installation, testing and commissioning</p> <p>Cove light flexible strip light 14.5 Watts/mtr (Qty in running mtrs) Havells Cat no-Indura Flexi strips or equivalent</p>	50	Rm		
					
8B.5	<p>installation, testing and commissioning</p> <p>15-Watt LED Pendent Light Fixture for</p>	4	No		

	Reception Havells cat no - Uneco Pendent 150Watt LED or equivalent				
8B.6	installation, testing and commissioning SITC of 3 Watts LED Ni Cd Battery backup up to min 90 minutes, emergency Exit light of Prolite Make or equivalent. The sample shall be submitted before ordering.	8	No		
8B.7	Installation, testing, of Passive infra-red presence detector for lighting control of entire office (ON/OFF selection of lights) (Lights switch OFF in steps of 1 minute)	20	No		
8B.8	Installation, testing and commissioning Ground burial Light fixture as per Havells Make-Adorn 6 Watt LED or equivalent	10	No		
8B.9	Installation, testing and commissioning Decorative Light -1 Metal hanging fixture suitable for E27 holder with LED lamp, CRI >80, 230V, direct light emission, housing in Metal, integral electronic control gear, ON/OFF, Protection class I, IP20, Dimension: Dia = 400mm, wattage=18W, Suspension and Built-in Power cable Suspension Height= 1500 mm. For Cafe	6	No		

					
8B.10	<p>Installation, testing, and commissioning</p> <p>Hanging light fixture with anodised aluminium frame</p> <p>24~26W LED down ligh</p> <p>Non-dimming with electronic drivers</p> <p>4000-5700K</p>	5	NO		
					
	TOTAL ITEM 8 .B.				
ITEM.No	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
9	ADDRESSABLE FIRE ALARM AND PA SYSTEM				

9.1	FIRE DETECTION SYSTEM (ANALOGUE ADDRESSABLE)				
	Morley, Ravel/ Ravel				
9.1.1	Supply, installation, connecting, testing and commissioning of addressable photoelectric type Smoke Detectors with mounting base, blinking LED etc. complete as required. Make Morley IAS	60	No		
9.1.2	Supply, installation, connecting, testing and commissioning of addressable rate of rise cum fixed temperature Heat Detectors with mounting base, blinking LED etc. complete as required. Make Morley IAS	1	No		
9.1.3	Supply, installation, connecting, testing and commissioning of Addressable Hooters cum strobe min. 95 db output, the cost includes of control module if required Make Morley IAS	4	No		
9.1.4	Supply, installation, connecting, testing and commissioning of Manual Call Box in ABS plastic as required complete. Pull Down Type Make Morley IAS	4	No		
9.1.5	Supply, installation, connecting, testing and commissioning of addressable fault Isolator Make Morley IAS	5	No		
9.1.6	Supply, installation, connecting, testing and commissioning of addressable control module for A.C./ AHU & Access Control System Make Morley IAS	3	No		

9.1.7	Supply, installation, connecting, testing and commissioning of addressable monitor module for integration of builder panel to main fire panel Make Morley IAS	1	No		
9.1.8	Supply, installation, testing and commissioning of Microprocessor based 1 loop panel, Networkable analog addressable type fire alarm control panel with 640-character LCD display. The panel shall equipped with sufficient no. of loops, each loop shall have capacity of 250 analog devices in each loop four access levels, capable of taking flash scan devices, Flash EPROM sufficient no. of programmable relay controls for controlling AHU's, pressurization fans, ventilation fans at fire pump room, Monitoring of fire hydrant and fire sprinkler, 240v AC power supply, Automatic battery charger, 24v sealed lead acid battery sufficient for 24hrs normal working and 2hrs during emergency as required according to specification. . Make Morley IAS, ZXI	1	Set		

9.1.9	Supply, installation, testing and commissioning of following grade with copper conductor armoured copper conductor cable as per specifications in cable trays, clamped including anchor fasteners to wall with suitable clamps, saddles fixing bolts, 2 Metal cable glands for each detector back box, complete in all respect as required as per specifications				
	2 core x 1.5 sq. mm Execl Make	790	RM		
9.1.10	Supply, installation, testing and commissioning in position 1.2mm thick M.S. outlet boxes for housing smoke detectors/heat detectors including providing 3 mm thick Hylam sheet cover as required				
	75mm x 75mm x 75mm	10	No		
9.1.11	Supply, installation, connecting, testing and commissioning of Fire Response indicator Make , Agni model , ,	45	No		
9.2	PUBLIC ADDRESS SYSTEM				
9.2.1	Supply, installation, testing and commissioning in position the following FRLS PVC conduits including all accessories concealed in False ceiling/walls/partitions as required including 5 sided 2.0 mm thick FRLS PVC junction boxes and 3mm thick Perspex sheet cover plate complete with 1.6 mm dia. G.I. pull wires in the length of conduit.				

