

ECGC LIMITED

(Formerly Export Credit Guarantee Corporation of India Ltd)



You focus on exports. We cover the risks.

**CIVIL, INTERIOR FURNISHING AND ALLIED ELECTRICAL WORKS
FOR AHMEDABAD EXPORTER BRANCH
AT THEIR NEW PREMISES
OFFICE NO. 401, HERITAGE,
NEAR GUJARAT VIDYAPITH, USMANPURA
ASHRAM ROAD, AHMEDABAD, GUJARAT, INDIA**

TENDER DOCUMENTS

CLIENT :
AHMEDABAD EXPORTER BRANCH
ECGC LIMITED
1ST FLOOR, NAGINDAS CHAMBERS
OPPOSIT AUDA OFFICE, USMANPURA,
ASHRAM ROAD, AHMEDABAD, GUJARAT, INDIA
Phone No. 079-27545446
website - www.ECGC.in



You focus on exports. We cover the risks.

ECGC LIMITED

(Formerly Export Credit Guarantee Corporation of India Ltd)

TENDER DOCUMENTS

SECTION 1.0- TECHNICAL BID (Envelope- A)

PROJECT NAME : CIVIL, INTERIOR FURNISHING AND ALLIED ELECTRICAL WORKS
FOR AHMEDABAD EXPORTER BRANCH
AT THEIR NEW PREMISES NO. 401, HERITAGE,
NEAR GUJARAT VIDYAPITH, USMANPURA
ASHRAM ROAD, AHMEDABAD, GUJARAT, INDIA

PROJECT DURATION : Six weeks.

PROJECT ESTIMATE : Rs. 47,18,200.00

(Say Rs. Forty Seven Lacs Eighteen Thousand Two Hundred Only)

REGISTERED OFFICE:

ECGC LIMITED
EXPRESS TOWERS
10TH FLOOR
NARIMAN POINT
MUMBAI – 400 021.
website - www.ECGC.in



(A Government of India Enterprise)

You focus on exports. We cover the risks.

**TENDER DOCUMENTS FOR
CIVIL, INTERIOR FURNISHING AND ALLIED ELECTRICAL WORKS
FOR AHMEDABAD EXPORTER BRANCH
AT. ECGC LIMITED OFFICE NO. 401
HERITAGE, NEAR GUJARAT VIDYAPITH, USMANPURA
ASHRAM ROAD, AHMEDABAD, GUJARAT, INDIA**

1. DATE OF ISSUE : 06-05-16
2. PLACE OF ISSUE OF TENDER : ARCHITECT OFFICE:
HRP INFRA CONSULTANTS PVT. LTD. F/4,
NAVRANG CENTRE, SWASTIK CROSS ROAD,
OFF C.G. ROAD, NAVRANGPURA,
AHMEDABAD-380009
3. LAST DATE OF RECEIPT OF TENDER : 19-05-16
4. PLACE OF RECEIPT OF TENDER : ECGC LIMITED
AHMEDABAD EXPORTER BRANCH
1ST FLOOR, NAGINDAS CHAMBERS
OPPOSIT AUDA OFFICE
USMANPURA, ASHRAM ROAD
AHMEDABAD, GUJARAT, INDIA
Phone No. 079-27545446
5. OPENING OF TECHNICAL BID : 20-05-16 AT 12 : 00 PM.
6. OPENING OF PRICE BID : ELIGIBLE TENDERERS SHALL BE INFORMED
SEPARATELY.
7. TIME OF COMPLETION : SIX WEEKS.
8. COST OF TENDER PAPERS : Rs. 1000 EACH.

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TENDER NOTICE

Dear Sirs,

**Sub: Civil, Interior Furnishing and Allied Electrical Works at. Office No. 401, Heritage,
Near Gujarat Vidyapith, Usmanpura, Ashram Road, Ahmedabad, Gujarat, India**

ECGC invites tenders, for the aforesaid work.

Tender copies will be available for free download from the website of ECGC

<http://www.ECGC.in> from 06-05-16.

Tender document downloaded from site be attached with tender fee of Rs. 1000/- by D.D. payable to ECGC , without the above fee, tender document is liable to be rejected. However Tender can also be received from, Architects, HRP Infra Consultants Pvt. Ltd. F/4, Navrang Centre, Swastik Cross Road, Off C.G. Road, Navrangpura, Ahmedabad-380009. on payment of Rs.1000/-, by D.D. [non refundable] during office timings, and on any working day from 06-05-16.

The tenders may be submitted in the following manner:

Envelope No. 1A (Tender Fee and EMD):

	Favoring	Amount Rs.	DD/ banker Cheque
Tender fee	ECGC LIMITED	1000/-	AHMEDABAD
EMD	ECGC LIMITED	40,000/-	AHMEDABAD

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

Envelope No. 1B (Technical Bid):

- Mandatory Information (strictly in the ECGC's prescribed Performa)
- Other supporting documents & credentials of the tenderer.

Must not contain any commercial information. Any Commercial discloser in the Envelop no. 1A and/or 1B will disqualify the tenderer without any further scrutiny.

3. The tenderer shall submit the completed tender documents duly signed in a separate envelope marked as "Commercial Bid- Envelope No. 2".

Envelope No. 2 (Commercial Bid):

- **Commercial Bid.**

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

Sealed tenders in the prescribed tender form, with the EMD, along with the Mandatory Information etc. and commercial bid (Envelope 1 and 2), should be addressed to BRANCH MANAGER, Ahmedabad Exporter Branch, ECGC Limited. 1st Floor, Nagindas Chambers, Opposite Auda Office, Usmanpura, Ashram Road Ahmedabad, Gujarat, India and super scribed. Civil, Interior Furnishing and Allied Electrical Works at. ECGC Limited Office No. 401, Heritage, Near Gujarat Vidyapith, Usmanpura, Ashram Road, Ahmedabad, Gujarat, India

ELIGIBILITY CRITERIA:-

1. Average financial turnover during the last 3 years, ending 31st March of the previous financial year, should be at least 40% of the estimated cost.
2. Experience of having successfully completed similar works during last 5 years ending last day of month previous to the one in which applications are invited should be either of the following:-
 - a. Three similar completed works costing not less than the amount equal to 40% of the estimated cost.
Or
 - b. Two similar completed works costing not less than the amount equal to 50% of the estimated cost.
Or
 - c. One similar completed work costing not less than the amount equal to 80% of the estimated cost.
3. Similar work means interior furnishing / renovation works of same nature /magnitude carried out for public sectors ECGCs, private sector ECGCs, public sector financial institutions, involving interior furnishing, electrification, Air conditioning , office automation.
4. Tenderer should have their office / branch office in Ahmedabad.
5. Tenderer whose main field of activity is contractor-ship can only apply.

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

Committee appointed by ECGC shall be doing due diligence for performance of contractor by using appropriate measurability tools, procedure and methods, that may include following :

1. Visit contractor works mentioned for the qualification by the contractor, and to take comprehensive view of contractor performance, site inspection or contacting appropriate contact persons for contractors performance or sourcing information found appropriate in this regard to documents submitted by contractor and work performance of contractor.
 2. Contractor capability appraisal by visiting his office and workshop.
- Tenders should be submitted to the office not later than 1700 Hrs. on 19-05-16.
 - Technical Bids will be opened at 12.00 PM on 20-05-16
 - ELIGIBLE TENDERERS SHALL BE INFORMED SEPARATELY for the Price Bids opening
 - Defect Liability and free maintenance period shall be twelve months from the date of virtual completion of the works.
 - Validity of offer shall be 120 days from the date of opening of the tender. The ECGC does not bind itself to accept the lowest or any tender and reserves to itself the right to accept or reject any or all tenders, either in whole or in part, without assigning any reason for doing so.

TENDER FORM

To,
Branch Manager,
ECGC Limited.
Ahmedabad Exporter Branch,
1st Floor, Nagindas Chambers,
Opposite Auda Office,
Usmanpura, Ashram Road,
Ahmedabad, Gujarat, India

Dear Sir,

Ref: **Civil, Interior Furnishing and Allied Electrical Works at Office No. 401, Heritage,
Near Gujarat Vidyapith, Usmanpura, Ashram Road, Ahmedabad, Gujarat, India**

Having examined the plans, specifications and schedule of quantities prepared by your Architect, HRP Infra Consultants Pvt. Ltd. and satisfying ourselves by visiting and inspecting the building as to the location of the site and working conditions, I/we hereby offer to execute the above works at the respective rates which I/we have quoted for the items in the Schedule of Quantities.

I/We herewith deposit Rs.40,000 (Forty Thousand Only) by Demand Draft or Banker's Cheque drawn in favor of ECGC LIMITED. as Earnest Money Deposit for the execution of the works at my/our tendered rates together with any variations should the work be awarded to me / us.

In the event of this tender being accepted, I/we agree to enter into and execute the necessary contract required by you. I/We do hereby bind myself/ourselves to forfeit the aforesaid deposit of Rs.40,000 (Forty Thousand Only) in the event of our refusal or delay in signing the Contract Agreement. I/we further agree to execute and complete the work within the time frame stipulated in the tender documents. I/we agree not to employ Sub-Contractors without the prior approval of the ECGC.

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

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

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

I/we enclose demand draft/Banker's Cheque for Rs. 40,000 (Forty Thousand Only) towards Earnest Money deposit (refundable) in envelope No. 1.

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

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

Yours truly,

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

Place:

Date

2, INSTRUCTIONS TO TENDERERS:

1. Location:

The site is located at. Office No. 401, Heritage, Near Gujarat Vidyapith, Usmanpura, Ashram Road, Ahmedabad, Gujarat, India.

- 1.1 Tenderers must get acquainted with the proposed work and study drawings, designs, specifications, conditions of contract and other conditions carefully before tendering. The Tenderer shall seek clarifications on any item, if required, prior to submitting his tender. No request of any change in rates or conditions for want of information on any particular point shall be entertained after receipt of the tenders.
- 1.2 The Tenderer is advised to inspect the site to ascertain the nature of site, access thereto, location, facilities for procurement of materials, labor rates and execution of the work. The Tenderer shall be deemed to have full knowledge of the site and drawings whether or not he actually inspects them.

2. Submission of Tender:

- 2.1 Tender must be submitted in original to the Branch Manager , Ahmedabad Exporter Branch, ECGC Limited. 1st Floor, Nagindas Chambers, Opposite Auda Office, Usmanpura, Ashram Road Ahmedabad, Gujarat, India and as per details given hereunder. The rates shall be filled in the Schedule given in, of the tender document. In case of any queries, the Tenderer may contact concern Architects.
- 2.2 The tender shall be submitted in three parts in separately sealed envelopes: The envelope containing the, tender offer shall be duly super scribed with the above title.
- 2.3 The Tenderer is requested to quote strictly as per the terms and conditions and specifications given in the tender document and not to stipulate any deviations. However, deviations, if unavoidable, should be indicated separately indicating the specific page number and clause number against which the deviations are made. Wherever specifications of certain works are not available they shall be deemed to be done as per relevant I.S code.
- 2.4 Addenda to this tender document, if issued, must be signed and submitted along with the tender document.
- 2.5 All pages to be initialed:
All signatures in tender documents shall be dated and stamped. All pages of tender documents shall be initialed at the lower right hand corner or signed wherever required in the tender papers by the Tenderer or by a person holding power of attorney authorizing him to sign on behalf of the Tenderer before submission of tender.
- 2.6 Rates to be in figures and words:
The Tenderer should quote in English both in figures as well as in words the rates and amounts tendered by him in the Schedule of Rates for each item and in such a way that interpolation is not possible. The amount for each item should be worked out and entered and requisite totals given of all items both in figures and in words. The tendered amount for the work shall be entered in the tender and duly signed by the Tenderer.
- 2.7 Corrections and Erasures
No corrections and alterations in the entries of tender papers shall be permitted. If any they shall be signed and dated in full by the Tenderer. Corrections with white fluid and overwriting are not permitted.
- 2.8 The tender shall contain the names, postal address of the residence and place of business of authorized person signing the tender and shall be signed in /his usual signature. Partnership firms shall furnish the full names of all Partners in the tender. It should be signed in the partnership name by all the partners or by duly authorized representative followed by the name and designation of the person signing. Tender by a Corporation shall be signed by an authorized representative, and a power of Attorney on their behalf shall accompany the tender. A copy of the partnership deed of the firm with names of all partners shall be furnished.
- 2.9 When a Tenderer signs a tender in a language other than English, the total amount tendered should, in addition, be written in the same language. The signatures should be attested by at least one witness.
- 2.10 Witness: Witnesses and sureties shall be persons of status and propriety and their names, occupation and address shall be stated below their signatures.

3. Information required along with tender:

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

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

5. Transfer of Tender Documents:

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

6. Earnest money:

- 6.1 The Tenderer shall pay the amount of Earnest Money as mentioned in the Notice Inviting Tender, by ECGC Demand Draft/Banker's Cheque payable to ECGC, at New Delhi. No interest on Earnest Money deposited by the Tenderer shall be allowed. The Tenderer should attach the Demand draft/ Banker's Cheque along with the tender failing which the tender will not be considered.
- 6.2 The Earnest Money of the unsuccessful Tenderers will be refunded within a reasonable period of time without any interest.
- 6.3 The Earnest Money deposited by the successful Tenderer shall be retained as part of Security Deposit.
- 6.4 The Security Deposit shall be forfeited if the Contractor fails to observe any terms and conditions of the Contract.

7. Validity:

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

8. Addenda:

- 8.1 Addenda to the tender document may be issued if required to clarify documents or to reflect modifications to the design or contract terms.
- 8.2 Each addendum issued by the Architect/Interior Designer will be distributed to each person or organization to whom a set of tender documents has been issued. Each recipient will submit the same along with his tender. All addenda issued by the Architect/Interior Designer shall become part of Tender Documents.

9. Right to accept or reject tender:

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

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

10. Rates:

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

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

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

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

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

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

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

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

14 Signing of the contract:

a) The successful Tenderer shall be required to execute an agreement in the proforma attached with this tender document within 30 days from the date of receipt of the notice of acceptance of tender. In the event of failure on the part of the successful Tenderer to sign the agreement within the above-stipulated period. The ECGC reserves the right to forfeit the earnest money/ security deposit and cancel the contract.

b) Until the Agreement is formally signed, the Work Order / Letter of Acceptance of Tender issued to the successful Tenderer and accepted by him shall be operative and binding on the ECGC and the Contractor.

15 On acceptance of the tender, the name of the accredited representatives of the Tenderer who would be responsible for taking instructions from the ECGC shall be mentioned by the Tenderer.

16 If so decided, the ECGC reserves the right to appoint PMC (Project Management Consultant) or any other agency to get the quality of works checked, measurements recorded, including certification of bills etc.

17 The ECGC reserves the right to reproduce partly or fully the items executed on site anywhere in the country premises and no copyright claims shall be made by any contractor of any description from the ECGC.

18 The ECGC has the right to delete items, reduce or increase the scope of work without the contractor claiming any compensation for the reduction in the scope of work.

19 Notices to local bodies:

The contractor shall comply with and give all notices required under any law, rule, regulations or bye laws of parliament, state legislature or local authority relating to works. the contractor shall before commencing the execution of work issue a certificate to the ECGC / architect / consultant that he has obtained all the permission registrations and give all the notices as are required to be obtained or give in under law . During work progress it is responsibility of contractor to attend to all persons, parties, agencies (government and non government organizations) that exists or may exist in similar work environment, to keep work going and to achieve work completion at his cost and expenses.

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

Tenderers.

Witness _____

Address _____

Date : _____

Signature of Tenderer

Address _____

Date: _____

Mandatory information required for Prequalification of the bidder

Basic Information

1. i) a) Name of the Applicant :
 - b) Address of the Regd Office :
 - c) Phone No :
 - d) Fax No :
 - e) E Mail address :
 - f) Cell No :
 - g) Web-site, if any :
 - ii) a) If main Office is o/s Ahmedabad:
Please furnish office address of
Office establishment in Ahmedabad
 - b) Contact Phone No :
 - c) Fax No. :
2. a) Year of establishment (enclose :
Documentary evidence):
 - b) No. of years of experience in the :
Relevant field (Minimum experience
Required is 5 years in relevant
Field)
3. Type of the Organization (Whether :
Proprietorship, Partnership, Private
Ltd, Co-operative body etc)
4. Name of the Proprietor/Partners/Directors of the
Applicant with addresses & Phone Numbers
 - a)
 - b)
 - c)

5. a) Details of Registration – Whether :
Partnership firm, Company, etc.

b) Name of Registering Authority,
Date & Registration Number

6. a) Details of Registration :

b) Registration No. & Date (copy :
of relevant document to be attached

7. Name & Address of banker :

8. Whether an assesses of Income Tax. If :
so, mention Permanent Account No.
(Enclose document evidence)

9. Please mention Service Tax Regis :
tration (Enclose Documentary
evidence)

10. Details of registration, if any, in the :
panel of Contractor For other
Organization/ Statutory bodies/Public
Sector ECGCs/CPWD/PWD etc

11. LST / TAN / SSI Reg. No. :

12. CST / VAT / PF Reg. No. :

**Contractor is requested to fill this information on their company letter head and enclosed separately.
Schedule (A)**

GENERAL CONSTRUCTION EXPERIENCE RECORD

SCHEDULE (A)

All individual firms are requested to complete the Information in the form with regard to the management of work contracts generally. The information supplied should be the annual turnover of the application in terms of the certified amounts billed to client for each year of work in progress or completed. The annual periods should be completed financial years

Annual turnover data (Interior furnishing work only)		
Year		
1	2010-11	
2	2011-12	
3	2012-13	
4	2013-14	
5	2014-15	

History of Litigation: **Schedule : D**

Bidder should provide information on any history of litigation or arbitration resulting from contracts in last five year or currently under execution.

Year	Award for / or Against Bidder.	Name of Client, cause of Litigation and matter of dispute.	Disputed amount in Rupees.

NOTE

If the information to be furnished in this schedule will not be given and come to the subsequently will result in disqualification of the bidder.

DRAFT AGREEMENT

This Agreement made at _____ day of _____ between The ECGE OF INDIA LTD (hereinafter 'The Employer') of the one part and

M/s _____

(whose registered office is situated at,

_____ hereinafter called 'The Contractor' of the other part).

Whereas the Employer is desirous of carrying out interior furnishing works on premises New Branch Office located in Office No. 401, Heritage, Near Gujarat Vidyapith, Usmanpura, Ashram Road, Ahmedabad, Gujarat, India and has been provided drawings, specifications and schedule of quantities describing works prepared by their Architect/Interior Designers HRP Infra Consultants Pvt. Ltd. F/4, Navrang Centre, Swastik Cross Road, Off C.G. Road, Navrangpura, Ahmedabad-380009

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

And whereas the contractor has been paid advance Rs.40,000/- as the Earnest Money. Total retention money shall be 10% of the total work done and is termed until the expire of the defects liability period for the due observance and performance of the contract.