9.2.1	25 mm dia 2.0 mm wall thickness	450	RM		
9.2.2	Supply, installation, testing and commissioning of following (BOSCH) make Music Accessories / Equipment's.				
9.2.2a.	Supply, installation, testing and commissioning of complete loud speaker ceiling mounted type, complete as required (Bosch LBD 0606, or equivalent,) with metal grill.	32	No		
9.2.2b	Supply, installation, testing & commissioning of Bosch Plena Mixer PLE- ME 120 Amplifier capable of delivering 240 W RMS power output, built-in fan for temperature control, built in line matching transformer distortion typically 0.03% @ 1 KHz, Hum and Noise 90 dB below rated output, complete as required.	1	No		
9.2.2c	Microphone unit- Bosch Make	1	No		
9.2.2d	Supply, installation, testing & commissioning of suitable size of equipment rack for above system made out of CRCA sheet to house all the control equipment. Complete as required.	1	No		
9.2.2e	Main Termination Box	1	No		
9.2.3	Wiring with 2 core 24/.2 mm PVC insulated twisted copper conductor wires in existing conduit/ trunking as required. Make Execl	500	RM		

	TOTAL OF ITEM 9.				
ITEM.N O	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
10	CCTV SYSTEM (IP BASED)				
	Supply /installations				
10.1	<p>Supply, installation, testing and commissioning 1/3-inch Indoor Dome 2 Mp IP Colour Cameras, 0.3 lux (night vision) at 30IRE minimum illumination sensitivity supporting 4 CIF resolution at 25 FPS with dual MPEG4 Streaming, electronic shutter, switchable automatic gain control, auto white balance, back light compensation, with varifocal 3.6 - 10 mm auto iris lens, including cost of suitable wall / ceiling surface/ recessed mounting IP Rugged Dome camera. The camera shall be capable of functioning through Power over Ethernet (PoE) for installation with only one cable. The camera system shall be as a single integrated unit and shall be complete with all interconnections etc as required.</p> <p>Make - Honeywell or Equilent, model no- HIE2PIV S3</p>	14	No		
10.2	Supply, installation, testing and commissioning 1/3 inch out door type box camera 2 MP IP Colour Cameras, 0.3 lux (night vision) at 30IRE minimum illumination sensitivity supporting 4 CIF	2	No		

	<p>resolution at 25 FPS with dual MPEG4 Streaming, electronic shutter, including cost of suitable wall / ceiling surface/ recessed mounting IP Rugged camera. The camera shall be capable of functioning through Power over Ethernet (PoE) for installation with only one cable. The camera system shall be as a single integrated unit and shall be complete with all inter connections etc as required. Make -Honeywell or Equilent</p>				
10.3	<p>Supply, installation, testing & commissioning of Network Video Recorder Server and Software for recording up-to 16 cameras with MPEG2 and MPEG-4 sources simultaneously at a minimum stream of 70 MBPS, analog monitor support and networked multi-user option/client & server complete as per specifications and as required. provide suitable size of internal and external hard disk capacity 24 x 7 for 30 days and the recording shall be motion based with 25 FPS (Cost of recommended PC and legal software for PC in the client scope) make -Honeywell or Equilent,</p> <p>Model no-H265 4 K 16 Ch Nvr No Poe</p>	1	No		
10.4	<p>Supply, installation, testing and commissioning Wall/Partition mountable 32" LED, Full HD smart tv, with inbuilt NTSC/PAL auto switchable</p>	1	No		

	and with Connectors suitable for showing outputs from all PC's/NVRs on a single screen with suitable inputs for video, s-video, HDMI : 3, USB : 2, Wi-Fi, Bluetooth, Digital Audio Ports, RF Antenna Input, Ethernet, complete as per specifications and as required: Model no- L.G -32LM6360PTB or Equilent.				
10.5	Supplying, installing, testing and commissioning of Rack mountable 24 port 10/100/1000 Base T Edge POE Switches complete as per specifications and as required. D-Link DGS-1100-24P or Equilent	1	No		
10.6	Supplying, installing, testing and commissioning of Rack mountable 4-pair Cat 6 RJ-45, Jack Panel Distribution Interface. The panel shall consist of 16 RJ-45 Modular jacks on the front and wired to the Insulation Displacement Conductors at the back for easy terminations. The Interface shall be complete with necessary Retainers, mounting screws, identification labels and Velcro straps for cable security complete as per specifications and as required. D-Link NPP-C61BLK241 or Equilent	1	No		

10.7	Supply, installation, testing and commissioning of 6 U wall mounted Rack with glass front door, power supply, MCB, cable manager, drawer shelves and wiring channels to accommodate CCTV systems equipment and accessories as mentioned in the BOQ above and including all connections and terminations as required	1	No		
10.8	CAT-6 UTP cable Make D -Link NCB-C6UGRYR-305, or Equilent	650	Rm		
10.9	CAT-6 RJ 45 2 Nos outlet with suitable size of G.I./ PVC box, cover plate and patch cord etc. D-Link NKJ-C6BLU1B21, or Equilent	9	No		
10.1	Supply, installation, testing and commissioning in position the following FRLS PVC conduits including all accessories concealed in False ceiling/walls/partitions as required including 5 sided 1.5mm thick M.S. junction boxes and 3mm thick Perspex sheet cover plate complete with 1.6 mm dia. G.I. pull wires in the length of conduit. BEC make				
10.10a	25 mm dia conduit (1.6 mm wall thickness)	250	Rm		
10.10b	32 mm dia conduit (2.0 mm wall thickness)	150	Rm		
	TOTAL OF ITEM 10 :				

ITEM.N O	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
11	ACCESS CONTROL SYSTEM				
11.1	Supply, installation, testing and commissioning in position the following FRLS PVC conduits including all accessories concealed in F. ceiling/wall/floor as required including 1.6 mm thick FRLS PVC junction or pull boxes with 3mm thick Perspex sheet cover plate complete with 1.6 mm dia. G.I. pull wires in the length of conduit. BEC make				
11.1.1	25 mm dia conduit (1.6 mm wall thickness)	220	Rm		
11.1.2	32 mm dia conduit (2.0mm wall thickness)	150	Rm		
11.2	Supply, installation, testing and commissioning of FRLS multi core shielded flexible PVC insulated copper conductor wires in existing FRLS PVC conduit complete with cable terminations Excel Make				
11.2.1	8 core - 18 AWG Controller to Card Reader	600	Rm		
11.2.2	4 core - 18 AWG Controller to E.M. Lock, contact, sensor, exit push button, Buzzer etc.	300	Rm		
	TOTAL OF ITEM 11				