Now it is agreed as follows :

1. In consideration of the said sum to be paid at the time and shall upon and subject to the said conditions, execute and complete the work shown in the said drawings and described in the said specifications.
2. The Employer shall pay the contractor the said or such sums as shall become payable hereunder at the time and in the manner specified in the said conditions.
3. The terms 'Architect/Interior Designer' in the said conditions shall mean HRP Infra Consultants Pvt. Ltd. F/4, Navrang Centre, Swastik Cross Road, OFF C.G. Road, Navrangpura, Ahmedabad-380009. Tender documents containing Special conditions of rates entered therein, shall be read and studied as forming part of this agreement.
4. The Employer through the Architect, reserve to himself the right of altering the drawings and nature of the work, of adding to or omitting any items of work or having portions of the same carried out without prejudices to this contract.
5. Time shall be considered as the essence of this agreement and the contractor hereby agrees to commence the work soon after the site is handed over to him as provided for in the said conditions and complete the entire work within 6 weeks from the date of commencement of work
6. This Agreement and Contract shall be deemed to have been made in Ahmedabad and any questions or disputes arising out of or is deemed to have arisen, in Ahmedabad and only the Court in Ahmedabad shall have jurisdiction to determine the same.

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

Signed by the said in the presence of:

WITNESS –1:

Name

Owner

Signature

Address

Signature

WITNESS –1:

Name

Contractor

Signature

Address

Signature

CONTRACT DATA

Important contract data is summarized as under;

1	NAME OF WORK	: Civil, Interior Furnishing and Allied Electrical Works at. ECGC Limited Office No. 401 Heritage, Near Gujarat Vidyapith, Usmanpura, Ashram Road, Ahmedabad, Gujarat, India.
2	SOURCE OF FUNDS	: ECGC LIMITED. New Delhi
3	TYPE OF WORK	: CIVIL, INTERIOR FURNISHING WORK
4	PROJECT IMPLEMENTATION PERIOD	: Six Weeks
5	DEFECT LIABILITY PERIOD	: Six Months after date of completion as per certificate issued by the ECGC /Architect (release of retention money as mentioned in "xxx")
6	COMMUNICATION FOR SITE	: ECGC, Ahmedabad Office
7	ISSUE OF BID DOCUMENTS	: 06/05/2016
9	PLACE OF ISSUE OF DOCUMENTS AND BID DOCUMENT FEES	: Rs. 1000.00 in form of Check/cash in favor of ECGC LIMITED, AHMEDABAD (non refundable)
10	EARNEST MONEY DEPOSIT	: Rs. 40,000.00 (Rupees Forty thousand only)
11	SECURITY DEPOSIT	: Equi. to 2.5% of contract value in Form of DD in favor of ECGC LIMITED, AHMEDABAD
12	FORM OF SECURITIES	: By Demand Draft Payable In favour of the ECGC LIMITED, AHMEDABAD
13	BID VALIDITY	: Ninety (90) days from due date for submission of bid. (From :
15	SUBMISSION OF BID	: 19/05/2016 at 5:00PM
16	OPENING OF THE TECHNICAL BIDS (DATE & TIME)	: 20/05/2016 at 12:00 PM
17	PLACE OF OPENING OF BIDS	: ECGC LIMITED. Ahmedabad office
18	VALUE OF RA BILL	: Not less then Rs.5 lacks
19	RETENTION MONEY /	: - 2.5% in form of ECGC Guarantee and Equi. To 5% of contract value will be deducted from each running bill including final bill
20	MARKET RATE PERCENTAGE ADDITION TO COVER OVERHEADS AND PROFIT IN CASE OF EXTRA ITEMS.	: 15 % PERCENTAGE.
21	AUTHORITY COMPETENT TO DECIDE IF ANY OTHER CAUSE OF DELAY BEYOND CONTRACTOR'S CONTROL.	: ECGC LIMITED. Ahmedabad
22	AUTHORITY FOR APPOINTING ARBITRATOR.	: ECGC LIMITED. Ahmedabad
23	PENALTY FOR DELAYED	: 0.05% of contract value per day but maximum up to 5% of contract value.
24	PERIOD OF MAINTENANCE AND GENERAL DEFECTS LIABILITY PERIOD	: Twelve months from the date of completion of the project.
25	FOR WATER PROOFING AND ANTI-TERMITE TREATMENT	: 5 years from the date of completion of the project.

26	DISMANTLED MATERIAL	:	All dismantled serviceable material is property of ECGC LIMITED. Ahmedabad Authority
28	LAST DATE OF RECEIPT OF BIDS	:	19/05/2016 at 5:00 PM on ECGC LIMITED office. Ahmedabad
29	OPENING OF TECHNICAL BID	:	ECGC LIMITED office. Ahmedabad at 20/05/2016 12:00 PM only technical bid.
30	ARCHITECT CUM CONSULTANT	:	HRP Infra Consultants Pvt. Ltd Ahmedabad

Sign of Contractor

Sign of Employer

2.1 GENERAL REQUIREMENTS:

- a) Equipment, devices and materials used should be as per Industry standards. Workmanship and installation of false floor, false ceiling, furniture, etc. should consider proper laying, fixing and testing all points across the Office. Co-ordination with other agencies for other sub systems installed in the Office is to be taken care of like Electrical, PAC, Security Systems, DG Sets, Split ACs etc.
- b) Care is to be taken considering maintenance of various systems and necessary provisions made at desired places for sub systems.
- c) Usage of materials as mentioned is to be strictly adhered to.
- d) Skilled manpower is to be deployed during project implementation under trained supervisor at site.
- e) Wherever possible efficient layout, necessary accessories and bends etc. should be used and work completed on time at all stages of the Project.

The response to RFP must include/ensure the following:

- 2.1.1 Detailed description of materials proposed in accordance with the requirement statement.
- 2.1.2 Compliance to all the Technical Specifications / makes / etc. spelt out in this RFP must be ensured.
- 2.1.3 Comprehensive Bill of Quantity with identification numbers, sizes, specifications and quantity for materials to be used must be provided.
- 2.1.4 Wherever required design/layout should be provided for each section.

Bidder should offer Warranty as required in the RFP.

- 2.1.5 Care is to be taken considering subsequent maintenance of various devices and systems and necessary provisions made at desired places.
- 2.1.6 Timely completion of the work including at each project stage is essential.
- 2.1.7 Bidder must provide write-up, pictures etc as documentary proof of quality work executed.
- 2.1.8 Any special skill, list of tools or other important information may be provided, which can explain qualitative expertise of the Bidder for this project.
- 2.1.9 The work is to be carried out as per Industry standard and specific needs of a Office.

2.2 BROAD DETAILS AND REQUIREMENTS:

Bidder shall carry out supply, installation, testing, commissioning of Civil, Interior Furnishing and Allied Electrical Works at. ECGC Limited Office No. 401 Heritage, Near Gujarat Vidyapith, Usmanpura, Ashram Road, Ahmedabad, Gujarat, India. Such work shall be executed as per the National and International standards, the best industry practices and Vendor's standard practice/documentation and recommendations.

Through this tender, it is envisaged to finalize a contract agreement on turnkey basis the Civil works including construction and furnishings, suitable and equipped for housing the office equipments at following locations:

**AHMEDABAD EXPORTER BRANCH
AT. ECGC LIMITED
OFFICE NO. 401, HERITAGE,
NEAR GUJARAT VIDYAPITH, USMANPURA
ASHRAM ROAD, AHMEDABAD, GUJARAT, INDIA**

This tender envisages the creation of entire Civil infrastructure to realize a state of the art facility to host office servers etc at the designated site. The basic Office layout is provided herewith. The proposed Office area is about **2000 sq. ft.** The work is to be executed carefully, ensuring that the other areas of premises and nearby services are not disturbed and maintain cleanliness all the time during project execution.

- 2.2.1 Bidder shall carry out the work including necessary co-ordination and consideration to many other systems to be installed for the Office:
- a) The Bidder should ensure that the work is carried out by using material from manufacturer of repute.
 - b) The Bidder and his OEM shall work in coordination to resolve the issues related to interoperability problem with any other equipment/solution during the implementation of the solution.
- 2.2.2 The Bidder should supply all necessary accessories required to install the various subsystems to commission and integrate the equipment/solutions for Office Setup.
- 2.2.3 The Bidder along with ECGC, Ahmedabad shall conduct the inspection & testing of all equipments / materials at the time of delivery and after implementation and commissioning.
- 2.2.4 The warranty shall be comprehensive in nature i.e. shall include components replacement/ repairing of material, equipments / solution, free of cost and all expenses incurred on the replacement /repairing/standby shall be borne by the Bidder.
- 2.2.5 The terms and the time period of the warranty should be as per the specifications given separately under the heading of "Warranty". The warranty on equipments would be original OEM warranty or 1 year whichever is longer.
- 2.2.6 The work is to be carried out by skilled manpower and materials required at the Office sites in Ahmedabad.
- 2.2.7 Bidder shall provide list of desired spares and ensure availability of service support at least for the next five (5) years within the country. Bidder to provide information and organization set up for the spares and service support offered by them wherever applicable.

- 2.2.8 Bidder shall provide spares and service support as mentioned under. Bidder to provide information and organization set up for the spares and service support offered by them.
- a. The Bidder shall agree to supply the spares for a period of three years after the date of Final Acceptance Certificate at the same or less price.
 - b. The Bidder or its OEM shall stock all necessary spare parts available with them for the replacement / rectification of problems and must be used so as to rectify the faults at Office sites within the time limit specified by ECGC.
- 2.2.9 The Bidder shall clearly describe what other technical services, assistance, training or support will be provided to ECGC and other participating entities to deploy the proposed solution.
- 2.2.10 The Bidder should have their Sales & Service arrangement to be able to provide Offsite / Onsite 24 X 7 hours support at Office sites at Ahmedabad respectively.

2.3 INSPECTION AND TESTS:

The inspection and tests shall be conducted at the installation premises at Office No. 401 Heritage, Near Gujarat Vidyapith, Usmanpura, Ashram Road, Ahmedabad, Gujarat, India.

- 2.3.1** The inspection and tests shall be conducted at the installation premises. The Bidder / OEM shall provide all necessary facilities and equipments including access to drawings and production data required to carry out such tests.
- 2.3.2** The Bidder shall provide inspection and testing procedures manual including QA Policy and Procedures for the equipment before the delivery. This inspection procedure should be provided to ECGC before the delivery of the equipment.
- 2.3.3** The Bidder shall provide the following things as minimum before the delivery of the Equipment.
- Identification of the equipment delivered
 - Bill of Quantity along with detailed specifications and quantity
 - All the documentation in hard/soft copy, required for the successful installation and commissioning of the equipment.
- 2.3.4** On site Test shall include testing of all equipments for the acceptance level of various parameters for system reliability, availability and maintainability. The Bidder shall broadly include/submit a comprehensive write up to cover the performance test as proposed to be conducted. The intent of the performance shall be to demonstrate that the proposed system performs all the functions as indicated in the Specification Sheets correctly and reliably and as per the requirement of ECGC.
- 2.3.5** The write up/ procedure for performance test shall be subjected to ECGC's approval. The availability tests shall include all reasonable exercises with which the combination of equipment and software can be expected to perform in actual usage.
- 2.3.6 Inspection Tests for Components:**
- a) Confirm on the components with the Packing list & Purchase Order.
 - b) Check for internal/ external damages.
 - c) Check for appropriate Power conditions.
 - d) Verify if the equipment and accessories are as per the list provided by the Bidder.
 - e) Demonstration of working conditions of Equipment's Functionality.

2.3.7 Inspection Tests for completely integrated system:

- a) Physical inspection
 - b) Verification of contents as provided by the Bidder in response to this RFP.
 - c) Verification of documentation as provided in softcopy and/or hardcopy format.
 - d) Demonstration of the proper functioning of all devices to be deployed as per the specifications.
- Tests shall be carried out as per applicable material standards and specifications.

2.3.8 Post Implementation

Integrated Test Plans should include the following as minimum:

- Should any inspected or tested equipment/solution fail to conform to the specifications, ECGC may reject it and the Bidder shall replace the rejected goods or make all alterations necessary to meet the requirements of specifications, free of cost to ECGC within one week.
- The Bidder shall also furnish the reference documents/standards etc. as referred in quality plans along with the quality plans.
- In case the equipment is assembled at the time of commissioning then these equipments shall be tested post implementation of the equipment/solution.

2.3.9 Service Level Requirements

- Warranty/AMC involves comprehensive maintenance and repairs of all items, equipments for the work executed, including free of cost replacement of parts, consumables if any, modules, sub-modules, assemblies, sub-assemblies, spares, parts, to make the system operational. Bidders to provide make and shades of colours used etc. Provide OEM warranty Guarantee cards etc.

2.3.10 MAINTENANCE:

- The material supplied shall have warranty of 1 year (or higher as per OEM policy) from the date of completion of installation, testing and commissioning of the systems.
- Warranty involves comprehensive maintenance and repairs of material for the installed material, including free of cost replacement of parts, consumables if any, modules, sub-modules, assemblies, sub-assemblies, spares, to make the system operational.

2.3.11 Manufacturer's Technical Data

- Manufacturer's performance data, certified factory drawings of apparatus giving full information as to capacity, dimensions, materials and all information pertinent to the adequacy of the submitted equipment shall be submitted for approval. Manufacturers' names, sizes, catalogue numbers and/or samples of all materials shall be submitted for approval.
- Submittals and drawings should, as far as possible be complementary so that drawings and submittals can be crosschecked.
- Requirements for Equipment submitted for approval must be accompanied by relevant drawings, technical data, catalogues and samples. Where data certified drawings or other required information is not available until after orders have been placed, Project-in-charge will give provisional approval until all requested drawings and information have been supplied to the PROJECT-IN-CHARGE and approved by him. It is Contractor's responsibility to ensure that all necessary information is supplied to the PROJECT-IN-CHARGE in accordance with the progress of the work.

2.3.12 Proprietary Materials

- Proprietary materials to be used in the works, shall, when brought to site be got inspected by the PROJECT-IN-CHARGE.

- Proprietary materials brought to site shall be stored as per recommendation of the manufacturer and as directed by the PROJECT-IN-CHARGE.
- The Contractor shall, on demand, produce to the PROJECT-IN-CHARGE any document / proof of purchase in respect of the supplies.
- The Contractor shall ensure that the materials are brought to site in original sealed containers/ packing bearing manufacturer's markings.

2.3.13 COMPLETION SCHEDULE:

The contract execution shall be on turnkey basis and timeline from the date of issuance of **Purchase/Work Order** or **Letter of Intent (LoI)**, whichever is earlier, will be as under:

Site	Supply	Installation & Commissioning	Handing over to ECGC
ECGC Limited Office No. 401 Heritage, Near Gujarat Vidyapith, Usmanpura, Ashram Road, Ahmedabad, Gujarat, India.	Within 15 days	Within Six weeks	After Six weeks

3. FUNCTIONAL AND TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATION

1. GENERAL DATA

GENERAL

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

DRAWINGS/DIMENSIONS

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

CO-ORDINATION OF DRAWINGS

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

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

B.I.S. CODES OF PRACTICE

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

SETTING OUT

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

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

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

2. P.O.P. PUNNING

GENERAL

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

PREPARATION OF SURFACE

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

PLASTER OF PARIS

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

APPLICATION

The material will be mixed with water to a workable consistency. Plaster of Paris shall be applied directly on the wall plasters in suitable sizes panels and finished to a smooth 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. HERITAGE SURFACE TEXTURES

General:

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

Heritage Granules Interiors

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

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

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

PREPARATION OF SURFACE

Ensure substrate is dry.

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

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

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

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

Procedure for making trough for application:

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

- f) Check for lumps in the mixture. If lumps found, mix thoroughly again.
- g) Allow the dough is ready is application.

Method of Application:

- a) Take the prepared dough little at a time and apply into the surface by at towel.
- b) Spread the material as thinly as possible (max. thickness 1.5mm) without any voids.
- c) Finish the coating by lightly pressing with the towel.
- d) At the end of the day, complete the job at a corner and as a straight line edge. This will ensure an even coating on continuation the next day.
- e) Ensure that the coated area is not tampered with or exposed to rain for a minimum of two days after completion of application. This is the minimum curing period required.
- f) Days after completion of application. This is the minimum curing period required.
- g) Pot life of prepared dough: Use up the dough within 4 hours after preparation. To extend pot life, cover the dough with wet cloth. Keep dough in shade when not in use.

Drying time of coating:

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

4. GLAZED/CERAMIC TILE DADO

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

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

b. CERAMIC TILES FLOORING

Ceramic tile paving in terrace and other areas where called for shall be or non-slip ceramic tiles as Approved by Architect. The tiles shall be of approved color, size and shape and shall be laid to the pattern approved by the Architect. The tiles shall be of uniform color, true to size and shape and free from tracks, twists, uneven edges, cracking and other defects. The tiles shall be generally of size 300 x 300 mm unless otherwise called for. The tiles shall be laid over a bed of 20mm thick cement mortar 1:3 (1 cement : 3 coarse sand) and leveled to at true surface. The surface of the bedding mortar shall be left rough to provide bond for the tiles. A floating coat of thick cement slurry shall be laid over the screed to proper levels and the tiles set over the same firmly to correct line and levels.

5. WALL FINISHES

EXTENT AND INTENT

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

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

GENERAL

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

PLASTER WORK

The primary requirements of the plaster work, shall be to provide an absolute water tight enclosures, dense, smooth, and hard and divided of cracks on the interior and exterior. The contractor shall do all that is necessary to ensure this result. All plastering shall be finished to true plane without imperfections and square with adjoining work and shall form 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 grooves are not called for the joints between concrete members and masonry, in-filling shall be covered by a layer of 24 gauge, 12mm size galvanized chicken wire mesh strips 400mm wide or as shown, installed before plastering.

CHASING

All chasing, installation of conduits, boxes etc. to be completed before any plastering or other wall finish is commenced on a surface. Chasing or cutting of plaster or other finish will not be permitted. Broken corners shall be cut back not less than 150mm on both sides and patched with plaster of Paris as directed. All corners shall be 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.

SAMPLES

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

PREPARATION OF SURFACE

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

INTERNAL PLASTER TO WALLS

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

MORTAR MIXING

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

APPLICATION

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

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

CHICKEN MESH ON WALLS

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

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

CURING

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

CEILING PLASTER

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

PREPARATION OF SURFACE

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

APPLICATION

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

CURING

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

GROOVES

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

6.0 METAL WORK

ALUMINUM DOORS, WINDOWS AND GLAZING

SHOP DRAWINGS

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

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

Metal thickness

Arrangement of components Jointing

Details of site connections

Fastening

Flashing

Metal finishes

Glazing

Weather stripping

Sub framing

Hardware (including preparation)

Sealant

Other pertinent information.

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

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

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

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

GLAZING: Glazing shall comprise of reflecting bronze or approved shade tinted or heat reflective float glass 6mm thick on outside and 8mm thick toughened float glass on inside, all glass panels shall be retained within aluminium framing by used of exterior grade Ethyl Propylene Di Methaline (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.

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

FITTINGS:

The contractor shall fix aluminum doors, windows etc. in prepared opening. Aluminum door frames, wherever possible, shall be fixed in place before erecting partitions. Where this is not possible, prepared opening shall be left for hold fasts. Breaking of partitions or walls for inserting hold fasts will not be permitted. Where the frames are to be fixed to column/wall faces they shall be fixed with rawl bolts/expansions bolts of approved make in approved manner. Special concrete blocks with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate 10 mm size) with 3mm thick M.S. plate 100 x 100mm shall be cast set at suitable places into the jambs of openings. Door and windows frames shall be welded to the blocks with spaces in approved manner.

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

plumb and level and for their satisfactory operation after the fixing is complete.

MANUFACTURER'S ATTENDANCE

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

MASTIC CEMENT

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

6. CARPENTRY AND JOINERY

EXTENT & INTENT

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

GENERAL

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

7. TIMBER

General: Specified variety of timber shall be used in the work. The timber shall be sawn in the direction of grains.

The sawing shall be truly straight and square.

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

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

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

The moisture contents in wood shall be as per the CPWD Specification 1977.

The testing of wood shall be carried out as per CPWD Specification 1977.

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

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

8. BLOCK BOARD

The Block board to be used shall be grade, i.e., exterior grade of commercial type (X-com) which shall have both faces of commercial plywood veneer. The Block board shall be solid core, phenol formaldehyde resin bonded of Approved make. The core shall be made of strips of wood each not exceeding 25 mm in width joined together.

Sandwiched and glued between two or more outer veneers with the direction of the grains of the core block running at right angle to that of adjacent veneers.

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

9. PARTICLE BOARD

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

10. PLYWOOD

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

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

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

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

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

11. FLUSH DOORS

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

12 ADHESIVES

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

13 NAILS, SPIKES, SCREWS & BOLTS

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

ROUGH CARPENTRY

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

WORKMANSHIP

All carpenter's work shall be done by skilled workmen using proper tools. All joints shall as far as possible, be mortised and tenoned and glued with best quality approved waterproof glue. Where mortise tenon joints are not possible, the joints shall be securely nailed with the longest nails that may be used without splitting the wood.

Whenever it is necessary or an adequate joints cannot be formed by nailing, the members shall be lapped or jointed by GI straps or extra wood blocks. All joints shall be done with neatness and as approved and directed by the Architect.

14. PARTITIONS AND CABINET WORK

General: Partitions, cabinets, etc. shall be fabricated and workshop as far as practicable and then brought inside the building ready to set in place. The various members shall be worked in the best manner known to the trade, mortised and tenoned, doweled, blocked and glued together so as to avoid the use of nails as far as possible. The details shall be closely followed, moulding clearly cut and miters accurately made. Free edge of shutters, Shelves, partitions, sides etc. shall be provided with first class teakwood edging, glued and nailed in approved manner.

Shelves, where shown fixed, shall be supported on aluminium or other cleats or in other manner as approved by the Architect. Adjustable shelves shall brass sockets and pins as detailed on drawings. Drawer bottoms shall be of 6 mm commercial ply, unless otherwise show. Drawer front, sides and back shall be first class teakwood. The drawers shall slide on wooden bearers as shown on drawings.

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

PRESERVATIVE TREATMENT

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

PAINTING AND POLISHING

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

PROTECTION OF WORK

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

15. GLASS AND GLAZING

EXTENT AND INTENT

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

GENERAL

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

GLASS SIZES

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

GLASS BREAKAGE

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

MATERIALS

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

PREPARATION OF FRAMES AND GLASS

Before installation the contractor shall ensure that:

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

INSTALLATION

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

COMPLETION

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

16. HARDWARE

EXTENT AND INTENT

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

GENERAL

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

SAMPLES

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

QUALITY

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

GUARANTEE

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

17. PAINTING

EXTENT AND INTENT

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

MATERIALS

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

COLOR

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

COMMENCEMENT OF WORK

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

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

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

18 . ENAMEL PAINT

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

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

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

19. PLASTIC EMULSION PAINT

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

OIL BOND DISTEMPER

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

OILING

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

20. SPIRIT POLISHING

Polish: Polishing material shall be prepared by dissolving pure shellac, varying in shade from pale orange to lemon yellow, free from direct and other materials, in methylated spirit at the rate of 0.15Kg. shellac to 1 liter of spirit. Suitable pigment to achieve the required shade of polish shall be added as directed by the Architect. Preparation of Surface: The surface cleaned of all dirt etc. shall be rubbed down smooth with sand paper and well dusted. Knots of visible shall be covered with a preparation of red lead and glue size laid on while hot. Holes and indentations shall be given a coat of wood filler made by mixing whiting (ground chalk) in methylated spirit at the rate of 1.5 kg. of whiting to one liter of spirit. The surface shall again be rubbed down perfectly smooth with fine sand paper and wiped clean.

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

21. WAX POLISHING

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

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

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

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

22. FIRE RESISTANT COATINGS ON WOOD WORK

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

Application:

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

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

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

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

SPECIAL NOTES

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

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

TECHNICAL SPECIFICATIONS FOR ELECTRICAL AND ELV WORKS:

Distribution Board

Scope:-

This scope shall cover supply, assembling, Grouting, installation, testing and commissioning of all type of company made MCB distribution boards etc. as described in this specified make, specification, as per drawings and schedule of quantities.

Standards:-

IS:-8623:-Specification for factory built assemblies for low-voltage switchgear and control gear assemblies, for voltages upto 1000V AC & 1200V DC

Technical Parameters:-

DB Should have minimum following detail

Made from Minimum 18Gauge sheet steel, double door, Surface or recess type as per requirement, powdercoated, adequate coating of color, phase barrier, Cu. busbar link, independent neutral bus bar, holes and knockout, screws as per standard, dust and vermin proof, necessary ceiling gasket, detachable gland plate-top and bottom, 2 nos. of earthing stud, appropriate rating of busbars as per IS, earthing link-1 no.

Drawing:-

Distribution Board should have a distribution diagram on the door.

Inspection & Testing:-

Factory Tested.

Method of Measurement:-

The measurement unit in Nos. for 1-Phase DB & 3-Phase DB.

LT Cable

Scope:-

This scope shall cover supply, laying, testing and commissioning of medium voltage XLPE cables.

The scope shall include cutting the cable into required lengths, packing, loading, unloading, insurance, transportation, delivery to stores/site as per work order, stocking in stores, testing of cables at stores etc. of medium voltage cable.

Standards:-

IS 7098 Part- I: SPECIFICATION FOR CROSSLINKED POLYETHYLENE INSULATED PVC SHEATHED CABLES FOR WORKING VOLTAGES UP TO AND INCLUDING 1 100 V

IS-1554 part-1: SPECIFICATION FOR PVC INSULATED (HEAVY DUTY) ELECTRIC CABLES FOR WORKING VOLTAGES UP TO AND INCLUDING 1 100 V

Technical Parameters:-

LV Power Cables:-

1100 Volts grade single / multicore standard Aluminum/Copper conductor extruded XPLE insulated with extruded PVC inner sheath outer sheath made of FRLS PVC compound.

Control Cables:-

1100 Volts grade multicore minimum 1.5/2.5 sq.mm. cross section standard copper conductor minimum 7 strands PVC insulated inner extruded sheathed and other sheath made of extruded FRLS PVC compound.

Drawing:-

Contractor shall submit the as built drawing of the cable laying drawing.

Contractor shall submit following document to client from Manufacturer:

1. Data sheet indicating results of tests
2. Test reports

Inspection & Testing:-

All cables shall be adequately protected against any risk of mechanical damage to which they may be liable in normal conditions of handling during transportation, loading, unloading etc.

The cable shall be supplied in single length i.e. without any intermediate joint or cut unless specifically approved by the client. The cable ends shall be suitably sealed against entry of moisture, dust, water etc. with cable compound as per standard practice.

Test to be carried out at Manufacturer premises:

The cables shall be tested at manufacturer's works. Following routine tests for each and every length of cable and copy of test results shall be furnished for each length of cable along with supply. Cables shall be tested in presence of client's representative (If specified).

- Voltage Test
- Conductor Resistance Test:
- Cable Test Before and After Laying of Cables at Site
- Insulation Resistance test
- Continuity Test
- Earth Resistance test

Testing:

MV cables shall be tested upon installation with a 500 V Meggar:

-Continuity test between conductors.

-Insulation Resistance :-(a) Between conductors.(b) All conductors and ground.

All measured test readings shall be recorded for documentation duly signed with engineer in- charge.

Method of Measurement:-

The cables will be measured in meters, considered up to End Termination point (lugs).

Transportation, Delivery & Storage:-

The cable shall be supplied in the actual length as per detailed work/purchase order

The cable shall be dispatched at client's stores or at site as per detailed instructions given by client/Engineer-IN charge at later stage.

The cable shall be loaded from the main vendor's store and properly stacked as per instruction of client's local representative. All such Labour and transportation charges shall be clearly mentioned in the offer.

Guarantee:-

The submitted parameters shall be as per IS for given period of service life.

LT Cable termination**Scope:-**

This scope shall cover with supply of Heavy duty Nickel plated brass casted glands, Aluminum/Copper Heavy-duty long neck lugs etc with installation, testing and commissioning of medium voltage XLPE cables. The scope shall include cutting the cable into required lengths, crimping of lugs without solder, crimping paste with necessary bimetallic lugs, self-stacking ferrules with identification, GI/Brass Nut Bolts plain washer, spring washer etc. as per requirement.

Standards:-**As per Standard****Technical Parameters:-**

-Single compression glands shall be used for indoor covered Area

-Double Compression Gland shall be outdoor locations.

-Flame proof Glands for hazardous areas shall be CMRS approved.

-Cable joints:-Jointing kit to be used with specified compound for 1.1 KV grade insulation.

Drawing:-

As Per specified in the drawing /Cable schedule directed by Engineer –in Charge at site.

Inspection & Testing:-

-Gland with check nut tightness to be checked

-Meggar test to be carried out before charging of cables.

-If require shrouded to be provided between to bus bar .

-Ferrule, Bimetallic lug, nut -bolt plain and spring washer type and tightness to be verified by torque ratchet.

-Distance between to phase/earth should be as per IS to be maintained.

Method of Measurement:-

The cable termination shall be measured in Termination point Nos.

Transportation, Delivery & Storage:-

The contractor has to carried out weather proof store for safety of material

Guarantee:-

As per standard.

Internal Wiring

Scope

This section covers, definition of point wiring, system of wiring and supply, installation, connection,testing and commissioning of point wiring for light points, ceiling fan points, exhaust fan points,convenience socket outlet points, power socket outlet points, bell outlet points etc. including fixingof light fixtures, ceiling fan, exhaust fan, wall fan, bell etc

Codes & Standards

The following standards and rules shall be applicable:

IS: 732 Code of practice for electrical wiring installation (Systemvoltage not exceeding 650 V)

IS: 1646 Code of practice for fire safety of buildings (General) Electrical installation.

IS: 9537 (Part - 2) Rigid Steel conduit for Electrical wiring

IS: 2667 Fittings for rigid steel conduits for electrical wiring

IS: 3480 Flexible steel conduits for electrical wiring

IS: 3837 Accessories for Rigid Steel conduit for Electrical wiring

IS: 694 PVC insulated cables.

IS: 9537 (Part - 3) Rigid non-metallic conduits for electrical wiring.

IS: 6946 Flexible (Pliable) non-metallic conduit for electrical wiring

IS: 1293 3 pin plugs and sockets

IS: 8130 Specification of conduit for Electrical Installation

IS: 3854 Switches for domestic purpose.

IS: 3419 Fittings for rigid non-metallic conduits

IS: 4648 Guide for electrical layout in residential buildings Indian electricity acts and rules

Technical requirements

Point Wiring

A point shall consist with a switch as required, including the ceiling rose or pendant holder or swan holder, or ceiling fan box or socket or suitable termination. A point shall include, in addition, the earth continuity conductor/wire to the earth pin/stud of the outlet/switch box and to the outlet points
Supply, installation, fixing of, junction/pull/inspection/switch boxes and outlet boxes
Supplying and drawing of wires of required size including earth continuity wire
Supply, installation and connection of flush type switches, sockets, cover plates, switch plates, and fixing fan regulator etc.

The point shall be complete with to the outlet point, through switch board, conduit with accessories, junction, pull, inspection boxes, control switch, socket, outlet boxes, ceiling roses, button/swan holder, connector etc.

Point Rate

The rate per point shall include supply, installation, connection, testing and commissioning of point as described under "point wiring". The measurements of the points will be enumerated

Wiring System

Unless otherwise mentioned on the drawings, the system of point wiring shall be as follows:

The system of wiring shall consist of single core, FRLS insulated, 650/1100 volt grade, copper conductor wires/cables laid through exposed (surface mounted) PVC conduits as directed & wherever required, conduits shall be concealed in walls and slabs

General

Prior to laying of conduits, the contractor shall submit for approval, the shop drawing for conduit layout indicating the route of the conduits, number and size of the conduits, location of junction/inspection/pull/outlet boxes, size and location of switch boxes, number and size of wires pulled through each conduit and all other necessary relevant details. Only after the drawings are approved, the contractor shall proceed with the work of laying of conduits.

Material

PVC Conduit

All non-metallic PVC conduits shall conform to IS: 9537 (Part - 3). The conduit shall be planed and of type as specified in IS: 9537 and shall be used with the corresponding accessories (Refer IS: 3419 specification for fittings for rigid non-metallic conduits).

PVC conduits shall be rigid unplasticised, heavy gauge having 2.0 mm. wall thickness

Boxes

All the boxes for switches, sockets and other receptacles, junction boxes, pull boxes and outlet boxes shall be fabricated from 2.0 mm. thick mild sheet painted with two coats of red- oxide and then two coats of enamel paints as called for. Colour of the paints shall be as approved by the client. The boxes shall have smooth external and internal finished surface

Boxes in contact with earth or exposed to the weather shall be of 2 mm. mild steel and hot dip galvanized after fabrication

Separate screwed earth terminal shall be provided in the box for earthing purpose .

All boxes shall have adequate no. of knock out holes of required diameter for conduit entry

Switch boxes to receive switches, socket outlets, power outlets, telephone outlets, fan regulators, etc. shall be fabricated to the approved shape and size to accommodate all the devices without overcrowding.

Outlet boxes to receive ceiling fan shall be fitted with adequately sized rod.

Hook to fix ceiling fan. The boxes shall be of minimum depth of 65 mm.

Boxes installed for concealed wiring shall be provided with suitable extension rings or plaster covers as required.

Boxes for use in masonry block or tiled walls shall be square cornered tile type, or standard boxes having square cornered tile type covers. These boxes shall be installed in the center of the masonry block or tiles.

Cast metal boxes installed in wet locations and boxes installed flush with the outside of exterior surface shall be gasketed.

Cover Plate

The cover of the boxes to receive outlet points shall be of best anodized sheet cut to shape and size or plate of approved manufacturers of switches.

Cables

The cables shall conform to IS: 694. For all internal wiring FRLS insulated cables of 650/1100 volts grade, single core shall be used

The conductors shall be plain annealed copper conductors complying with IS: 1554

The conductors shall be circular copper conductor.

The insulation shall be FRLS compound complying with the requirements of IS: 694. It shall be applied by an extrusion process and shall form a compact homogenous body.

The thickness of FRLS insulation shall be as set out in the relevant standards .The cores of all cables shall be identified by colours in accordance with the following sequence.

Single phase	Red
Three phase	Red, Yellow, Blue
Neutral	Black
Earth	Green or Green/Yellow

Means of identifying the manufacturer shall be provided throughout the length of cable

Unless otherwise specified in the drawings the size of the cables used for internal wiring shall be as follows:

In case of circuit wiring for lights, exhaust fans, ceiling fans, bell, convenience socket outlet points (P+N+E):

2.5sq.mm.	From D.B. to switch boards.
1.5sq.mm.	From switch boards to outlet points

In case of power socket outlet circuit having not more than two 15 A power outlet (P+N+E):

4.0sq.mm.	From D.B. to first power outlet
2.5sq.mm.	From first power outlet to second power outlet

In case of power socket outlet circuit having single 15 A power outlet like water heater (P+N+E):

4.0sq.mm.	From D.B. to power outlet.
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In case of 15 A. power outlet for window Air conditioner or other likewise appliances (P+N+E):

4.0sq.mm.	From D.B. to power outlet.
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The earth continuity conductor shall be similar to circuit cables and shall be drawn through conduit along with other circuit cables. The size of the earth continuity conductor shall be as follows:

Minimum size of earth conductor with respect to Phase conductor

Nominal cross-section area of largest associated copper circuit conductor in sq.mm	Nominal cross-sectional area of earth continuity conductor in sq.mm.
1.5	1.5
2.5	1.5
4.0	2.5

Separate circuit shall run for each water heater, kitchen equipment, window air conditioner and similar outlets at location as shown on drawing.

Switches

Switches shall conform to IS: 3854, IS: 1293 and IS: 4615. The switches shall be single pole, single or two way as shown on the drawings or as specified. They shall be of moulded type rated for 250 volt, and of full 5/15 A capacity. They shall be provided with insulated dollies and covers.

The switches shall be rocker operated with a quiet operating mechanism with bounce free snap action mechanism enclosed in an arc resistant chamber.

The switches shall have pure silver and silver cadmium contacts.

The switches shall be flush modular type.

The make of the switches shall be as indicated in the drawings or BOQ or make of material or as suggested and approved by the client.

The switches installed in outdoor area shall be industrial, metal clad type, and shall be provided in weather proof enclosures, complete with weather proof gasketed covers.

Sockets

The sockets shall conform to IS: 1293. Each socket shall be provided with control switch of appropriate rating. The sockets shall be moulded type, rated for 250 volts, and either of full 5 A or 15 A capacity, as mentioned on the drawings.

Sockets shall be of three pin type, the third in being connected to earth continuity conductor.

The socket shall be flush modular type.