ITEM.N O	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
12	NETWORKIG Make AMPS / D- Link				
<u>12.1</u>	<u>A: Horizontal Cabling (For Data)</u>				
12.1.1	Supply, installation, testing and commissioning GS8E CAT6 Modular Patch Cords,7Ft, BLUE - for Data -User end,	58	Each		
12.1.2	Supply, installation, testing and commissioning CAT 6 MGS400 I/O for Data Points (for user end) blue Colour	58	Each		
12.1.3	Supply, installation, testing and commissioning 2 Port Face Plate Shuttered (85*85mm), white color	60	Each		
12.1.4	Supply, installation, testing and commissioning Giga SPEED® XL 3071 ETL Verified Category 6 U/UTP Cable, low smoke zero halogen white jacket,4 pair count,1000ft (305m) length, WE TOTE® box for DATA	11	Box/305mtr		
12.1.5	Supply, installation, testing and commissioning M2000 U/UTP Modular Panel 1U, 24 port angled Data	3	Each		
12.1.6	Supply, installation, testing and commissioning CAT 6 MGS400 I/O for Data Points (for rack end) BLUE Colour	72	Each		
12.1.7	Supply, installation, testing and commissioning GS8E CAT6 Modular	58	Each		

	Patch Cords,7Ft, BLUE - for Data -Rack end				
12.2	<u>Horizontal Cabling (For Voice)</u>				
12.2.1	Supply, installation, testing and commissioning CAT 6 MGS400 I/O for Voice Points (for user end) Yellow Colour	50	Each		
12.2.2	Supply, installation, testing and commissioning Giga SPEED® XL 3071 ETL Verified Category 6 U/UTP Cable, low smoke zero halogen white jacket,4 pair count,1000ft (305m) length, WE TOTE® box for VOICE	10	Box/305mtr		
12.2.3	Supply, installation, testing and commissioning M2000 U/UTP Modular Panel 1U, 24 port angled voice	2	Each		
12.2.4	Supply, installation, testing and commissioning CAT 6 MGS400 I/O for Voice Points (for rack end) Yellow Colour	48	Each		
12.2.5	Supply, installation, testing and commissioning GS8E CAT6 Modular Patch Cords,7Ft, Yellow - for Voice - Rack end	42	Each		
12.3	Voice Resources				
12.3.1	Supply, installation, testing and commissioning 25 Pair Indoor riser cable	25	Mtr		

12.3.2	Supply, installation, testing and commissioning M2000 U/UTP Modular Panel 1U, 24 port angled for voice resources	2	Each		
12.3.3	Supply, installation, testing and commissioning CAT 6 MGS400 I/O for Voice Points (for rack end) Yellow Colour voice resources	48	Each		
12.3.4	Supply, installation, testing and commissioning 50 Pair Krone MDF (Field Riser cable)	1	Each		
12.3.5	Supply, installation, testing and commissioning 10 Pair Disconnection Module	5	Each		
12.3.6	Supply, installation, testing and commissioning Jumper Wire ,100Mtr Roll	2	Roll		
12.4	Network Rack & Accessories				
12.4.1	Supply, installation, testing and commissioning OPEN RACK/Aluminium-M6 Tapped/2Post/45U/Powder Coated/19"DIN/Black Make- Netrack / APW	1	Each		
12.4.2	Supply, installation, testing and commissioning High Density Vertical Cable Organiser/6 inch/Front & Back/45U/Black	2	Each		
12.4.3	Supply, installation, testing and commissioning Run-Way Kit-20Inch	1	Each		

12.4.4	Supply, installation, testing and commissioning Mounting Hardware/OR/Pk-20	2	Each		
12.4.5	Supply, installation, testing and commissioning 1Ph, 230V, 16A, 2U standard rack mount power distribution unit with 6 X Indian Round Pin 5/15A, Inlet Plug type 16A Indian Round Pin with 3-meter input cable	2	Each		
12.5	Testing and commissioning				
12.5.1	Cable, Penda scanning Identification, Ferruling with Cylindrical ferrule both ends, Certification of Copper ports (as per OEM guidelines) and commissioning Copper Consumables items Ferrule Tube for UTP cables, Bubble Wrap rounds for securing cables, Rack Name Plates, Cable Ties, Velcro Tie etc	100	Point		
	TOTAL OF ITEM - 12				
ITEM.NO	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
13	FIRE FIGHTING				
13.1	Supply, installation, testing and commissioning weather proof outdoor/indoor type hose cabinet made of not less than 1.5 mm CRCA MS sheet having glazed door, locking arrangement, painted with two coats of enamel paint over a coat of primer and of size suitable to accommodate yard	2	NO		

	hydrant, two nos. 15 m lengths of 63 mm dia RRL hose pipe and branch pipe.				
13.2	Supply, installation, testing and commissioning impact, abrasion and weathering resistant rubberised fabric lined (RRL) hose pipe conforming to IS: 636-1979 (Type - B) of 63 mm dia and 15 m length with gun metal instantaneous male and female couplings conforming to IS: 903-1975. note: new RRL pipe providing fixing according to the existing fittings,	3	NO		
13.3	Supply, installation, testing and commissioning SS branch pipe nozzle conforming to IS: 903, suitable for instantaneous connections to hose coupling etc. as required:	2	NO		
13.4	Supply, installation, testing and commissioning 15-20mm dia Adjustable gun metal shut off nozzle (size and fixing with existing first aid fire hose reel) conforming to IS:8090, make/model as approve by engineer incharge.	1	NO		
	FIRE EXTINGUISHERS				
	For common areas only				
	Note: All fire extinguishers shall be ISI marked				

13.5	Providing and fixing fully charged ABC powder type (MAP-90) portable fire extinguishers conforming to IS:15683, fixed to wall with brackets complete with initial charge. (Note: The cost for stand of fire extinguisher shall be included in this rate) (Secure Zone or Equilent)				
	a) Capacity 6 Kg. -	4	No		
13.6	Providing and fixing Co2 Gas type fire extinguishers conforming to IS:15683, Capacity 4.5 Kg. (Secure Zone or Equilent)	4	No		
13.7	Providing and fixing Clean Agent (FE 36) based like portable fire extinguishers fixed to wall with brackets complete (Note: The cost for stand of fire extinguisher shall be included in this rate) type of capacity 2 kg. For data room (Secure Zone or Equilent)	3	No		
13.8	<u>Providing and fixing fully charged ABC powder type Portable Fire Ball Extinguisher fixed to Electrical Pannell with brackets complete with initial charge. (Note: The cost for stand of fire extinguisher shall be included in this rate) Elide Fire Ball Extinguisher Cap-1.3 KG(Secure Zone or Equilent)</u>	2	no		
13.9	MISCELLANEOUS				

13.9.1	Functional checking/servicing existing hydrant (at 4th floor) including cleaning, Repairing, painting same as good existing colour. (Cost including one no door Repairing /painting) It is advised to, survey and assess the condition of existing fir shaft, fire door, hydrant etc. items before quoting the rates.	1	job		
	TOTAL OF ITEM - 13				
ITEM.N O	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
14	1 NO. 20 KVA UPS WITH 15 MINUTES BATTERY BACKUP				
	Design, manufacture, supply and installation, Testing & Commissioning of 1 No. 20 KVA UPS System (Input - three phase and Output Single phase)				
	The specifications are as under for each UPS:				
	PARAMETERS				
14.1	UPS Capacity				
	20 KVA/18 KW 3 Phase 50 C/S input and single-phase output				
14.2	Number of UPS				
	1 Number				
14.3	Battery Backup				
	15 Minute				

14.3a	Make of batteries				
	Rocket (Korea)/ Amar Raja (Quanta)/ Panasonic/Exide				
14.3b	Ampere hours of batteries.				
	Mention the battery AH, number of batteries and the no of banks. Minimum 13285 Vah with one string only.				
14.4	Input Supply				
	3 Phase 4 wire 415 volts 50 C/S neutral solidly earthed.				
14.5A	Input Voltage variations				
	340 volts to 460 volts				
14.5B	Current distortion				
	min < 5% THDI Max. (above 50% load) min < 10% THDI Max. (below 50% load)				
14.6	Input frequency bandwidth				
	+/-10% Selectable at site				
14.7	Input power factor				
	more than 0.9				
14.8	Out Put Supply				
	1 Phase 2 wire 230 volts 50 C/S neutral solidly earthed.				
14.9	Output Voltage Variations (Static)				
	Plus, minus 1 %				
	Output Voltage Variations (Dynamic)				

	Plus, minus 2 % in case of 0% to 100% or 100% to 0% step load change				
14.1	Technology				
	True on-line double conversion				
14.10. a	Rectifier				
	PWM based Rectifier Fourth Generation IGBT technology with Direct Digital Control by utilizing Digital Signal Processors and Application specified IC which give high power and fast switching, less drive power & small power losses, over current & over temperature protection, control power failure and short circuit protection etc.				
14.10. b	Inverter				
	Fourth Generation IGBT technology with Direct Digital Control by utilizing Digital Signal Processors and Application specified IC which give high power and fast switching, less drive power & small power losses, over current & over temperature protection, control power failure and short circuit protection etc.				
14.1	Static Bypass switch for transferring the load to the input source during clearing overloads that exceeds the capability of power electronics				

	Special Hybrid bypass transfer switch is used (Make before brake technology). Bypass Switch shall be 3pole Automatic to make it adaptable to all kind of earthing system (TN, TT & IT).				
14.1	Switching Speed				
	High Speed Switching which reduces heat dissipation & provides high efficiency				
14.1	Synchronous frequency range				
	+/-5% (Selectable)				
14.1	Type of Batteries using				
	Sealed Maintenance Free lead acid batteries (AGM or GEL -please specify) with 10 years float life.				
14.2	Duty condition				
	UPS will continuously operate at 40 degree C without any derating				
14.2	Output load unbalancing capability				
	100% unbalanced non-linear load				
14.2	Input frequency variation: '+/-10%				
14.2	Power walk in (time required for UPS to take rated load at the time of starting)				
	1 Sec. through 30 Seconds (every 1 Second selectable (0-100% rated loads) Default setting 20 seconds.				