The sockets installed in machine room, plant room or wet/damp area shall be metal clad weather proof type.

The finishing and make of all the sockets shall be same as light switch.

The socket shall have fully sprung contacts and solid brass shrouded.

Terminals to ensure positive electrical connections.

The sockets shall be provided with automatic shutters, which open only when earth pin of the plug inserts in the socket.

The socket shall be provided with three pin plug top suitable to the socket and of the same make as socket.

Drawings & Information

N.A.

Inspection & Testing

Insulation Resistance Test

The insulation resistance shall be measured by applying 500 volt megger with all fuses in places, circuit breaker and all switches closed.

The insulation resistance in megohms of an installation, measured shall not be less than 50 megohms divided by the number of points on the circuit.

The insulation resistance shall be measured between:

EARTH TO PHASE

EARTH TO NEUTRAL

PHASE TO NEURAL

PHASE TO PHASE

Earth Condtiuity

The earth continuity conductors shall be tested for electrical continuity and the electrical resistance of the same along with the earthing lead but excluding any added resistance or earth leakage circuit- breaker, measured from the connection, with the earth electrode to any point in the earth continuity conductor in the completed installation and shall not exceed one ohm

POLARITY OF SINGLE POLE SWITCHES

A test shall be made to verify that every no-linked, single pole switch is connected to one of the phase of the supply system

Completion Certificates

All the above tests shall be carried out in presence of client and the results shall be recorded in prescribed forms. Any default during the testing shall be immediately rectified and that section of the installation shall be re tested. The completed test result from shall be submitted to the client for approval

On completion of an electric installation a certificate shall be furnished by the contractor, countersigned by the certified supervisor under whose direct supervision the installation was carried out. This certificate shall be in a prescribed form as required by the local electric supply authority.

System Installation

Concealed Installation with Rigid PVC Conduit

All the rigid PVC conduit used for concealed installation shall be as per IS ; 9537 and its accessories shall be as per IS: 3419 (Small Wire Ropes).

Whenever necessary bends or diversion may be achieved by bending the conduits with the help of bending spring. No other method of bending is allowed

Conduit pipes shall be joined with the help of plain coupler fixed at the end with the help of vinyl solvent cement. No other method of joining is permissible.

All other methods, no wires through conduit, bunching, etc. Shall be as specified in the concealed installation Prior to fixing the conduits, the complete route shall be marked on site for the approval of consultant

Concealed Wiring System with Rigid PVC conduit

The rigid PVC conduits shall be used for concealed wiring system. The conduits shall be concealed in the concrete slab, floor, walls, beams, columns etc

Fixing of Conduit

Conduits embedded in concrete shall be installed in the frame work before pouring concrete. The conduits shall be installed above the bottom reinforcing bars, and shall provide positive wire fastening of the conduit to the reinforcing rods at an interval of not more than one meter, but on either side of couplers or bends or outlet/pull/junction boxes or similar fittings, proper hold fast shall be fixed at a distance of 30 cm from the center of such fittings. Conduits embedded in the wall shall be fixed inside the chase . The chase in the wall shall be neatly made and be fixed in the manner desired. In the case of building under construction, chase shall be provided in the wall at the time of their construction and shall be filled up neatly with cement mortar 1:4 after erection of conduit and brought to the original finish of the wall. Cutting of horizontal chases in walls is prohibited. The conduits shall be fixed inside the chase by means of staples or by means of saddles not more than 60 cm apart.

Conduits shall be so arranged as to facilitate easy drawing of wires through them. Entire conduit layout shall be done in such a way as to avoid additional junction boxes other than light points. The wiring shall be done in a looping manner. All the looping shall be done in either switch boxes or outlet boxes. Looping in junction or pull boxes are strictly not allowed. Where conduits cross building expansion joints, adequate expansion fittings or other approved devices shall be used to take care of any relative movement

All conduits shall be installed so as to avoid steam and hot water pipes

Conduits shall be installed in such a way that the junction, derivation and pull boxes shall always be accessible for repairs and maintenance work. The location of junction/pull boxes shall be marked on the shop drawings and approved by the client.

A separation of 200 mm shall be maintained between electrical conduits and hot water lines in the building

No run of conduit shall exceed ten mtr. between adjacent draw in points nor shall it contain more than two right angle bends, or other derivation from the straight line

Caution shall be exercised in using the PVC conduits in location where ambient temperature is 50 degree cel. or above. Use of PVC conduits in places where ambient temperature is more than 60 deg. cel. Is prohibited. The entire conduit system including boxes shall be thoroughly cleaned after completion of installations and before drawing of wires. Conduit system shall be erect and straight as far as possible. Traps where water may accumulate from condensation are to be avoided and if unavoidable, suitable provision for draining the water shall be made.

1. All jointing method shall be subject to the approval of the client.
2. Separate conduits shall be provided for the following system.
 - 15 A power outlets.
 - 5 A outlets and lighting system.
 - Low voltage system.
 - Telephone/intercom system.
 - C.C.T.V. system
 - Sound system
 - Computer data cabling system
 - Equipment wiring

Conduit Joint

Conduits shall be joined by means of plain couplers vinyl and/or solvent cement. Where there are long runs of straight conduit, inspection type couplers shall be provided at intervals, as approved by the client

The conduits shall be thoroughly cleaned before making the joints

In case of plain coupler joints, proper jointing material like vinyl solvent cement (gray in color) or any material as recommended by the manufacturer shall be used.

Bends in Conduit

Wherever necessary, bends or diversions may be achieved by bending the conduits or by employing normal bends. No bends shall have radius less than 2.5 times outside dia. of the conduit Heat may be used to soften the PVC conduit for bending, but while applying heat to conduit, the conduit shall be filled with sand to avoid any damage to the conduit.

Outlets

All the outlets for fittings, switches etc. shall be boxes of substantial construction.

In order to minimize condensation or sweating inside the conduits, all outlets of conduit system shall be properly drained and ventilated, but in such a manner as to prevent the entry of insects , etc.

Fixing between conduit and boxes, outlet boxes, switch boxes and the like must be provided with entry spouts and smooth PVC bushes.

Joints between conduit and any type of boxes shall be affected by means of conduit couplers in to each of which shall be coupled smooth PVC bush from inside the box. In any case all the joints shall be fully water tight.

Bunching of Cables

Cables of AC supply of different phase shall be bunched in separate conduits

The number of insulated wires/ cables that may be drawn into the conduits shall be as per the following table. In this table, the space factor does not exceed 40%. However, in any case conduits having lesser than 19 mm dia. shall not be used.

Maximum Permissible Number of 650 Volt Grade Single Core Cable that may be drawn in to Rigid PVC conduit

CABLE SIZE IN SQ.MM	SIZE OF CONDUITS (MM)			
	MAXIMUM NO. OF CABLES			
	25	32	38/40	50/51
1.5	8	15	-	-
2.5	6	10	-	-
4.0	4	8	12	-

Wiring with Rigid Steel Conduit

All conduits and it's accessories shall be of threaded type and under no circumstances pin grip type or clamp type accessories be used.

Fixing of Conduit

Conduit pipes shall be fixed by heavy gauge spacer bar saddles. The saddles shall be of 3 mm x 19 mm galvanized mild steel flat, properly treated and securely fixed to support by means of nuts and bolts raw bolts, brass machine screws, as mentioned, at an interval of not more than one meter but on either side of couplers, or bends, or junction/pull/outlet boxes or similar fittings, saddles shall be fixed at a distance of 30 cm from the centre of such fittings.

Draw boxes shall be located at convenient location for easy drawing of wires.

Every mains and sub mains shall run in independent conduits with an independent earth wire of specified capacity along the entire length of conduit.

The conduits to be installed shall be of ample cross section area to facilitate the drawing of wires. The diameter of the conduit shall be selected as per table specified in these specifications. But in no case it shall be less than 25 mm

diameter

Entire conduit layout shall be done such as to avoid additional junction boxes other than for outlet points. Conduits shall be free from sharp edge and burrs. Conduits shall be laid in a neat and organized manner as directed and approved by the client. Conduit runs shall be planned so as not to conflict with any other services pipe, lines/duct.

The entire conduit system shall be electrically and mechanically continuous and shall be bonded, together by means of approved type earthing clamp and earthed through a bare copper conductor of 14 SWG to the earthing terminals on the nearest distribution board.

If required, connection between PVC and steel conduits shall be through a junction box. Direct connection between PVC and steel conduits are not allowed.

Where exposed conduits are suspended from the structure, they shall be clamped firmly and rigidly to hangers of design to be approved by client. Where hangers are to be anchored to reinforced concrete, appropriate inserts and necessary devices for their fixing shall be left in position at the time of concreting, making holes and opening in the concrete will generally not be allowed. In case, it is unavoidable, prior permission of the client shall be obtained.

Conduit Joints

Conduit pipes shall be joined by means of screwed couplers and screwed accessories, as per IS: 2667. The threads shall be free from grease or oil. In long distanced straight runs of conduit, inspection type couplers two way junction boxes at reasonable intervals shall be provided or running threads with couplers and lock nuts shall be provided. The bare threaded portion shall be treated with anti-corrosive paints. Threads on conduit pipes in all cases shall be between 11mm to 27mm long, sufficient to accommodate pipes to full threaded portion of couplers or accessories. Cut ends of conduit pipes shall have no sharp edges nor any burrs left, to avoid damage to the insulation of conductors while pulling them through such pipes.

Brass female bushes shall be used in each conduit termination in a switch box, outlet box, electrical panel or any other box.

Conduit shall be secured in each outlet box switch box, electrical panel or any other box by means of one brass hexagonal lock nut and bush, outside and inside the box

At each building, expansion joints approved oil tight double wire wound flexible steel conduit or any other approved method shall be used. This shall be united on both sides with the rigid conduits by suitable union.

Conduits installed in the plant room for mechanical equipment shall be properly clamped with the mechanical supports, but in no case, it shall be fixed with the body of the equipment.

The connection of conduit to the mechanical equipment shall be through oil tight double wirewound flexible steel conduit. In any case the length of the flexible conduit shall not exceed one meter. The flexible conduit shall be properly clamped with the body of the equipment. They shall not in any case be clamped with any cover or any removable parts of the equipment

Bends in Conduit

All necessary bends in the system including diversion shall be done by bending pipes or by inserting suitable solid or circular inspection type normal box or similar fittings. Conduit fittings shall be avoided as far as possible on conduit system exposed to weather, where necessary, solid type fittings shall be used. Radius of such bends in conduit pipes shall be not less than 75 mm. No length of conduit shall have more than the equivalent of four quarter bends from outlet, the bends at the outlets not being counted.

Protection Against dampness

In order to minimize condensation or sweating inside the conduit, all outlets of conduit system shall be properly drained and ventilated, but in such a manner as to prevent the entry of insects, as far as possible

Protection of Conduit against Rust

The outer surface of the conduits including bends, junction boxes, etc., forming part of the conduit system shall be adequately protected against rust, particularly when such system is exposed to weather. In all cases, no bare/threaded portion of conduit pipe shall be allowed unless such bare threaded portion is treated with anti-corrosive coating or covered with approved plastic compound.

Bunching of Cables

Unless otherwise specified, insulated conductors of different phases shall be bunched in separate conduit. Wires carrying current shall be so bunched in the conduit that the out going and return wires are drawn into the same conduit. Wires originating from two different phases shall not be run in the same conduit. The number of insulated wires/cables that be drawn into the conduits shall be as per the following table.

MAXIMUM PERMISSIBLE NUMBER OF 650/1100 VOLTS GRADE SINGLE CORE CABLE THAT CAN BEDRAWN INTO RIGID STEEL CONDUITS.

CABLE SIZE IN SQ.MM	SIZE OF CONDUITS (MM)			
	MAXIMUM NO. OF CABLES			
	25	32	38	50
1.5	10	14	-	-
2.5	8	12	-	-
4.0	6	10	-	-

Switch and Socket

Switches shall be installed at **900** mm above finished floor level unless otherwise indicated on the drawings. The switch controlling the light point or fan shall be connected on to the phase wire of the circuit and neutral shall be continuous, having no fuse or switch installed in the line except at the D.B. All fan regulators shall be fixed inside the switch boxes on adjustable flat M.S. strips/plates with tapped holes and brass machine screws, leaving ample space at the back and side for accommodating wires. The cover plates to the switch box shall be fixed by means of sunk head brass cadmium screws. Where two or more switches and fan regulators are installed together, they shall be provided with one gang cover plate with knockouts to accommodate required number of switches, sockets and regulators. The switch controlling the socket outlet shall be on the phase wire of the circuit. The third pin of the socket shall be connected to the earth continuity conductor of the circuit. The switch boxes, installed back-to-back in the same wall shall be offset from each other, 150 mm horizontally, to preclude noise transmission.

Drawing of Conductors

The drawing and joining of copper conductor or 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 may cause breakage of conductors. There shall be no sharp bends. Insulation shall be shaved off for a length of 15 mm at the end of wire like sharpening of a pencil and it shall not be removed by cutting it square or ringing. FRLS insulated copper conductor wire ends before connection shall be properly soldered (at least 15mm length) with soldering flux/copper solder, for copper conductor. Strands of wires shall not be cut for connecting to the terminals. All strands of wires shall be soldered at 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 terminals block/connectors. The pressure applied to tighten terminal screws shall be just adequate, neither too much nor too less. Conductors having nominal cross section exceeding 4 sq. mm shall always be provided with crimping type 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 wire men and cable jointers shall be employed to do joining work. For all internal wiring FRLS insulated wires of 650/1100 volts grade shall be used. The sub-circuit wiring for point shall be carried out in looping system and no joint shall be allowed in the length of the conductors. No wire shall be drawn in to 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 cleaned of moisture, dust, and dirt or any other obstruction by forcing compressed air through the conduits

Joints

The wiring shall be by looping back system, and hence 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. Contractors shall be continuous from outlet to outlet. For joints where unavoidable, due to any specified reasons, prior permission in writing shall be obtained from the client before making such connections. Joints by twisting conductors are prohibited.

Load Balancing

Balancing of circuit in three phase installation shall be planned before the commencement of wiring and shall be strictly adhered to.

Earthing

All earthing systems shall be in accordance with IS: 3043 - 1985 code of practice for earthing

LIGHT FIXTURES AND FANS

Scope:-

The scope of work shall cover the supply, installation and testing of various types of light fixtures.

Standards:-

The following standards and rules shall be applicable:

IS 3646 (1960) Code of practice for interior illuminator.

IS 1913(1969) General and Safety requirements for electric lighting fittings.

Indian Electricity Act and Rules issued here under.

Technical Parameters:-

GENERAL REQUIREMENTS

All fixtures shall be complete with accessories and fixings necessary for installation whether so detailed under fixture description or not. Fixture housing, frame or canopy shall provide a suitable cover for the fixture outlet box of fixture opening

Fixture shall be installed at mounting heights as detailed on the drawings or instructed on site by the client's representative

Fixtures and/or fixture outlet boxes shall be provided with hangers to adequately support the complete weight of the fixture. Design of hangers and method of fastening other than shown on the drawings or herein specified shall be submitted to the client's representative for approval

Fixture shall be completely wired and constructed to comply with the regulations and standards for Electric Lighting Fixtures, unless otherwise specified. Fixtures shall bear manufacturer's name and the factory inspection label unless otherwise approved

Wiring within the fixture and for connection to the branch circuit wiring shall be not less than 1.5 sq.mm. copper for 250 Volt application. Wire insulation shall suit the temperature conditions inside the fixture and wires bypassing the choke shall be heat protected with a heat resistant sleeve

Metal used in lighting fixtures shall be not less than 22 SWG or heavier if so required to comply with specifications or standards. Sheet steel reflectors shall have a thickness of not less than 20 SWG. The metal parts of the fixtures shall be completely free from burrs and tool marks. Solder shall not be used as mechanical fastening device on any parts of the fixture

Ferrous metal shall be bonderized and given a corrosion resistant phosphate treatment or other approved rust inhibiting prim coat to provide a rust-proof base before application of finish

Non-reflecting surfaces such as fixture frames and trim shall be Alluminium die cast

All the fixtures are as per the IP - 54 insulation class

Vendor shall be responsible for measuring the level of illumination after installation

Lighting fixtures shall be designed for minimum glare and for continuous operation under specified atmospheric

condition

All fixtures shall be complete with accessories like power factor improvement capacitors, ballast ignitor etc.

Fluorescent fixture shall be of sheet steel casing with corrosion resistance finish. It shall be provided with separate wiring channel with cover plate and an earth terminal. All screw shall be chromiumbrass only. Lamp and starter holders shall be of tough molded plastic with spring loaded rotor type connector. Condensers shall be low loss paper impregnated hermetically sealed. Internal wiring shall be neatly clipped and where by passing the ballast, a suitable heat resistance barrier or sleeve shall be provided.

REFLECTOR

Light reflecting surface shall be mirror finished having the reflection factor of not less than 80%. All parts of reflector shall be completely covered by finish and free from irregularities. It shall be capable of withstanding a 6 mm. radius bend without showing sign of cracking, peeling or loosening from the base metal. Finish shall be capable of withstanding 72 hours exposure to ultra violet sun lamp placed 10 cm. from the surface without discoloration, hardening or warping and retain the same reflection factor after exposure. Test result shall be furnished for each lot of fixtures

Lighting fixture reflectors shall generally be manufactured from sheet steel of aluminium of not less than 20 SWG. They shall be readily removable from the housing for cleaning and maintenance without disturbing the lamps and without the use of tools. They shall be security mounted to the housing by means of positive fastening devices of a captive type.

Polystyrene egg-box type louvers shall be provided whenever specified. Appropriate captive type fixing devices shall be incorporated for securing these.

BALLAST

Lighting fixtures ballasts shall be designed manufactured and supplied in accordance with the relevant standard IS 6616 and shall function satisfactorily under site conditions specified. The ballasts shall have a long service life and low power loss

Ballasts shall be mounted using self-licking, anti-vibration fixings and shall be easy to remove without removing the fittings

Ballast shall contain a thermosetting type compound not subject to softening or liquefying under any operating conditions or upon ballast failure. The ballasts shall be of the inductive and heavy duty type Filled with polyester of equivalent. They shall be free from hum and protected from the atmospheres. Ballasts which produce a humming sound shall be replaced free of cost by the supplier HPMV lamp ballasts shall be provided with suitable tappings

STARTERS

Lighting fixtures starters shall be of the safety type (i.e. if the lamps fails to ignite at the first start, no further starting must be possible without attending to the tube light. Starters shall have bimetal electrodes and high mechanical strength

Starters shall be replaceable without disturbing the reflector or lamps and without the use of any tool. Starters shall have brass contacts and radio interference capacitor

CAPACITORS

Lighting fixture capacitors shall have a constant value of capacitors and shall be connected across the supply of individual lamp circuits

Each capacitor shall be suitable for operation at 240 volts \pm 5% single phase 50 Hz with a suitable value of capacitance so as to correct the power factor of lists corresponding lamp circuit to the extent of 0.98 lag

The capacitors shall be hermetically sealed preferably in metal container to prevent seepage of impregnating material and ingress of moisture

LAMP HOLDER

Lamp holders for fluorescent tubes shall be of the spring loaded, low contact resistance, bi-pin rotor type, resistant to wear and suitable for operation at the specified temperature, without deterioration in insulation valve, contact resistance of lamp holding quality. The shall hold the lamp in position under normal condition of shock and vibration.