14.2	Step load change: 100% step load change				
14.2	Overload Capacity: Mention % of load for 30 min, 10 min, 5 min and 1 minute.				
14.2	Crest factor: minimum 3:1				
14.2	Isolation Transformer: Transformer less UPS				
14.2	Output distortion (Linear Load)				
	Mention Total Harmonic Distortion (THD)% between Phase to Phase and Phase to Neutral for 100% linear load				
14.2	Output distortion (Non-Linear Load), defined as per standard ENV 50091-3				
	Mention Total Harmonic Distortion (THD)% between Phase to Phase and Phase to Neutral for 100% Non-linear load				
14.3	Noise level: 55 to 60 db at 1 meter				
14.3	Special features				
	LCD display and LED based Mimic display 1. The 7segment display Panel located on the front panel of the UPS to offer the user real time fault diagnostic data. 2. LED based Mimic panel independent from LCD display to indicate the operation status of the UPS system 3. Voltage major loop & current minor				

	loop to provide instantaneous wave shaping				
14.3	Manufacturer & Model: to be mentioned				
14.3	Output Power Factor: 0.8 Inductive to 0.9 Capacitive without reducing the Active Power				
14.3	Soft Start Capacity: Required				
14.3	Pure Sinewave output with no break output: Required				
14.3	Frequency slew rate (rate of change of frequency during synchronization)				
	Selectable up to 2Hz/Sec in the steps of 0.5Hz/Sec				
14.3	Phase sequence reversal detection and protection				
	UPS should detect the Phase sequence of Input & Bypass supply and protect the internal circuitry as well as provide alarm in the LCD display during phase sequence reversal.				
14.3	Frequency output				
	50 Hz constant, irrespective of the Input frequency.				
14.3	Frequency correction: Required				
14.4	Incoming & Outgoing Terminals				

	Suitable for connecting separate Bypass Panel Cable Connections in addition to normal AC Input cable connections				
14.4	Connection to static bypass: provision required from raw power				
14.4	Automatic Save and Shutdown of PC's: Required				
14.4	Output to be minimum rated capacity, irrespective of load power factor leading or lagging.				
	between 0.9 leading and 0.8 lagging, there shall be no deration.				
14.8a	20 KVA UPS: 18 KW				
14.4	All cabling between UPS and Battery cabinet: To be included in rates.				
14.4	UPS Ambient temperature: 40 degree C				
14.4	2 Years Warranty with UPS and 2 years with Batteries: To be included in rates				
14.4	Protection level: I.P. 20				
14.4	Colour: to be mentioned				

14.4	Overload: During the starting of loads, the UPS should not pass to overload. The UPS will be designed at 105% in order to pass the transitory starting of the loads.				
14.5	Output Power Quality: In order to achieve <5% Voltage THD at load end while considering big length of electrical distribution cables, the output Voltage THD of the UPS will be less than 3% at all conditions				
14.5	Battery Protection: The DC protection shall be ensured by a circuit breaker with under voltage trip coil to isolate the Battery Bank from UPS during fault at the either side of the DC bus. It shall provide protection against deep discharge of the batteries by automatically disconnecting battery bank from UPS after low battery shutdown. It shall also isolate the battery bank from UPS during activation of EPO command.				
14.5	Charger Capacity: Should be min 10% of C20 rating of battery				
14.5	Display: Separate Mimic panel & LCD display				
14.5	Battery Circuit Breaker: It should be provided in a separate enclosure and separate with each individual battery banks.				

14.5	IR Test to be conducted for all the batteries before and after commissioning.: to be done				
	including above specifications	1	set		
	TOTAL OF ITEM 14:				
ITEM.N O	DESCRIPTION	Qty.	UNIT	RATE	AMOUNT
15.0	SCREEN 55"				
15.1	Providing, fixing, testing, commissioning, in position in located in drawing Frame screen TV 55" item inclusive- 100% Colour Volume (Quantum Dot), Dual LED, Quantum Processor 4K, Quantum HDR, HDR 10+, Art Mode, Smart TV (Tizen OS), Adaptive Sound+, Active Voice Amplifier, Ambient Mode+, OTS Lite, Free sync Premium Pro; 40W (4.0Ch) Sound output, Smart Box: with 5 mtr optical ethernet, Bluetooth, HDMI x 4, USB x 2 *TV license required* rate including with all consumable item complete in all respect. MODEL NO-QA55LS03A or Equilent make	5	No		
	TOTAL ITEM NO - 15				

BILL OF QUANTITY – PART C

HVAC

ITEM NO	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
Item 1 VRF/VRV AC SYSTEM					
1.0	SITC (Supply, Installation, testing and Commissioning) of Variable Refrigerant volume /Flow modular type air-conditioning system (Cooling and heating) complete with indoor and outdoor units. Suitable for individual remote controller and centralized controller. Full charge of refrigerant gas, as per detail given in specifications and having following items. Refrigerant to be used shall be- R 410 A only. Rate quoted to including lead, lift, scaffolding etc. Complete. Daikin, Mitsubishi, Carrier				
1.1	OUTDOOR UNITS:				
	Modular type outdoor units equipped with highly efficient scroll fully inverter type compressors, single module, heat exchanger, low noise condenser fan, vibration isolator, auto check function for connection error, Y joints, auto address setting of capacity as mentioned below. The quoted capacity of the outdoor units should				