Lamp-holders for incandescent and HPSV lamps shall be of G.L.S. type manufactured in accordance with relevant standards and designed to give long and satisfactory service

LUMINAIRES

HPSV fixture shall be of single die cast aluminium made out of LM6 canopy , anodized high purity aluminium reflector, toughened glass at the front and die cast aluminium control gear box complete with all accessories mention in 3.22 with pre-wired up to connector block and loop in and loop out facilities

Street light fixture shall be of single die cast aluminium housing with provision for the easy removal of gear box during maintenance. Acrylic bowl shall be linked to one end and toggle shall be provided. Neoprene rubber and felt gasket shall be provided between acrylic bowl and fixture to prevent entry of insects and moisture

Industrial low bay fitting shall be of die cast aluminium housing, high purity Al. Reflector, acrylic cover and wire guard

LAMPS

Lamps shall be supplied and installed in all lighting fixtures furnished under this contract Lamps used for temporary lighting service shall not be used in the final lamping of fixture units

Lamps shall be of wattage and type as shown on the drawings and schedules. Where not shown, the details shall be ascertained from the client before procurement Lamps for permanent installation shall not be placed in the fixtures until so directed by the Client's representative, and this shall be accomplished directly before the respective portions are ready for occupation

DRAWINGS & INFORMATION

As per of the proposal the bidder furnish relevant descriptive and illustrative literature on lighting fixtures and accessories and following drawings/ data for the respective lighting fixtures:-

1. Dimensional Drawings.
2. Mounting details cable entry facilities and weights.
3. Light distribution diagrams (Zonal & Isokandora)
4. Light absorption and utilization factors.
5. Lamp output V/S temp. curves.

INSPECTION AND TESTING

Each fixture shall be tested at 1500 volts rms. 50 Hz for one minute and no flashover of breakdown shall occur between current carrying parts and ground

Insulation resistance of each fixture shall be tested at 500 V.D.C. and the insulation resistances so measured shall not be less than 2 mega ohms between all current carrying parts and ground.

Each fixture complete with its proper lamp/lamps shall be shown to operate satisfactorily at its normal voltage and frequency.

Each fixture shall be examined visually to ensure that it is complete in all respect and satisfactorily finished.

Type and routine test certificates shall be submitted for tests conducted as per relevant IS/BS for the fixture and accessories

METHOD OF MEASUREMENT

Supply of the fixture including transport to site, loading and unloading etc. as specified will be treated as one unit for measurement and payment.

TRANSPORT, DELIVERY AND STORAGE

The prices shall be F.O.R. site basis including packing & forwarding charges. The quoted price must include all the costs for necessary mode of transportation up to the final location of fixture or site store. The fixture should be supplied with required storage arrangements suitable for placing in open storage yard. All incidental expenses during transportation shall be part of quoted prices including transit insurance. The charges for loading and unloading of equipments at site should form part of offer.

GUARANTEE AND WARRENTY

The Bidder shall stand guarantee for the performance of entire fixtures and components for twelve(12) months from the date of commissioning or eighteen (18) months from the date of dispatch, whichever is earlier, as agreed up on and as reproduced in the purchase order within the tolerance specified or as permitted by the relevant standards for the equipment in his scope of supply. The Purchaser also reserves the right to use the rejected equipment or part thereof until the new equipment meeting the guaranteed performance is supplied by the Bidder.

SPARES

The bidder shall quote for minimum spares required for two years safe operation of light fixtures along with the offer separately.

LED LIGHT FIXTURES

GENERAL REQUIREMENT

General Purpose Led Luminaires suitable for Office /Industry / Street Light applications. The Fixtures should be Operational for 220-240 V Single Phase 50 HZ AC , and operational from 170-280 V without significant drop in output .

LED ORIGIN

The LED modules should be from Cree/Nichia/Philips LumiLeds Only with efficiency of a min 130 lm/watt and efficacy of fixtures should be greater than 80 lm/w for both indoor and outdoor fixtures, built with Integral driver. The class and LED shall be procured from a single bin of class 1 to 2 only.

IP Protection

The Min degree of Protection for Indoor Fixtures should be IP20 and IP65 for Outdoor/ Semi Indoor Fixtures. The THD of Fixtures should be strictly <10 % and drivers should be compulsorily provided with miswiring/ overload and short circuit protections.

Housing

For Indoor applications the housing should be made of die cast/ Metal Housing and diffusers should be polycarbonate only, outdoor fixtures should be with die cast aluminum / extruded aluminum housing only.

Fixtures

The Fixtures should be prewired upto the terminal block and easy to mount and Install and maintain if necessary. The fixture should comply LM79-08 certification criteria and also module should be backed with LM80-08 Certificate from the OEM.

Guarantee, Warranty & Reports

The fixtures should be warranted for a period of 3yrs from the date of Installation. The fixtures should have some kind of embossing/ engraving to identify the brand name.

The manufactures should provide all kind of test report, technical details as and when called for The fixture may be tested from govt approved Lab for Claimed parameters by the manufacturer.

EARTHING SYSTEM

Scope:-

Design, assembling, testing, painting, supply, delivery at site with all related accessories as per the specifications.

Standards:-

The design, material, assembling, inspection and testing shall comply with all currently applicable statutory, regulations and safety codes in the locality where the system will be installed. The equipment shall also conform to the latest applicable standards and codes of practice as mentioned below.

IS 3043 Code of Practice for Earthing

IS 3716 Insulation Co-ordination Application Guide

IS 2309 Code of Practice for Protection of Buildings and Allied Structures against Lightning

Indian Electricity Rules, 1956

Indian Electricity Act, 1910

National Electrical Code

EQUIPMENT EARTHING

All apparatus and equipment transmitting or utilizing power shall be earthed in the following manner. Copper /G.I. Earth strips/wires shall be used unless other-wise indicated.

General:-

1. Three phase power panel and distribution boards shall have two distinct earth connections of the size correlated to the incoming cable size. In case of single phase DB's a single earth connection is adequate.
2. Armored cable shall be earthed by two distinct earth connections to the armoring at both the ends and the size of connection being as for the metallic conduit.
3. In the case of unarmored cable, an earth continuity conductor shall either be run outside along with the cable or should form a separate insulated core of the cable
4. Metallic conduit shall not be accepted as an earth continuity conductor. A separate insulated continuity conductor of size 100% of the phase conductor subject to the minimum shall be provided.
5. Nonmetallic conduit shall have an insulated earth continuity conductor of the same size of phase conductor for metallic conduit. All metal junction and switch boxes shall have an inside earth stud to which the earth conductor shall be connected. The earth conductor shall be distinctly coloured (Green or Green / Yellow) for easy identification

Technical Parameters:-

Plate Earthing Stations

The plate electrode shall be 600 x 600 x 3.25 mm copper plate or 600 x 600 x 6.15 mm hot dip GI.

1. The earth resistance shall be maintained with suitable soil treatment
2. The earth lead shall be connected to the earth plate through Hot Dip G.I. bolts
3. The earthing conductors shall be of copper strip in case of copper earthing
4. G.I. pipe with funnel of approved quality shall be used for watering the earthing electrodes / stations.
5. This brick chamber with cement plaster of dimensions in accordance with the drawing shall be constructed so as to protect the earthing station and to facilitate to locate the earthing station easily. The chamber shall also facilitate pouring of water and would provide easy access for testing, which would require disconnection of the earth electrode and connection to the earthing grid.
6. IS marked cast iron cover of appropriate dimensions shall be supplied as specified in IS: 3043 along with fabricated MS angle frame. The cover shall be hinged to the frame. The frame shall be grouted in brick masonry work of earthing station. The cove rand frame shall be painted with bitumen paint after applying primer. Earthing station Tag No. shall be painted on top of cover as per designation given on the layout drawing.
7. The hardware and other consumables for earthing installation shall be of copper/bras in case of copper earth plate and shall be hot dip galvanised iron material in case of G.I. earth plate
8. The depth of an earth electrode pipe shall be in approximately in accordance with the drawing as well as on nature of soil. However as per general guidelines, the pipe electrode shall have to be placed at depth where soft earth is available. This is to reduce the effect of earth resistance.

Pipe Electrode Earth Station

1. The earth station shall be as shown on the drawing and shall be used for equipment earth grid and/or street light pole earthing.
2. The earth electrode shall be 3 M long 38/50 mm diameter class "A", Galvanized steel **pipe**
3. The earth resistance shall be maintained with a suitable soil treatment.

4. The earth lead shall be fixed to the pipe with a nut and safety set screws. The clamp shall be permanently accessible
5. The earthing grid and the earthing conductor shall be hot dip Galvanized iron strips of the size as shown in the drawing
6. G.I. pipe with funnel of approved quality shall be used for watering the earth electrode \ station
7. This brick chamber with cement plaster of dimensions in accordance with the drawing shall be constructed so as to protect the earthing station and to facilitate to locate the earthing station easily. The chamber shall also facilitate pouring of water and would provide easy access for testing, which would require disconnection of the earth electrode and connection to the earthing grid.
8. The hardware and other consumables for earthing installation shall be of copper/bras in case of copper earth plate and shall be hot dip galvanised iron material in case of G.I. earth plate
9. The depth of an earth electrode pipe shall be in approximately in accordance with the drawing as well as on nature of soil. However as per general guidelines, the pipe electrode shall have to be placed at depth where soft earth is available. This is to reduce the effect of earth resistance.

TYPE OF EARTHING STATION

CHEMICAL TYPE EARTHING STATIONS:

- 4.3.1 The substation earthing and equipment earthing shall be done with details given in earthing scheduled in BOQ & Drawing.
- 4.3.2 The earthing station shall be as shown on the drawing.
- 4.3.3 The earth resistance shall be maintained with suitable soil treatment as shown in the drawing. 4.3.4 The resistance of each earth station should not exceed the limit specified in IS : 3043.
- 4.3.5 The earthing grid and the earthing conductors shall be of copper strip of size as mentioned on the drawing.
- 4.3.6 The block masonry chamber with Cast Iron hinged cover shall be provided for housing the termination block as shown in the drawing.
- 4.3.7 The hardware and other consumable for earthing installation shall be of copper/brass, as per details shown in the drawing.
- 4.3.8 **GROUNDING:** The grounding system shall incorporate the following individual components or a combination of the following:
 - Deep driven copper bonded steel core ground rod/ Copper Plate / Copper Rod as central injection point for flow of fault current which is securely connected to the lower end of the down conductor.
 - The use of ground resistance improvement material shall be applied in order to reduce the resistivity levels of the grounding system and maintain a constant low resistivity. The grounding system shall be maintenance free.
 - Maintenance Free Earthing System consist of following material:
Copper Bonded Earth Rod- Length 1.5Mtr/3Mtr Dia. 5/8
 - Ground Rod Clamp – For Earth Termination.
 - Ground Resistance Lowering Compound.

The Copper bonded earth rods are made in accordance with national and international standards such as BS6651, BS7430 and UL467. Threads are rolled onto the rod ensuring an even copper covering which eliminates the risk of chipping whilst driving.

Description: Threaded Copper bonded Earth Rod

Material: Carbon steel rod bonded with Copper

Length: 1.5Mtr./3Mtr Rod Diameter (Actual): 5/8

Weight: 1.92kg / 4Kg.

A low resistance, non corrosive earth enhancing compound designed for use in standard soil conditions is to be used for these earthings. This compound shall have following characteristics:

- Will not dissolve or leach away with time
- Maintains constant resistance for the life of the earthing system.
- Effective in normal soil conditions.
- No maintenance required

Ground Resistance Improvement Powder to be used which shall not wash away under seasonal conditions and therefore provides a permanent presence in working to improve and maintain the integrity of the earthing system.

U-Bolt Rod Clamp.

Suitable for clamping earth rods to tape or round conductor.

Description: Suitable for Rod Diam. : 5/8 & Copper Tape Size: 25mm x 3mm

Weight: 90 gm.

Inspection & Testing:-

The entire earthing installation shall be tested as per requirements of Indian Standard Specification IS: 3043

The following earth resistance values shall be measured with an approved earth megger and recorded.

1. Each earthing station
2. Earthing system as a whole
3. Earth continuity conductors

Earth conductor resistance for each earthed equipment shall be measured which shall not exceed 1 ohm in each case. Measurements of earth resistance shall be carried out before earth connections are made between the earth and the object to be earthed. All tests shall be carried out in presence of the consultant / client.

Compliance with the provisions of this specification shall not relieve the Bidder of the responsibility of furnishing apparatus and accessories of proper design, electrically and mechanically suited to meet the operating requirements under the specified service conditions and be suitable for the purpose of which they are intended.

Method of Measurement:-

Provision of earthing station complete with excavation, electrode, watering pipe, soil treatment, masonry chamber with cast iron cover etc. shall be treated as one unit of measurement.

The following items of work shall be measured and paid per unit length covering the cost of the earth wires / strips, clamps, labour etc.

- A. Main equipment Earthing grid and connection to the earthing station.
- B. Connection to the switch board, power panels, DB etc .The cost of Earthing the following items shall become part of the cost of the item itself and no separate payment for Earthing shall be made.

1. Motors - Earthing forming part of the cabling / wiring for the motors.

2. Isolating switches and starters should form part of mounting frame, switch starter etc.
3. Light fittings - form part of installation of the light fittings.
4. Conduit wiring, cabling - should form part of the wiring or cabling.
5. Street lighting - should form part of the street light poles

Transportation, Delivery & Storage:-

The prices shall be F.O.R. site basis including packing & forwarding charges. The quoted price must include all the costs for necessary mode of transportation up to the final location of earthing system or site store. All incidental expenses during transportation shall be part of quoted prices including transit insurance. The charges for loading and unloading of equipments at site should form part of offer.

Guarantee:-

The Bidder shall stand guarantee for the performance of entire equipment and components for twelve (12) months from the date of commissioning or eighteen (18) months from the date of dispatch, whichever is earlier, as agreed upon and as reproduced in the purchase order within the tolerance specified or as permitted by the relevant standards for the equipment in his scope of supply.

MATERIALS REQUIRED

All required hardware such as bolts, nuts, washers (round and spring type), anchor fasteners, screws, etc. of sizes and type as required shall be conforming to relevant IS. All hardware shall be hot-dip galvanized or zinc passivated / cadmium plated as per requirement of work either mechanical fabrication or electrical jointing.

All other items required for installation shall be as approved by site in-charge.

INSTALLATION OF SYSTEM

The plate/pipe electrode, as far as practicable, shall be buried below permanent moisture level but in no case less than 3 M below finished ground level

The plate/pipe electrode shall be kept clear of the building foundation and in no case, it shall be nearer by less than 2 M from outer face of the respective building wall / column

The plate electrode shall be installed vertically and shall be surrounded with 150 mm. thick layers of Charcoal dust and Salt mixture

20 mm. dia. G.I. pipe for watering, shall run from top edge of the plate / pipe electrode to the mid level of block masonry chamber

Top of the pipe shall be provided with G.I. funnel and screen for watering the earth / ground through the pipe

The funnel with screen over the G.I. pipe for watering to the earth shall be housed in a block masonry chamber as shown in the drawing

The masonry chamber shall be provided with a Cast Iron hinged cover resting over the Cast Iron frame which shall be embedded in the block masonry

Construction of the earthing station shall in general be as shown in the drawing and shall conform to the requirement on earth electrodes mentioned in the latest edition of Indian Standard IS: 3043, Code of Practice for Earthing Installation

The earth conductors (Strips / Wires, Hot dip G.I. / copper) inside the building shall properly be clamped / supported on the wall with Galvanized Iron clamps and Hot Dip GI screws / bolts. The conductors outside the building shall be laid at least 600 mm. below the finished ground level/

The earth conductors shall either terminate on earthing socket provided on the equipment or shall be fastened to the foundation bolt and / or on frames of the equipment. The earthing connection to equipment body shall be

done after removing paint and other oily substances from the body and then properly be finished.

Over lapping of earth conductors during straight through in joints, where required, shall be of minimum 75mm. long and bitumen coated.

The earth conductors shall be in one length between the earthing grid and the equipment to be earthed

Minimum distance of 2 mtr shall be maintained between other electric conductor, earthing conductor and the conductor laid for the lightning protection system. Earthing and lightning protection system conductors shall be bonded to each other to prevent side flashover in case of non-availability of adequate clearance.

The earthing met conductors, risers, earthing cables, etc. passing through walls shall be covered with galvanized iron sleeves for the passage through wall. Water stop sleeves shall also be provided wherever the earthing conductor enters the building from outside.

Telephone and Data Distribution system

Scope :

1.1 The scope of work shall cover supply, installation, commissioning and testing of :

i) Telephone cables ii) Telephone Tag Blocks iii) Telephone wiring in conduits

Conduits :

2.1 Conduits shall be as given below : The conduit shall generally be as specified under section 'Internal Wiring'.

Cables and Wires :

The type of cables and the services shall be as follows :

i) Indoor Multi pair, PVC insulated sheathed armored and sheathed. ii) Inside Twin core PVC insulated with conduit twisted cores.

All multi core cables and wires shall be of tinned copper conductor of not less than 0.5 mm dia and shall be colour coded twisted pairs with rip cord.

The conductor resistance shall be less than 150 ohms per KM and the insulation resistance between the conductors not less than 50 megohms and the nominal capacitance of about 0.1 micro farad per kilometer.

Cables laid underground or locations subject to dampness and flooding shall be filled with polyethylene compound and shall have sufficient protection against moisture and water ingress.

All armoring shall be of galvanized steel wires and protected against corrosion by an outer sheath of PVC in the case of indoor cables and polyethylene in the case of outdoor cables. Outer sheathing must be fire retarding and anti-termites.

All unarmoured single core cables and inner sheath of armored cables shall be provided with rip cord.

All single pair cables for final extension to the telephone outlet box shall be unarmoured tinned copper conductors of not less than 0.5 mm. diameter and shall be drawn in conduits. All telephone outlets shall consist of 2 A 2 pair polythene connector in G.I box with 6 mm perspex cover with beveled edges and chromium plated brass hardware.

Tag blocks :

The telephone tag blocks shall be suitable for the multi core telephone cables and shall have two terminal blocks, cross connect type. All incoming and outgoing cables shall be terminated on separate terminal blocks and termination shall be silver soldered. The cross connecting jumpers shall be insulated wires of same diameter and screw connected.

The tag blocks shall be mounted inside fabricated sheet steel boxes with removable hinged covers and shall be fully accessible. The enclosure shall be painted with 2 coats of red oxide and stove enameled

Installation:

The installation of conduits shall generally be as specified under section 'CONDUIT WIRING'.

All cables shall be on cable racks and neatly stitched together.

The connection at the tag blocks shall be silver soldered so as to achieve minimum contact resistance.

The final branch connections with single pair cables in conduits and the maximum number of cables in each conduit shall be as follows:

Conduit diameter Max. No. of cables

Inch / mm.

3/4" / 20 2 Nos. single pair

1" / 25 6 Nos. single pair

1¼" / 32 12 Nos. single pair

1½" / 40 18 Nos. single pair

Category 6 UTP cable

Cable should meet or exceed the TIA Category 6 / ISO Class E attenuation specification, NEXT requirements in ISO/IEC 11801, CENELEC EN50173 and TIA/EIA 568C.

CAT 6 UTP balanced twisted pair cable shall conform to the Category 6 component specifications and the installed channels shall comply with the ANSI/EIA/TIA 568C.2-1 Category 6 and ISO/IEC 11801 Class E Channel Performance Specification

All balanced twisted pair cable and apparatus shall conform to the Category 6 component specifications and the installed channels shall comply with the Category 6/Class E Channel Performance Specification up to the maximum 100 meters (328 feet) length, including up to 6 connection points.

The high performance Category 6 UTP cable shall be of the traditional round design with mylar bisector tape. There should not be any limitation for minimum length of Cat 6 Channel (should not have high resonance problem in shorter channels).

The Category 6, 4 pair UTP channel shall support emerging high-bandwidth applications, including 1 Gbps Ethernet, potentially 1.2 Gbps ATM and 2.4 Gbps ATM, IEEE 1394B S400, Multi-Tasked Split Screen Computing, Virtual Holographic Video Conferencing, Instant Access Telemedicine, 3D CAD/CAM Engineering, Internet-Intranet Communications/Commerce, as well as all 77 channels (550 MHz) of analog broad band video.

Category 6 cable shall perform on 400 % margin and at least 6 db NEXT.

The Category 6 cable and components shall be electrically backward compatible with existing Category 3, 5, and 5e. Should be UL verified as Category 6 / ETL listed as Category 6, i.e., The 4 pair UTP cable shall be UL[®] and c (UL) Listed Type CMP (plenum) or CM (non-plenum).

Should have thin bisector tape for additional performance benefits.

Performance guaranteed to meet or exceed Category 6/Class E Channel Specifications to 550 MHz.

Performance guaranteed up to 6 connections in any length channel configuration up to 100 meters.

CAT 6 UTP indoor cable shall consist of 23 AWG polyethylene, insulated conductors, twisted into four pairs and shall be of the traditional round design with bisector tape and jacketed with a non-plenum polyethylene jacket.

Category 6/Class E NEXT, PSNEXT, FEXT, ELFEXT, PSELFEXT and return loss extrapolated to 250 MHz.

Cable should be capable of delivering potentially in excess of 1.2 Gbps to the workstation in accordance with application standards.

The cable shall support Voice, Analog Baseband Video/Audio, Fax, Modem, Switched-56, T-1, ISDN, RS-232, RS422, RS-485, 10BASE – T Ethernet, Token Ring, 100Mbps TP-PMD, 100BASE-T Ethernet, Ethernet IEEE 802.3 1000BASE-T, TIA-854-A 1000BASE-TX, 155 Mbps ATM, AES/EBU Digital Audio, 270 Mbps Digital Video, 622 Mbps 64-CAP ATM and emerging high-bandwidth applications, including 1 Gbps Ethernet, gigabit ATM, IEEE 1394B S100 and S400, as well as all 77 channels (550 Mhz) of analog broadband video, Building Automation System applications.

Transmission: The balanced twisted pair cable channel performance shall be guaranteed up to the maximum 100 meters (328 feet) length, including up to 6 connection points.

The cable jacket shall comply with Article 800 NEC for use as a plenum or non-plenum cable. The 4 pair UTP cable shall be UL[®] and c (UL[®]) Listed Type CMP (plenum) or CMR (non-plenum).

The Category 6 UTP Ethernet Cable and Category 6 Channel Components shall be manufactured by a single manufacturer. The manufacturer shall warrant the Category 6 channel cable, components, and applications for a period of 20 years.

Physical Specifications:

→ Nominal Jacket Thickness: 0.022 in (0.56 mm)

→ Nominal Outside Diameter: 0.232 in (5.89 mm)

→ Gauge of Conductor: 23/24 AWG

Electrical Specifications:

→ Maximum DC Resistance: 7.61 Ohms/100 m

→ Maximum DC Resistance Unbalance: 3%

Conformance to Electrical Standards as follows:

→ ANSI/TIA/EIA 568B.2-1 Category 6

→ ISO/IEC 11801: 2002 (Edition 2) Class E

→ CENELEC EN50173: 2002 (Edition 2) Category 6

EPABX

Proposed exchanges shall have following functions & Technical requirements. Please note below requirement is assumed as per standard requirement for said properties. This is to be confirmed by Customer.

TECHNICAL PARAMETERS

EPABX:-

Type: IP-PBX with Universal Connectivity and Mobile Extensions Universal Slots: 6, Max. IP Users: 50, Max. TDM Ports: 48, Built-in Ports: 5 IP Users*, AIP, AOP, RS232C & Ethernet, Power Supply: Universal SMPS (100-240V AC, 47-63 Hz), *Require ETERNITY PE Card VoIP8/16 card to avail built-in IP Users

ETERNITY PE Card CO4+SLT4

Type: Expansion Card for Analog Trunks (CO) and Analog Extensions (SLT) CO Ports: 4, SLT Ports: 4, Compatible PBX: ETERNITY PE Series

ETERNITY PE Card SLT8

Type: Expansion Card for Analog Extensions (SLT) SLT Ports: 8 Compatible PBX: ETERNITY PE Series

ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE (EPABX Requirements)

1. The equipment shall be electronic type. It shall have a microprocessor / micro controller based.
2. It shall employ PCM/TDM, 100% non-blocking, digital switching technology.
3. It shall have distributed processing architecture, SLIC and SMT Design.
4. System power supply should be inbuilt and SMPS type which input ranges from 90 – 265 VAC, 48-60 Hz.
5. It should have automatic on line self-diagnostic and reporting system, complete with visual indication facilities, fault isolation and recovery features.
6. It should be suitable for DTMF as well as the FSK type of telephone instruments.
7. Its capacity shall be suitable for 16 numbers of C.O. Lines and 48 analog extension
8. The system shall have modular design, flexible and universal slots so that any module can be installed anywhere in the slots.
9. The system shall have the inbuilt auto attendant facility and shall be able to answer minimum 5 calls simultaneously and should support dial by name.
10. It shall have minimum 15 participant's conference.
11. The system shall have an ISDN Digital platform and shall be compatible with ISDN PRI line of Local Service Provider.
12. The system shall have multiple port interfaces such as analog extension lines, Digital key phone, IP Extension, C.O. Line, GSM/3G, E & M Line, PRI/E1 and VoIP. The all interfaces shall be in the form of expansion cards and can be plugged into the universal slots of the system as and when require in the future.
13. The system shall have at least 2-RS232 ports for SMDR/PMS/CAS Interface and one parallel printer port for Centronics interface.
14. The system can be programmed through Analog telephone, Digital key phone, and Ethernet without any external devices.
15. The system can be programmed remotely if it is connected to the Internet.
16. The call ringing sequence would be programmable and have options such as simultaneous, hunting off, round robin and delayed simultaneous.
17. The system shall have a built-in remote maintenance facility.

18. It shall have built-in one number of public address port and external music port.
19. The system shall have the unrestricted simultaneous dialing facility. Preferably system shall have dedicated DTMF circuit on each port.
20. Caller line identification (CLI) on Analog and digital/PRI trunks shall be in-built for both DTMF and FSK telephone instrument.
21. The system shall integrate in-skin voice mail card with adequate storage capacity.
22. Detail reports of all system parameters should be generated through the SMDR port of EPABX.
23. The system shall have a QSIG Protocol on PRI to support suitable to work with other EPABX.
24. The system should support CLI based DISA feature.
25. Each port of the system shall be programmable. It shall have programmable features.
26. The system shall support flexible numbering for extensions such as it may have extension with 1 digit, 2 digits and up to 6 digits numbers as well as in combination of all.
27. The system shall have web based software programming tool for system administration. The license copy of the software and all hardware attachments shall be provided for on site programming.
28. Access codes, system timers and access to features shall be programmable.
29. Storage of outgoing, incoming and internal call reports shall be generated on the SMDR port of the system. It shall also be available online through Ethernet Port.
30. Voice guided auto attendant shall be preferably built-in.
31. DISA, DOSA and remote programming features along with their hardware cost shall be provided.
32. There shall be minimum 900 numbers possible and shall be able to dial it as an abbreviated numbers.
33. Features given to an extension shall be accessed from any other extension by dialing the secret codes.
34. System features shall have class of service, night service, conference, auto diagnostic etc. Class of service shall be unrestricted. STD restricted and semi restricted.
35. System must have following features:
 - Call Budget on Trunk
 - CLI based DISA (Mobile Extension)
 - GSM Trunk Connectivity
 - Multi-Stage Dialing
 - Returned Call to Original Caller (RCOC)
 - Automatic Call to Missed (Predefined) Calls on GSM SIMs
 - Dual Ring
 - Routing of calls to only permissible legal networks (Logical Partitioning)
 - SMDR though Ethernet Port
36. Extension features shall have extension to extension call, extension to central office, extension to operator, automatic call back, call transfer, call forward, follow me, executive/secretary, do not disturb, barge-in, raid, Boss ring, Priority, emergency reporting etc.
37. Operator features shall have the assistance to extension, attended call transfer, call intercept, indication of call waiting, night service control etc.
38. The system shall have features as CLI based routing, call duration control, least cost routing i.e. time, number or combination of both.
39. The system shall have a conversational recording in the mail box. Conversation recording should be possible on both Digital key phone and Analog phone lines both.
40. The system shall have security dialer. It is preferable to connect any sensor such as Glass break sensor, fire sensor etc. shall connect directly to the system. When sensors get activated system will dial out the pre programmed number and deliver prerecorded emergency message as well as request for confirmation.
41. The system shall have call buffer storage of more than ten thousand calls (outgoing, incoming and internal calls).
42. It should be possible to support IP Trunks and Extension with the single expansion card.

43. Expansion of VoIP channels shall be possible with an expansion card.
44. The system shall provide IP functionality to support IP extensions and trunks over SIP protocol.
45. The system shall support 50 IP Users and 16 VoIP (SIP) Trunks.
46. Varied type of IP Terminals such as IP Phone, SIP soft phone and Mobile SIP Client shall be supported.
47. The system shall also be required to supply IP Phones of the same manufacturer.
48. IP functionality of the system shall be in-skin interface cards and can be inserted on the any slots on the platform.
49. The system must support following features of IP telephony:
 - Dynamic DNS (DDNS)
 - Registrar Server
 - Proxy Server
 - Presence Server
 - NAT and STUN

Mode of measurement:

The main telephone cables shall include supply and laying of multi pair cables on ceiling/wall/on cable trays/racks including all supports and shall be measured and paid on running length basis. Cable trays/racks shall be paid for separately.

The multi pair tag blocks shall consist of two telephone connector's strips, jumpered interconnections silver soldered enclosure etc. and shall be measured and paid as one unit.

The conduit wiring for telephone shall include single pair 0.5 diameter cable in heavy duty rigid, PVC conduits and shall include junction boxes, pull boxes, 2 pair 2 A connector in GI box, perspex cover etc. and shall from one point
The copper cables for internet shall include supply and laying of CAT 6 cables on ceiling/wall/on cable trays/racks including all supports and shall be measured and paid on running length basis.

The EPBAX shall include supply, installation, testing & commissioning of telephone connectivity from each users and shall be paid as One unit.

CLOSED CIRCUIT TELEVISION SYSTEM

GENERAL

The facility are expansive, critical and present unique challenges for security personnel. The objective shall be to provide High degree of Electronic surveillance system to the entire premises.

The purpose is to monitor & servile the entire area for unwanted, untoward incidents. It is also essential to have recorded images to be stored at least for 30 days of all critical area's to facilitate investigations of a reported case. The objective is also to restrict unauthorized personnel entry & exit thru critical area's, and facilitate effective people management strategically placed video surveillance cameras help to enhance security by providing motion based/continuous monitoring of all parts of premises.

A. All equipment and materials used shall be standard components that are regularly manufactured and used in the system.

B. All systems and components shall have been thoroughly tested and proven in actual use.

C. All systems and components shall be provided with a one-day turnaround repair express and 24-hour parts replacement. The repair and parts express shall be guaranteed by the manufacturer on warranty and nonwarranty items

SCOPE

The system shall consist of separate components to comprise a system which is as follows:

1. High Definition color Cameras

2. Digital Video Recorder

The Contractor will install, test, & commission the system as per drawings. The Viewing angle, clarity, brightness function of all the cameras has to be as per given technical specification.

Cameras to be installed in various areas as shown in drawing.

The Cabling shall be (3+1) Copper Cable with standard accessories type as per specification given herein. Digital video recorders shall be placed as shown in drawing.

Original Equipment Manufacturer Standard

High Resolution Dome Camera

Sr.No.	Description	
1	Video Standard	PAL
2	Scanning System	Progressive
3	Image Sensor	1/4" CMOS Sensor
4	Resolution	720P
5	Number of Pixels	1280 (H) × 720 (V)
6	Minimum Illumination	0.01Lux BW, 0Lux IR
7	Video Output	AHD BNC, CVBS terminal
8	Video Frame Rate	25 fps (PAL)
9	Sync System	Internal
10	Automatic Electronic Shutter	1/25s ~ 1/50,000s(PAL), 1/30s ~ 1/60,000s
11	Lens Type	3.6mm
12	IR LEDS	24 LEDS
13	IR Illumination Distance	Upto 20m, depending on scene reflectance
14	SNR	>50 db
15	Day/Night	Auto with ICR
16	Automatic Gain Control	Auto
17	White Balance	Auto
18	Digital Noise Reduction	Auto (3DNR)
19	WDR	DWDR (ON/OFF)
20	OSD	Yes

21	Electrical: Input Voltage	DC12V ± 10%, 500mA
22	Power Consumption	6W ± 10%
23	Mechanical Construction	Housing: Vandal resistant, Color: Semi-white
24	Connectors	Video output: AHD BNC connector; CVBS terminal, Power input: 2.1 mm plug
25	Environmental :Operating Temperature	-10°C to 50°C
26	Relative Humidity	10% to 95%, non-condensing
27	Certification Regulatory	CE
28	System Compatibility: Compatible DVR	AHD DVR

8 Channel 720P AHD Digital Video Recorder:-

- 720P high resolution recording
- H.264 High profile compression
- Playback 4/8 channels simultaneously
- Multiple recording options: manual, schedule, motion detection
- Pentaplex operation: live view, record, play back, backup and remotely access
- HDMI and VGA output simultaneously upto 1080P resolution
- 1/2 SATA HDD interface: maximum 12TB storage capacity
- DHCP, DDNS, IE browser and CMS supported
- On-line user view: maximum 10 users simultaneously
- Mobile app for Android and iOS
- Power: DC12V

Sr.No.	Description	
1	Operating System	Embedded Linux
	VIDEO	
2	Video Standard	PAL
3	Video Compression	H.264 (High Profile)
4	Inputs	8 BNC
5	Recording Rate	8 channels 720P@200/240 fps
	AUDIO	
6	Audio Compression	G.711A
7	Two-way communication	Reuse audio input/output channel 1
8	Audio Input	4 channel, RCA
9	Audio Output	1 channel, RCA
	Recording and Playback	
10	Record Mode	Manual / Schedule/ Motion detection
11	Playback	8 channels 720P@25/30 fps
12	Hard Disk	1 SATA port, up to 6 TB
13	Backup Mode	USB Device, Network
	Display	
14	Display	1 VGA, 1 HDMI, 1 BNC
15	Display Resolution	1920x1080; 1280x1024; 1024x768; 800x600
16	Display split	1/4/6/8/9
17	Privacy Masking	3 rectangular zones for each camera
18	OSD	Camera Title; Time stamp; Video loss; Motion detection; Recording
	Auxiliary Interface	
19	Alarm Input	4
20	Relay Output	1

21	PTZ control	RS 485,Support Multiple PTZ control
22	USB	2 ports (1 on rear panel), USB 2.0
23	IR Remote	rear panel), USB 2.0 Yes
	Network	
24	Ethernet	RJ 45 10M/100M Adaptive Ethernet Port
25	Network Function	HTTP; TCP/IP; DHCP; IP filter; DDNS; P2P; UDP; PPoE
26	Maximum number of users	10 USERS
27	Mobility	iPhone, iPad, Android (phone and tablet)
	Electrical	
28	Power Supply	12V DC
29	Power Consumption	< 8W (without HDD)
	Environmental	
30	Operating Temperature	-10°C to 50°C
31	Relative Humidity	10% to 90%, non-condensing
32	certificates	CE

TESTING & COMMISSIONING

Sr.No.	Description	Visual Inspection
1	All cables are tested for continuity, insulation, resistance etc.	
2	System installation proper as per drawing	
3	Carry out visual checks on all cameras, cables, DVR camera housing etc.to ensure they are clean and free from any mechanical damage	
4	Check for proper termination & feruling	
5	Check input A/C supply voltage	
6	Check Input supply DC voltage at every camera	
7	Check proper connection of video cable to ensure that there is no video loss	
8	Check DVR connections with camera & monitor	
9	Check all camera's signal on monitor. Also check for clarity, sharpness of the picture.	
10	Check recording, playback & other various features of DVR randomly.	
11	Check recording FRAME RATE	

DOCUMENTATION

The CCTV system contractor, upon completion of the commissioning activity, shall hand over the system to the customer. At the time of hand over, the contractor shall provide the customer with the following documentation:

1. Copy of detailed report
2. Component and equipment list
3. Product description sheets
4. System design drawing(s)
6. System schematic diagram(s)
7. System operating manuals

HANDOVER

Prior to final acceptance, the installing contractor shall provide complete operation and Maintenance instruction manuals to the owner. All aspects of system operation and maintenance shall be detailed, including wiring diagrams of all circuits, a written description of the system design, sequence of operation and drawing(s), illustrating control logic and equipment used in the system. Checklists and procedures for emergency situations, maintenance operations and procedures shall be included in the manual.