	<p>be actual at ambient conditions. COP of VRV/ VRF ODU shall be minimum 3.2 and EER is 11 for each selected module in cooling mode. VRV / VRF System shall not trip up to 50 °C ambient temperature. All interconnecting piping, Y-joints and U bends within the condensing unit shall be painted with special coating to protect against severe atmosphere conditions (like Polluted area) of clear transparent polymer coating. The unit shall be suitable to work on 400V +/- 10%, 3 Phase, 50Hz AC power supply. Complete in all respect, with test certificate. As per drawings.</p> <p>Each outdoor unit shall be provided with suitable amps. 400/440 Volts AC supply MCCB 25 KA in waterproof box as incomer and suitable capacity of MCCB & internal wiring in the outdoor unit.</p> <p>The unit shall be provided with its own microprocessor control panel with provision for integration with the building management system for Airconditioning system.</p> <p>There are three circuits, two independent circuits, third TFA Circuit. Each connected to heat pump below.</p>				
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	Outdoor units consisting of more than 1 module (e.g. 18 HP = 10 HP + 8 HP), each should have one separate inverter driven compressors.				
	18.0 HP HEAT PUMP (total hp=55), each consisting of more than 1 module.	3	no		
1.2	INDOOR UNIT				
	Supply, installation, testing and commissioning of mentioned capacity VRF/VRV Cassette type indoor unit complete with DX evaporator coil, fan and fan motor, synthetic washable media pre-filter, , fan; electronic expansion valve ; suitable for operation on single phase 230 V \pm 10%, 50Hz AC supply, complete, as required. ; section with low noise fan/dynamically balanced blower, multispeed motor; The unit shall have automatic force shut down provision in case of fire on receiving signal from BMS System. The cooling capacity of indoor unit will be at air inlet conditions of 27 Degree C DB and 19 Degree C WB temperature. powder coated galvanised steel housing, control panel with cordless remote control, cabling, power cabling, vibration isolation, necessary galvanized steel supports.				

	Unit shall have external attractive decorative panel, drain pump and fresh air intake provision. Complete as per specifications and drawings. Units with drain pump, fresh air provision. Make – Daikin, Mitsubishi, Carrier				
	Note- For big area with multiple IDU required single remote control or as per site requirement.				
	Ceiling Mounted Cassette Units (4-Way)				
1.2a	0.8 TR Cassette unit	3	No		
1.2b	1.3 TR Cassette unit	9	No		
1.2c	1.0 TR Cassette unit	7	No		
1.2d	1.5 TR Cassette unit	2	No		
1.2e	2.0 TR Cassette unit	1	No		
1.3	Hi-wall type indoor				
	Supply, installation, testing and commissioning of mentioned capacity VRF/VRV Hi-wall type indoor unit complete with DX evaporator coil, fan and fan motor, filter, powder coated galvanised steel housing, control panel with cordless remote control, cabling, power cabling, vibration isolation, necessary galvanized steel supports Unit shall have external attractive decorative panel, drain pump and fresh air intake provision.				

	Suitable for operation on 230 V \pm 10%, 50 Hz, single phase AC supply, complete as required. The unit shall have automatic force shut down provision in case of fire on receiving signal from BMS System. The cooling capacity of indoor unit will be at air inlet conditions of 27 Degree C DB and 19 Degree C WB temperature. Complete as per specifications and drawings. Make – Daikin, Mitsubishi, Carrier				
1.3.a	1.0 TR HI-Wall unit with drain pump	2	NO		
1.4	VRV/VRF TFA INDOOR UNITS:				
	Supply, installation, testing and commissioning of mentioned capacity VRF/VRV Ductable TFA type indoor air conditioners complete evaporator with coil, fan and fan motor, fresh air inlet/outlet control panel with cordless remote control, cabling, power cabling, vibration isolation, necessary galvanized steel supports etc. The unit shall have automatic force shut down provision in case of fire on receiving signal from BMS System. As per specifications and drawings. Make – Daikin, Mitsubishi, Carrier.				
1.4.a	4.0 TR 635 CFM TFA unit	4	NO		
1.4.b	Y-JOINTS:				

	Supply Installation, testing, commissioning of supply & return Y-joints sets of required size for refrigerant piping as per manufacturer standards.				
	Y- Joints set	23	SET		
1.5	CLEAN AIR FILTER				
1.5.a	supply PM 2.5 clean air filter with fixing arrangement chamber for round flow cassette IDU's filter efficiency 99% and pressure drop not more than 75%	22	NO		
1.6	VRV/VRF CENTRAL CONTROLLER				
1.6a	Supply, Installation, Testing & Commissioning of Central Controller of digital type of latest generation suitable for all VRV /VRF equipment's / AHU to Operate, Monitor, Scheduling Programme, On / Off, Temperature Setting etc. complete as per specification as required to operate all the indoor units.	1	NO		
	TOTAL ITEM NO- 1				
ITEM NO	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
2	Item no. 2. REFRIGERANT PIPING				
	Supply Installation, testing, commissioning and Interconnecting refrigerant copper pipe work including vaccumiazation and Nitrogen testing				

	<p>of following nominal sizes of soft/hard drawn copper refrigerant piping for VRV/VRF system (between indoor & outdoor units) complete with fittings, with suitable adjustable ring type hanger supports, jointing/brazing including accessories, insulated with XPLE Class-O tubular insulation/with Class-O closed cell elastometric nitrile rubber tubular sleeves sections of specified thickness as given below for Suction and Liquid lines, All piping inside the room shall be properly supported with MS slotted angle, including cutting chases, holes in walls/slabs and making them good. All external piping shall run in covered cable tray (item for cable tray shall be quote separately). All exposed pipe shall have UV coating on insulation and pressure testing 450 psi all accessories as per specifications etc. as required</p>				
	<p>NOTE: -</p> <p>1)The Copper Piping & Piping Circuit should be with Minimum Number of joints, which shall be attained by:</p>				
	Using One End Expanded Tubes				
	Bending the tubes instead of using elbow joints wherever 90-degree bending is required.				

	Piping should be routed at site in such a manner, that brazed joints in the refrigeration piping are kept to a minimum.				
	The makes of tube fittings shall be same as that of tubes.				
	The thickness of fittings used shall be same as that of the pipe.				
	Indoor & Outdoor Unit Location has been shown on the drawing. Sizes of refrigerant piping will vary from manufacturer to manufacturer. AC contractor has to estimate the length & sizes as per their equipment's.				
2.1	6.4 mm dia (OD) (Soft drawn) with tube wall thickness 1.2 mm with 19 mm thick insulation	190	R.MT		
2.2	9.5 mm dia (OD) (Soft drawn) with tube wall thickness 1.2 mm with 19 mm thick insulation	70	R.MT		
2.3	12.7 mm dia (OD) (Soft drawn) with tube wall thickness 1.2 mm with 19 mm thick insulation	210	R.MT		
2.4	15.9 mm dia (OD) (Soft drawn) with tube wall thickness 1.2 mm with 19 mm thick insulation	90	R.MT		
2.5	19.1 mm dia (OD) (Hard drawn) with tube wall thickness 1.2 mm with 19 mm thick insulation	45	R.MT		
2.6	22.2 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm with 19 mm thick insulation	55	R.MT		

2.7	25.4 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm with 19 mm thick insulation	10	R.MT		
2.8	28.58 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm with 19 mm thick insulation	50	R.MT		
2.9	34.9 mm dia (OD) (Hard drawn) with tube wall thickness 1.62 mm with 19 mm thick insulation	5	R.MT		
2.10	41.27 mm dia (OD) (Hard drawn) with tube wall thickness 1.62 mm with 19 mm thick insulation	10	R.MT		
	TOTAL ITEM NO-2				
ITEM NO	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Item 3, Drain, Lamp, Split AC, Stand.				
3.0	DRAIN PIPING:				
	Providing & fixing of insulated uPVC drain lines heavy duty with Nitrile rubber insulation for various units in clamping manner above false ceiling & in concealed manner below false ceiling level. From the structural ceiling it should hanged using self-threaded rods or shall be fixed on wall /beam etc. with clamps & the distance between 2 clamps shall be less than 1 meter. It shall not be placed over the false ceiling nor it shall be fixed with false ceiling members. It shall be laid required gradient for easy disposal of the drain water & testing shall be				

	done before filling the zaries. The drain line shall not be laid in the floor (except toilets & other utility areas where there are no electrical lines in the floor). All drain pipes of split / Cassette air-conditioners should be uPVC of suitable size as recommended by manufacturing company and it should be connected to the nearest rain water pipeline/ as per the site condition. make -Supreme/Astral/Finolex				
3.1	32 mm dia heavy duty density 10 KG/sq.cm (Insulation Thickness - 6 mm)	200	R.MT		
3.2	40 mm dia heavy duty density 10 KG/sq.cm (Insulation Thickness - 6 mm)	70	R.MT		
3.3	UVGI LAMP				
	Providing and fixing of UV Lamps specially designed to be used in low temperature applications and shall provide a rated average life of 16,000 hours. The reflector shall be built from an high UV reflective aluminium material capable of withstanding air velocities of up to 2000 ft/min without excessive noise, wobble, or vibration.	9	Nos		
3 . 4	AIRCOOLED SPLIT AC SYSTEM				
	Supply, installing, testing and commissioning of inverter type Split Cooling units as per specifications and complete as required. Outdoor units shall be with rotary/scroll				

	compressor air-cooled condenser coil with fan, casing, MS-stand, cabling and earthing as required. Indoor units shall consist of centrifugal fan with motor, dx-cooling coil of copper tubes and aluminium fins, casing, filter, full charge of gas and oil, control wiring, interconnecting refrigerant piping between indoor and outdoor unit, cooling thermostat control wiring. The units shall be suitable for 230V±6%,50 Hz supply. Make - Daikin, Mitsubishi, Carrier				
	Note: Aluminium Fins and copper tubes of Air-Cooled Condenser along with copper tubing / piping with all joints and U-Bends exposed to coastal areas corrosive atmosphere / aggressive ambient, shall be painted with special corrosion prevention coating either in factory or at site.				
3.4.a	1.0 TR Hi-wall Unit	2	NOS		
3.5	MS STAND				
	Providing & fixing of M.S. Stand for cassette air-conditioner outdoor Condensing unit. It shall be made channels 75x40x4.8 mm or appropriate size & thickness duly painted with anti-corrosive paint. (two or more coat red oxide primer and two coat black color enamel paint) The entire item has to be executed as / req. of the machine & site conditions.	150	Kg		
3.6	CONTROL CABLE:				

	Supplying and fixing control cum transmission wiring of armored FRLS PVC insulated copper conductor cable between indoor and outdoor unit according to the drawing following sizes including cutting chases, holes in walls/slabs and making them good etc.				
	2 x 1.5 sq. mm	320	R.mt		
	TOTAL ITEM NO-3				
ITEM NO	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Part 4, Air distribution				
4.0	SHEET METAL DUCT				
4.1	Supply, installation, balancing and commissioning of fabricated at site GSS sheet metal rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports etc. as per approved drawings and specifications of following sheet thickness complete as required				
4.1.a	Thickness 0.63 mm sheet (24 G)	70	Sq.mt		
4.1.b	Thickness 0.80 mm sheet (22 G)	30	Sq.mt		
4.2	DUCT DAMPER				
	Supplying, fixing. testing commissioning of GI volume control duct damper complete with neoprene rubber gaskets, nuts, bolts, screws linkages, flanges etc., in accordance with approved shop drawings and specifications complete as required.	3	Sq.Mt		
4.3	Grills				