TRAINING

General

The contractor shall provide the customer with details of the training required by personnel to operate and maintain the CCTV system. The Contractor and the customer shall jointly agree the number of staff to attend the training courses.

MAINTENANCE

Routine maintenance should be carried out in accordance with customer's requirements. All performance checks undertaken should be recorded in the system log book. As a minimum, the following performance checks must be undertaken on each maintenance visit. Remove dust and dirt from the camera enclosures (Inside & outside) exterior using a soft brush or a lint cloth. A solvent which is harmless to the finishes of metal and plastic may be applied to more stubborn stains. Examine the exterior of the enclosure for any signs of damage or loose cable glands and rectify any faults found. Remove any dust or dirt from the interior of the camera & DVR using a soft brush or a vacuum cleaner. Examine the printed circuit boards for signs of overheating, dry joints and/or damaged tracks.

Conventional Fire Detection System

SCOPE OF WORK

The contractor's scope of work covers supply, installation, testing and commissioning of complete Fire Detection and Control System as specified.

GENERAL

The Main/Local 4-zone Fire Alarm Control Panel and loop devices including sensors, Manual Call points (MCP), interface modules and relay units should be sourced from the same manufacturer to ensure total compatibility between Hardware & Software.

All the equipment supplied as a part of this specification shall conform to the latest applicable Indian Standards or IEC publications and shall comply with all currently applicable Statutes, regulations and Local safety codes.

CONVENTIONAL PANEL

GENERAL

- Simple, user friendly design
- Simple to install
- Intuitive to use
- 4 Zones
- Walk test
- Enhanced feature set
- Multilingual text inserts
- Designed to comply with EN54 part 2 and part 4.

TECHNICAL:-

Mechanical:-

Construction

Fire retardant, ABS plastic moulded enclosure, sealed to IP30

Operating Temperature

+5°C to +45°C

Relative Humidity

5% to 95% non-condensing

Electrical:-

Operating Voltage

230 Vac 50/60 Hz (±15%)

Internal Power Supply

Output voltage +18.5 to +28.5 Vdc

Output Current 1.8 Amps maximum

Maximum Alarm load: 1 Amp

Standby Batteries

Minimum capacity 2 x 12 V 2.8Ah

Maximum capacity 2 x 12 V 7 Ah

Standby Battery

Sealed lead acid Type

Detection Circuits

4 detection circuits 2 mA per circuit (typically >20 detectors)

Approved Detectors

Apollo Series 60, Series 65 &Orbis.

Morley-IAS Horizon HRZ Series

System Sensor ECO1000 & Series 300

Digital Inputs

22 configurable inputs
(Class Change, Alert, Evacuate, Reset)

Digital Trigger

Input Extended closing contact

External Outputs

Sounder Outputs:

2 monitored outputs

0.5 Amps per circuit

Auxiliary Output:

+18.5 to +28.5 Vdc, 0.5 Amp. (max)

1. GENERAL

- A. All equipment's shall be tested prior to installation.
- B. The manufacturer shall have presence in the country to provide the required technical support for the installer and the end user.
- C. The offered products shall carry a 3 year warranty from the manufacturer.

Approvals

The System must be of a type submitted to, tested, approved, and/or listed by LPCB. The entire installation shall be installed to comply with:

- EN Standards
- BS Standards
- ISO

System Description

CONVENTIONAL FIRE ALARM SYSTEM

The CONVENTIONAL FIRE DETECTION AND ALARM SYSTEM will comprise of conventional fire control panels, smoke detectors and accessories. The smoke detector and accessories will be compatible with any standard conventional control panel as selected and approved by the user. The smoke detectors will be conventional type with optional facility to become addressable by use of external programmable accessories. The smoke detector should incorporate an Application Specific Integrated Circuit (ASIC).

The smoke detectors will have the latest state of the art optical chamber and will provide efficient and accurate detection for wide application of fires with a high level of resilience to non-fire environmental influences having a flat response for majority of fires it should be sufficient to apply the photo detector for all commercial fire applications.

The detectors will incorporate a bi-color LED indicator. The integral LED should change color according to the detector's status - Green = Normal, Red = Alarm. The Green LED should be programmable for blink/no blink operation.

Drift compensation' algorithms will be one of the key features of the detector by using a special dust resistant chamber design. These algorithms will ensure a consistent alarm sensitivity threshold for periods between service intervals. This will provide the user with both a reduction in the frequency of nuisance alarms and maintenance savings by extending the period before cleaning of the detector chamber is required.

TECHNICAL FEATURERS

- ❖ Advanced microprocessor based fire alarm panel with 16 x 2/40 x 2 character LCD display.

- ❖ 30 conventional detector connectivity in a Zone (Maximum 16 Zone)
- ❖ ATX key board interface with alpha numeric keys and special character for field programming.
- ❖ Operates on 220v. AC and 24 v. DC (battery backup)
- ❖ Rugged CRCA sheet with power coated finish.
- ❖ 1000 events data log in facility with time and date stamp (optional)
- ❖ TCP / IP connectivity for remote monitoring (optional)
- ❖ Displays Zone number, custom description in fire event

DETECTOR ELECTRICAL AND MECHANICAL SPECIFICATIONS

Electrical

Operating Voltage Range 8 to 30 VDC (Nominal 12/24VDC)

Maximum Standby Current 80µA

Maximum Permissible Alarm Current (LED On) 50mA at 24Vdc (Limited by Panel)

Environmental

Operating Temperature Range -20°C to +60°C-30°C to +70°C for short duration

Humidity 5 to 95% Relative Humidity (non-condensing)

Mechanical

Height 32.5mm

Diameter 102mm

Weight 75g

Max Wire Gauge for Terminals 1.5mm²

Color Pantone, warm grey 1C

a) **Photoelectric/ Optical Type Smoke Detector**

Optical smoke detector with the new and advanced chamber design makes it a universal smoke detector giving a flat response for majority of fires.

The detector while sensitive to all type of smokes will be insensitive to ambient lights, air drafts, and changes within the operating temperature and voltage ranges.

The detector can be connected to either class A or Class B wiring types using two wire connections through the detector plug in base or alternatively through the 4 wire relay bases giving potential free outputs at the time of operation.

The detector should have bi-color LED. In normal conditions should blink green and in case of fire it should blink Red.

The Detector shall meet the requirements of EN 54 or LPCB and shall be specifically approved by LPCB. It shall be possible to test the detector's working both from the Panel as well as locally by means as designed by the Bidder.

b) **Rate of Rise Type Heat Detector**

It is a combination of rate of rise and fixed temperature principle using thermistor and with automatic compensation for changes of ambient conditions. The detector should have bi-color LED. In normal conditions should blink green and in case of fire it should blink Red.

The thermal detectors are tested and approved to EN54 part 5 (2000) Class A1R by LPCB.

c) **Manual Call Box.**

The manual call point should be compatible with all conventional control panels.

They are suitable for immediate manual activation of the alarm or extinguishing system in the event of fire by breaking the front glass. The call point is reset by replacing the front glass.

MCP's can be surface mounted or flush mounted and are for indoor use generally rated for IP24D and listed with LPCB to BS5839:pt 2.

d) **Hooter**

Horn/Strobe shall be listed to UL 1971 and UL 464 and shall be approved for fire protective service. Horn/strobe shall be wired as a primary signaling notification appliance with flashing at 1Hz over the strobe's entire operating voltage range. The strobe light shall consist of a xenon flash tube and associated lens/reflector .

The horn shall have two tone options, two audibility options (at 24 volts) and the option to switch between a temporal 3 pattern and a non-temporal continuous pattern. Strobes shall be powered independently of the sounder with the removal of factory installed jumper wires. The horn on horn/strobe models shall operate on a coded or non-coded power supply (the strobe must be powered continuously

e) **FIRE ALARM CONTROL PANEL**

- 1) The fire Alarm Control Panel shall be microprocessor based Unit which shall control all detectors, Manual Call Points, Interface Units and Switching Systems connected to it. This shall complete with RS 485 communication system.
- 2) The Panel shall also give adequate warning signal whenever there is dust accumulation in detectors, and up to the point of its replacement it should be possible to change the level of ambient alarm calibration condition either by the use of software programme operable by the Client or by resetting the detector.
- 3) The Panel shall also be able to actuate Switches automatically in case of Fire condition that of AHUs and Power Supply or other Systems such as piped pressurized gas supply. The Bidder will be required to design and install the system in operation in coordination with the relevant Contractors. The Bidder will not be allowed to charge extra on this account, and such charges shall be included in his package.
- 4) The System shall be fail safe and adequate safe guards should be under taken that in the event of a failure of a part of the System it shall not handicap the complete system.
- 5) The Bidder shall undertake the responsibility of the complete installation, commissioning, user trials, training and maintenance of the system as required.
- 6) The Panel shall have its own Battery Back up of a minimum of 12 hours run. The Battery shall be of Nickel Cadmium or as Manufacturers Standard of capacity as required and accepted by the Client.
- 7) It shall be able to withstand temperature variations from 0 Degree Centigrade to 50⁰ Centigrade. Further, Relative Humidity (Non Condensing type) upto 95% shall not hamper its performance. The Voltage rating shall be from 17 V DC to 28 V DC, though the voltage may be changed depending upon the working voltages of a proprietary Fire Alarm Panel.
- 8) The Panel shall be totally enclosed dust and vermin proof type made of minimum 16 gauge dust inhibited sheet with even baked finish. The panel shall be of completely solid state design.
- 9) The logic circuits shall be based on high noise immunity solid tasted hardware employing modular construction. Logic cards shall be of epoxy fibre glass construction.
- 10) The Panel shall have an extra Zone to serve as Standby in case of burn out of or malfunctioning of any operating Zone.

7. INSTALLATION

Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer. All cables, junction boxes, cables supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas. Manual Pull Stations shall be suitable for surface mounting or semi flush mounting as shown on the plans, and shall be installed not less than 42 inches, nor more than 48 inches above the finished floor.

8. TESTING

Initial testing can be carried out as per following but not limiting to :-

SrNo	Description	Documentation/Visual Inspection
1	All cables are tested for continuity, insulation, resistance etc.	
2	Carry out visual checks on all panels, cables, interphase modules etc. to ensure they are clean and free from any mechanical damage	
3	Check for proper termination & ferruling	
4	Check input A/C supply voltage	
5	Check location/spacing of Detectors as per standards	
6	All devices are addressed as per drawing	
7	Check Distribution of Detector / Loops / Zones as per Drawing.	
8	Check all Modules / Detectors, for healthy blinking status.	
9	Apply Smoke / Aerosol to random detectors & check output of the same in panel, shall display proper address/Loop/zone.	
10	Check distribution of Amplification Zones as per approved shop drawings	
11	Check tripping of AHU / Fan / Access doors etc. on activation of detectors.	IF APPLICABLE
12	Activation of Speaker circuits as per programme, evacuation message/alert message/emergency message	
13	All the manual call points are working properly	
14	Hooter / Speaker are working as programmed	
15	If power fails, whether panel working on battery supply	
16	Panel display and all keys working properly	
17	Check for seamless integration with BMS	IF APPLICABLE
18	Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system.	
19	Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.	
20	Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.	IF APPLICABLE
21	Verify activation of all flow switches.	IF APPLICABLE
22	Open initiating device circuits and verify that the trouble signal actuates.	
23	Open signaling line circuits and verify that the trouble signal	

	actuates.	
24	Open and short notification appliance circuits and verify that trouble signal actuates.	
25	Ground initiating device circuits and verify response of trouble signals.	
27	Ground notification appliance circuits and verify response of trouble signals.	
28	Check presence and audibility of tone at all alarm notification devices.	
29	Check installation, supervision, and operation of all intelligent smoke detectors during awalk test.	
30	Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.	
31	When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.	

9. COMMISSIONING

Pre Commissioning At final commissioning of each system, the Contractor shall confirm that:

All detection devices, including point detectors, beam smoke detectors, flame detectors, and aspirating smoke detectors and inputs are tested and operate correctly. All manual controls, whether manual call points or centrally located controls, operate correctly. The correct indications are given at the control and indicating equipment, including the repeater panels, mimic panels and graphics PC central control and display terminal. All outputs operate, in the required manner, including alarm sounders or voice alarm system loudspeakers, visual indicators and connections to ancillary services and other systems. In particular, the Contractor shall check that audibility levels of sounders and/or audibility and intelligibility of voice alarm broadcasts are correct. The fire detection and fire alarm system complies with the operational sequence detailed in Section 5 of this Specification. The standby batteries are adequately sized. (Measurements of the quiescent and alarm loads shall be taken and compared to calculated values used at the design stage.) Calculations and measurements shall be submitted to the Engineer. Commissioning shall be fully documented and the documentation submitted to the Engineer. The Contractor shall demonstrate each fire detection and fire alarm system to the satisfaction of the Engineer by conducting a series of witnessed acceptance tests as directed by the Engineer. This shall take place after the above final commissioning and following receipt of the commissioning documentation by the Engineer. Acceptance testing shall include the actuation of all devices in the system, simulation of various faults and operation of all manual controls. Following commissioning, a system soak period of not less than one week shall follow, unless the system incorporates fewer than 50 automatic fire detectors, in which case no soak test is necessary. Both the installation and the commissioning activities shall be undertaken as a single continuous operation. Upon completion of the installation activity, the Fire Alarm contractor shall Test, Start-up, Commission and Handover the system to the customer. The Fire Alarm contractor shall make use of the following documents to record test results and details of commissioning tests:

Cable Test Sheets
Installation Check Report
System Layout Drawing(s)
System Schematic Diagram(s)

The Fire Alarm contractor shall be responsible for inspecting and testing the complete system, Including:

1. Detectors
2. Call Points
3. Sounders
4. Ancillary Devices
5. Fire Controller Equipment and Associated Devices
6. Auxiliary Equipment
7. Operating and Control Software.

The fire controller and associated devices and modules shall be tested in accordance with the guidelines set out in NFPA-72 and the testing instructions provided by the manufacturer. The Fire Alarm contractor shall start up and operate the system for a trial period to ensure that it operates correctly. The Fire Alarm contractor shall test all functions of the system, including the software, to ensure that it operates in accordance with the requirements of the design specification and relevant standards. The Fire Alarm contractor shall undertake audibility tests during which the sounders may be operated continuously over a period of two hours. (Should the customer require these tests to be carried out at a separate visit, or out of normal working hours, this can be arranged at additional cost.)

Commissioning of the system shall constitute practical completion. Following the satisfactory completion of installation, testing and start up, the Fire Alarm contractor shall demonstrate to the customer that the system successfully performs all of the functions set out in the design specification. The Fire Alarm contractor shall provide the customer with an agreed quantity of spare parts, testing equipment and consumables which are to be used during routine maintenance and testing of the system. The Fire Alarm contractor shall provide a customer appointed fire system supervisor with on-site training in the use, operation and maintenance of the system and explain the procedures to be followed in the event of fire and false alarms. The system supervisor shall also be shown how to carry out routine maintenance and testing procedures, and how to keep the Log Book. The Fire Alarm contractor shall prepare a report detailing all tests performed during installation and commissioning of the system. The report shall include the results of the tests and details of any specific Settings or adjustments made. Any outstanding tasks or activities which are to be completed at another time shall also be included in the report. The Fire Alarm contractor shall present an Acceptance Certificate for signature by the customer.

10. DOCUMENTATION

Pre Commissioning Prior to handover, the Contractor shall furnish with 'as fitted' drawings / wiring diagrams. 'As fitted' drawings shall indicate the layout of all equipment, layout of aspirating smoke detector pipework, cable routes and cable sizes/types used. Wiring schematics, including cable termination details, shall also be provided by the Contractor. 'As fitted' CAD drawings shall be prepared using a software package capable of providing dwg format and two electronic copies shall be made available in that format. Also, four sets of A0 prints shall be provided to the Engineer.

Prior to handover, the Contractor shall also furnish with O&M manuals. In addition to the manufacturer's technical data sheets on all components of the system and standard operating and maintenance instructions, the O&M manuals shall include specially written sections covering the specific operation of the system and any special maintenance requirements. Three printed copies of the O&M manuals shall be supplied along with a copy in electronic form in a format that is computer readable, e.g. the Microsoft Office™ range of software i.e. Word™, Excel™, etc.

The following documentation shall also be provided at handover:

- The site-specific software as loaded into each control panel, to be supplied in both electronic format and printed listing for secure storage on site by client.
- Alarm audibility and/or intelligibility information. (This can be recorded on the 'as fitted' drawings.)
- Test results for all system wiring.

- Commissioning testing results/listings.
- Standby battery calculations.

Contract Documentation

The Fire Alarm contractor shall provide a complete set of documents describing the system and its design concepts, installation, final testing, commissioning, and required operating and maintenance procedures.

As a minimum, the following documentation shall be provided for the system:

1. System description.
2. Checklist of equipment and components.
3. Installation instructions.
4. Equipment connection diagrams showing wiring detail of Addressable Device positions with addresses.
5. Standby battery calculations showing system power requirements and formulas used to calculate specified power.
- 6 Final testing instructions.
7. Commissioning instructions.
8. Certification documents.
9. Log book.
10. System operating instructions.
11. Routine maintenance instructions and schedules.
12. Remote monitoring link description and operating instructions (if this option is being provided).

As a minimum, the following drawings shall be provided for the system:

1. System schematic diagram.
2. Cabling and wiring diagram.
3. Detailed equipment connection diagrams.
4. Building plan showing zoning and location of fire controller, detectors, call points, sounders and ancillary devices.

The Fire Alarm contractor shall provide a complete set of system operating and service manuals for the following:

1. Fire controller
2. Detectors
3. Call points
4. Sounders
5. Ancillary devices
6. Remote monitoring link (if this option is being provided).

The date for submission of all documentation shall be in accordance with the schedule provided by the Fire Alarm contractor and as agreed with the customer.

FINAL INSPECTION:

At the final inspection a factory trained representative of the manufacturer of the major equipment shall demonstrate that the systems function properly in every respect.

INSTRUCTION:

Provide instruction as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided. The contractor and/or the systems manufacturer's representatives shall provide a typewritten "Sequence of Operation."

11. HANDOVER

The Alarm contractor, upon completion of the commissioning activity, shall hand over the system to the customer.