	Supplying & fixing of powder coated extruded aluminium Supply Air Grills with aluminium volume control dampers as per specifications.	2	Sq. Mt		
4.4	AIR DIFFUSERS				
	Supplying, fixing testing commissioning of supply air diffusers of powder coated aluminium with aluminium volume control dampers with anti-smudge ring & removable core.	3	Sq. Mt		
4.5	THERMAL INSULATION				
	Supply, installation, testing & commissioning of thermal insulated 25 mm thickness flexible duct of following sizes duly supported at regular interval as per site requirement etc. complete as required as per specifications.				
4.5.a	150 mm dia.	160	R.mt		
4.6	ACOUSTIC LINING				
	Supply and fixing of Acoustic lining of supply air duct and plenum with 25 mm thick resin bonded glass wool having density of 32 kg/m ³ , with 25 mm X 25 mm GI section of 1.25 mm thick, at 600 mm center to center covered with Reinforced Plastic tissue paper and 0.5 mm thick perforated aluminum sheet fixed to inside surface of ducts with cadmium plated nuts, bolts, stick pins, CPRX compound etc. complete as required and as per specifications.	5	Sq. Mt		

4.7	EXTERNAL THERMAL INSULATION				
	Supplying, installation, testing & commissioning of external thermal insulation on ducts with Closed Cell Cross Linked Polyethylene Foam of density 33 + 3Kg/m ³ Thermal Conductivity not exceeding 0.031 W/m°K at mean Temperature 0°C, complete as per specification.				
	19 mm thick	90	Sqm		
4.8	LOUVERS				
	Supplying, installing and testing of extruded aluminium Air louvers with bird screen in accordance with approved shop drawings and specifications complete as required	3	Sqm		
4.9	INLINE FANS				
	Supply, Installation, Testing and commissioning of Fresh/exhaust air fan suitable for Inline mounting comprising of forward curved centrifugal blower complete with induction motor, all compete as required. Motor shall be suitable for single phase, 230 volts, 50Hz AC. supply as per specifications of following capacities.				
4.9.a	100 CFM Capacity with 10 mm Static Pressure	1	No		
4.9.b	400 CFM Capacity with 10 mm Static Pressure	1	No		
	TOTAL Item 4:				

BILL OF QUANTITY – PART D**SUMMARY (A+B+C)**

S. N	DESCRIPTION	UNIT	AMOUNT
PART-A (INTERIOR FURNISHING)			
1	Dismantling Work	Rupees	
2	Flooring.	Rupees	
3	Brick Work/Plaster & Concrete Work	Rupees	
4	Pvc spout	Rupees	
5	(uPvc) Outer Profile Windows	Rupees	
6	Partitions And Doors	Rupees	
7	Panelling	Rupees	
8	Paint& P.O.P.	Rupees	
9	False Ceiling	Rupees	
10	Plumbing Works	Rupees	
11	Sanitary Work	Rupees	
12	Tables And Counters	Rupees	
13	Storage Cupboards Unit:	Rupees	
14	Sofa	Rupees	
15	Chairs:	Rupees	
16	Miscellaneous	Rupees	
17	Less Salvage Value	Rupees	(4,50,000)
PART-B (ELECTRICAL)			
1	Sub Distribution Panels	Rupees	

2	Distribution Boards	Rupees	
3	Raceways And Cable Trays	Rupees	
4	Cables, Mains & Sub Mains	Rupees	
5	Earthing	Rupees	
6	Point Wiring	Rupees	
7	Conduiting For Telephone, Computer & Conduiting and Wiring for T.V. System.	Rupees	
8A	Supply Of Lighting/ Fixtures	Rupees	
8B	Installation/Fixing of Lighting Fixtures	Rupees	
9	Addressable Fire Alarm and Pa System (9.1+9.2)	Rupees	
10	Cc Tv	Rupees	
11	Access Control System	Rupees	
12	Networking	Rupees	
12	Fire Fighting System	Rupees	
14	1 No. 20 Kva Ups With 15 Minutes Battery Backup	Rupees	
15	Screen	Rupees	
PART-C (HVAC)			
1	VRF/VRV AC SYSTEM	Rupees	
2	Refringent Piping	Rupees	
3	Drain, Lamp, Split AC, Stand	Rupees	
4	Air distribution	Rupees	
	GRAND TOTAL PART-A+B+C	Rupees	

	ADD GST	Rupees	
	TOTAL(PART-A+B+C) AFTER GST	Rupees	
Amount Words:			

Signature of the Tenderer/s

With the Seal of the Company

Date:

ANNEXURE – I

SCOPE OF WORK

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

INTERIOR FURNISHING:

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

i. ELECTRICAL:

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

ii. HEATING VENTILATION & AIR CONDITIONING (HVAC):

HVAC Work Including Outdoor Unit, Indoor Unit, Cassette Ac – (.8,1,1.3,1.5,2.0) Ton, Hi-Wall Type Indoor, TFA, Y-Joint, Clean Air Filter/Central Controller Refrigerant piping, UVGI Lamp, Air cooled Split Ac System, MS Stand, Control Cable, Air Distribution, Duct Damper, Grills, Air Diffusers, Thermal Insulation, Louvers, Inline Fans, etc.

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