At the time of hand over, the Fire Alarm contractor shall provide the customer with the following documentation:

1. Copy of detailed report
2. Component and equipment list
3. Product description sheets
4. System design specification
5. System design drawing(s)
6. System schematic diagram(s)

7. System operating and service manuals
8. Certificate of certification
9. Fire system users handbook, containing log book, routine maintenance instructions and schedules
10. Remote monitoring link description and operating instructions (if this option was provided).

12. TRAINING

General

The Fire Alarm contractor shall provide the customer with details of the training required by personnel to operate and maintain the fire detection and alarm system.

The Fire Alarm contractor shall provide two levels of training:

- * System Supervisor Training
- * Other Staff Training

The Fire Alarm contractor and the customer shall jointly agree the number of staff to attend the training courses. System Supervisor Training System supervisor training shall include technical training sessions provided at the Fire Alarm contractor's premises and on-site training given during installation and commissioning of the system. System supervisor training shall be given by an experienced and competent engineer familiar with the fire system being installed.

The scope of training provided shall depend on the type, size and complexity of the system. The Fire Alarm contractor shall initially provide technical training in all aspects of the system. The trainee shall then be given full instructions in the use, operation and maintenance of the system. This shall include instruction in the procedures to be followed in the event of fire and false alarms, routine maintenance and testing procedures, and how to keep the Log Book. Other staff training shall include training sessions provided on-site after hand over of the system. The training sessions shall be given by an experienced and competent engineer familiar with the fire system installed. The scope of training provided shall include full operating instructions in the use of the fire system. This shall include instruction in the procedures to be followed in the event of fire and false alarms.

13. MAINTENANCE

General

According to the recommendations in NFPA-72 fire systems should be regularly maintained under a maintenance agreement. Fire and planning authorities, and in certain cases insurers, have powers to check that fire systems are maintained. Failure to maintain the fire detection and alarm system could contribute to death or injury in the event of fire. The customer shall be responsible for ensuring that daily, weekly and monthly routine maintenance is carried out in accordance with the recommendations set out in NFPA 72 and the service and maintenance instructions provided by the Fire Alarm contractor or manufacturer. The Fire Alarm contractor shall provide detailed information about the maintenance services which can be provided after hand over of the system. If requested, the Fire Alarm contractor shall prepare and submit a draft maintenance contract for consideration by the customer. The draft contract shall include complete details of all materials and labour required to maintain the system in correct working order. It shall also include details of the testing procedures which will be carried out and specify the proposed number of visits per year.

PUBLIC ADDRESS SYSTEM

SCOPE OF WORK

The contractor's scope of work covers supply, installation, testing and commissioning of complete Public Address system specified.

GENERAL REQUIREMENTS

INSTALLATION:

Installation shall be as shown on the drawings, and as recommended by the major equipment manufacturer. All cables, junction boxes, cables supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas

Technical Detail:-

- Mixer amplifier as per total speaker wattage including buffer.
- 3 MIC inputs; 2 AUX input
- Master, Treble & Bass volume tailoring for amplifier output.
- 70 V and 100V selectable loudspeaker line output
- Automatic mute function for paging & announcements
- Individual input gain controls with master volume control.

Specification:-

Description	Value
Line Input	MIC 1,2,3,600 ohms,unbalanced; AUX 1,2
Microphone Input	1,2,3, 600 ohms 5-8 mV, unbalanced phone jack
Line Output	600 ohms; 1.2 V
Frequency Response	60Hz~15KHz
Total Harmonic Distortion(THD)	<0.5% at 1kHz
Signal Noise Ratio(S/R)	>72 dB
Constant Voltage Input	100V, 70V
Power Supply Voltage	AC 220V ± 10% 50/50Hz

TESTING:

Sr. No.	Description	Visual	Test Readings	Documentation
1	All cables are tested for continuity, insulation, resistance etc.			√
2	System installation proper as per drawing	√		
3	Carry out visual checks on all speakers & Processors are free from any mechanical damage, cables, inter phase modules etc.to ensure they are properly installed.	√		
4	Check for proper termination of bootlace lugs & feruling	√		
5	Check Input A/C Supply Voltage		√	
6	Check location / spacing of loudspeakers as in	√		√

	drawing.			
7	Check Distribution of Zones as per Drawing.	√		√
8	Check full load speaker sound quality & measure Sound pressure level (SPL) in dB.	√	√	
9	Check if local loudspeakers overrides by voice messages in case of emergency evacuation.	√		√
10	If power fails, whether Voice evacuation system is working on battery supply if yes for what time		√	
11	Check if recorder messages are CLEAR, free from any noise distortion & easy to understand with Room acoustic speech transmission Index (RaSTI) value >0.5.	√	√	
13	Check for Microphone locations & the sensitivity by paging	√		√
14	Play a soft music & check sound quality	√		

COMMISSIONING:

At final commissioning of each system, the Contractor shall confirm that:

All devices, control panels are tested and operate correctly.

The standby batteries are adequately sized. (Measurements of the quiescent and full loads shall be taken and compared to calculated values used at the design stage.) Calculations and measurements shall be submitted to the Engineer.

Commissioning shall be fully documented and the documentation submitted to the Engineer.

The Contractor shall demonstrate each zone and main panel to the satisfaction of the Engineer by conducting a series of witnessed acceptance tests as directed by the Engineer. This shall take place after the above final commissioning and following receipt of the commissioning documentation by the Engineer.

Both the installation and the commissioning activities shall be undertaken as a single continuous operation. Upon completion of the installation activity, the contractor shall Test, Start-up, Commission and Handover the system to the customer.

The contractor shall make use of the following documents to record test results and details of commissioning tests:

- Cable Test Sheets
- Installation Check Report
- System Layout Drawing(s)
- System Schematic Diagram(s)

The contractor shall be responsible for inspecting and testing the complete system. The contractor shall present an Acceptance Certificate for signature by the customer.

DOCUMENTATION:

The contractor, upon completion of the commissioning activity, shall hand over the system to the customer. At the time of hand over, the contractor shall provide the customer with the following documentation:

1. Copy of detailed report
2. Component and equipment list
3. Product description sheets
4. System design drawing(s)
6. System schematic diagram(s)
7. System operating manuals

HANDOVER:

Prior to final acceptance, the installing contractor shall provide complete operation and maintenance instruction manuals to the owner. All aspects of system operation and maintenance shall be detailed, including wiring diagrams of all circuits, a written description of the system design, sequence of operation and drawing(s), illustrating control logic and equipment used in the system. Checklists and procedures for emergency situations, maintenance operations and procedures shall be included in the manual.

TRAINING:

General

The contractor shall provide the customer with details of the training required by personnel to operate and maintain the PA system. The Contractor and the customer shall jointly agree the number of staff to attend the training courses.

MAINTENANCE:

Routine maintenance should be carried out in accordance with relevant customers' requirements. All performance checks undertaken should be recorded in the system log book. As a minimum, the following performance checks must be undertaken on each maintenance visit. Carry out verification checks as detailed in the commissioning instructions. Remove dust and dirt from the Control Panels/speakers using a soft brush or a lint cloth. A solvent which is harmless to the finishes of metal and plastic may be applied to more stubborn stains. Examine the exterior of the enclosure for any signs of damage or loose cable glands and rectify any faults found. Examine the printed circuit boards for signs of overheating, dry joints and/or damaged tracks. Examine the battery terminals for secure connection and for any signs of corrosion. Replace or repair as required

ACCESS CONTROL SYSTEM

Web Based Access Control Specifications

The proposed system should be a 2-door web-based access control panel designed to provide easy-to-use and cost-effective solution to meet the requirements of all entry-level applications. The system should have a built-in web server should allow user to use a standard Web browser to manage, control, and monitor the access control system from anywhere with internet connection. There should be no additional software required for the same.

The proposed system should have the following features:

System Overview

- 2-doors controller, expandable up to 20 doors over RS485 network
- Embedded Web server
- 32-bit ARM9 processor
- Onboard I/O: 2 readers; 8 supervised inputs; and 4 relay outputs
- Flash programming for firmware revision updates
- Anti-passback capability, hard and soft
- Two-door interlock supported
- Real time clock

System Capacities

- Cardholders: 10,000
- Transaction storage: 25,000 alarms and events
- 127 Time Zones and 255 Holidays
- 128 Access Level
- Card format compatibility: 128 types of Wiegand format support
- Credential facility codes: 8

Database and Database Maintenance

- Built-in SQL Lite Database
- Manual backup of system database to local client PC
- Alarm & Event database auto backup

Communication

- Onboard Ethernet port connected to TCP/IP network as master panel

- Onboard RS485 connection for downstream panels

Web Brower

- Standard web browser e.g. Internet Explore or Firefox
- Complete system configuration from Web Interface
- Live event and alarm monitoring
- Visualized viewing of door status and real-time manual control of locks and other devices
- Card report
- Alarm & Event report
- Detailed report generator
- 128-bit SSL browser login encryption
- Up to 6 users to log in simultaneously

Certification and Approvals

- CE/FCC/C-Tick/KCC

Projector

Scope:-

1.1 The scope of work shall cover supply, installation, commissioning and testing of :

- LCD projector
- Motorized projector screen
- Microphone
- network singal processor

Technical Specification

LCD Technology Projector, WXGA Resolution with 1280 x 800 Pixels, Next generation Wireless connectivity, Brightness - 4000 Lumens, Contrast Ratio: 10,000:1.	Projector	1 No
Motorized Projection screen with American Matt White Fabric with HD Series	Screen	1 No
High Performance Boundary Layer Microphone, Three-position bass-tilt switch, Phase Coherent Cardioid technology, Silent-operating ON/OFF switch, Audio frequency bandwidth: 50 Hz to 20 kHz, Transducer: Electret condenser, Polar Pattern: super cardioid.	Microphone	14 No
Network 12 Analog Inputs (with 48v Phantom Power per Channel), 8 Analog Inputs Expanded, 8 Analog Outputs, Configurable Signal Processing, 12 Channels of AEC Processing with Auto Gain Control and Noise Cancellation, Clear Front Panel LED Indication, Bi-Directional Locate Functionality, Configuration, Control and Monitoring from Company Software.	Signal Processor Digital Mixer	1 Set

h. Any optional spares/ Accessories/ Tooling, if the tenderer feels are necessary for the better performance of the equipment, their technical details with respect to their use and advantage, along with the price shall be given in the Bid. The warranty period should also be mentioned.

Testing & Commissioning

The Contractor has to do the Testing and Commissioning of the equipment with respect to aesthetics and maintenance view consideration.

Documentation

The Projector system contractor, upon completion of the commissioning activity, shall handover the system to the customer. At the time of hand over, the contractor shall provide the customer with the following documentation:

1. Copy of detailed report
2. Component and equipment list
3. Product description sheets
4. System design drawing(s)
6. System schematic diagram(s)
7. System operating manuals
8. Software Operation Manual
9. Database Management Operation Manual

Hand over

Prior to final acceptance, the installing contractor shall provide complete operation and maintenance Instruction manuals to the owner. All aspects of system operation and maintenance shall be detailed, including wiring diagrams of all circuits, a written description of the system design, sequence of operation and drawing(s), illustrating control logic and equipment used in the system. Checklists and Procedures for emergency situations, maintenance operations and procedures shall be included in the manual.

Training

The contractor shall provide the customer with details of the training required by personnel to operate and maintain the Entire system.

The Contractor and the customer shall jointly agree the number of staff to attend the training courses.

Maintenance

Routine maintenance should be carried out in accordance with relevant customers' requirements.

All performance checks undertaken should be recorded in the system log book.

As a minimum, the following performance checks must be undertaken on each maintenance visit.

Carry out verification checks as detailed in the commissioning instructions.

Remove dust and dirt from the LCD projector, Motorized screen exterior using a soft brush or a lint cloth. Solvent which is harmless to the finishes of metal and plastic may be applied to more stubborn stains.

Examine the exterior of the enclosure for any signs of damage or loose cable glands and rectify any faults found.

Remove any dust or dirt from the interior of the equipment using a soft brush or a vacuum cleaner.

Examine the printed circuit boards for signs of over heating, dry joints and/or damaged tracks.

Examine the battery terminals for secure connection and for any signs of corrosion. Replace or repair as required

Television Distribution

Scope :

1.1 The scope of work shall cover supply, installation, commissioning and testing of :

i) Television cables ii) Television Splitters iii) Television wiring in conduits

1.2 The Television exchange and the hand sets shall be supplied by the clients.

Conduits :

2.1 Conduits shall be as given below : The conduit shall generally be as specified under section 'Internal Wiring'.

3.0 Wires & Splitters :

3.1 The type of cables and the splitters shall be as specified in the BOQ :

4.0 Installation :

4.1 The installation of conduits shall generally be as specified under section 'CONDUIT WIRING'.

4.2 All cables shall be on cable racks and neatly stitched together.

4.3 The connection at the splicer/junction boxes shall be made with end sockets as to achieve minimum contact resistance.

4.4 The final branch connections with single cables in conduits and the maximum number of cables in each conduit shall be as follows :

Conduit diameter Max. No. of cables

Inch / mm.

3/4" / 20 1 no RG 6 / 11

1" / 25 2/3 nos. RG 6 /11

1¼" / 32 6 Nos. RG 6 /11

5.0 Mode of Measurement :

5.1 The main Television cables shall include supply and laying of RG 6 / 11 cables on ceiling/wall/on cable trays/racks including all supports and shall be measured and paid on running length basis. Cable trays/racks shall be paid for separately.

5.2 The multi way spillers shall consist of Television connectors sockets, jumpered interconnections silver soldered enclosure etc. and shall be measured and paid as one unit.

UPS SYSTEM

PART 1 GENERAL

SCOPE

The Scope include supply, installation, testing and commissioning of UPS system.

The Contractor shall furnish and install a three-phase continuous duty, on-line, double conversion, solid-state uninterruptible power system, hereafter referred to as the UPS. The UPS shall operate in conjunction with the existing building electrical system to provide power conditioning, back-up and distribution for critical electrical loads. The UPS shall consist of, as required by the project, the UPS module, battery cabinet(s), and accessory, maintenance bypass, and distribution applications, and other features as described in this specification.

RELATED SECTIONS

UPS DESCRIPTION

Standard UPS will include a minimum of (1) rectifier, (1) inverter, (1) static bypass, and (1) battery system.

A. Components:

1. Rectifier
2. Inverter
3. Sealed Lead Acid Batteries
4. Battery Charger
5. Static Bypass
6. User Interface Panel
7. Serial (RS-232)/USB Communication Interface for service use
8. Communication Card Slots (2)
9. Environmental (Building Alarm) Inputs (3)
10. Hardwired Input, Output
11. External Battery Cabinets (or racks)
12. Communications Options
13. SNMP/Web adapter

14. RS-232 and relay contact interface

15. Modbus RTU interface

- B. Modes of Operation: The UPS shall operate as an online, double-conversion UPS with the following modes:
1. Normal: During the Normal or Double-conversion Mode the rectifier shall derive power as needed from the commercial AC utility or generator source and supply filtered and regulated DC power to the online inverter. The inverter shall convert the DC power to highly regulated and filtered AC power for the critical loads.
 2. Battery: Upon failure of the AC input source, the critical load must continue to be supplied by the inverter without switching. The inverter must obtain its power from the battery. There must be no interruption in power to the critical load upon failure or restoration of the AC input source.
 3. Recharge: Upon restoration of the AC input source, the rectifier/battery charger must recharge the battery. The inverter shall, without interruption of power, regulate the power to the critical load.
 4. High Efficiency: The static bypass switch will conduct, and the UPS rectifier and inverter will be operated in a "suspended" mode, unless incoming power conditions require conventional double conversion operation. In High Efficiency mode the UPS input and output filters shall remain in-circuit to provide surge suppression. Transfer time from HE mode to Double Conversion mode, and vice versa, shall be typically less than 4ms.
 5. Bypass: The static bypass switch must be used for transferring the critical load to the AC utility supply without interruption, and shall be rated for continuous operation. Automatic re-transfer to normal operation must also be accomplished without interruption of power to the critical load. The static bypass switch must be capable of manual operation via the front panel controls. An optional integrated bypass back-feed protection contactor, in series with the static switch, shall prevent system voltages from bleeding backwards through the static switch and rectifier snubber components to the utility source in the event of a utility failure and shall also open upon detection of a short circuit static bypass SCR.
 6. Optional internal load testing: The UPS system will be capable of utilising the Easy Capacity Test (ECT) function, including internally adjustable load testing at the customer site, without the need for a load ECGC.

1.02 REFERENCES

A. The UPS and all components shall be designed, manufactured and tested in accordance with the latest applicable standards as follows. Where a conflict arises between these documents and statements made herein, the statements in this specification shall govern.

Safety

- a. IEC 62040 or EN 62040
- b. EN 60950

Emission and Immunity:

- c. IEC62040-2-C3 (conducted and radiated)
- d. EN61000-4,-5, level 4 – 4 kV L-PE, 2kV L- Electrostatic discharge (ESD): 8 kV air discharge, 4 kV contact discharge (IEC 61000-4-2, level 4) - Electromagnetic field: IEC 61000-4-8 level 3.

1.03 SUBMITTALS – FOR REVIEW/APPROVAL

A. Submit one copy of a concise operation and maintenance manual.

1.04 SUBMITTALS – FOR CONSTRUCTION

A. Submit one copy of a concise operation and maintenance manual.

1.05 QUALIFICATIONS

A. The manufacturer of the unit shall have a minimum of forty years' experience in the design, manufacture and testing of Uninterruptible Power Supplies.

B. For the equipment specified herein, the manufacturer shall be ISO 9001 certified for engineering/R&D and manufacturing facilities.

1.06 REGULATORY REQUIREMENTS

A. The UPS shall be CE marked.

1.07 DELIVERY, STORAGE AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer's instructions. The UPS and accessory cabinets meet structural requirements of ASTM D4169. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.08 OPERATION AND MAINTENANCE MANUALS

A. Equipment operation and maintenance manuals shall be provided with each assembly shipped and shall include instruction leaflets, instruction bulletins and renewal parts lists where applicable, for the complete assembly and each major component products.

1.09 MANUFACTURERS

A. APC / Eaton / ABB (Newave)

1.10 RATINGS

A. System Rating

1. The UPS module(s) shall have an output rating of:

a. As per BOQ

B. System Input

1. Input Voltage Operation Range

a. Nominal 400/230 (or 380/220 or 415/240 adjustable) VAC, 4-wire plus ground

b. -15% to +20% from nominal at 100% load
-50% to +20% from nominal at 50% load

2. Input Frequency

a. 42 to 70 Hz auto-sensing

3. Input Power Factor: 0.99 typical

4. Input Current Distortion: 5% THD maximum at full rated linear load

5. Inrush Current:

a. $\leq 120\%$ of rated current for ≤ 2 cycles

C. System Output, Normal Mode -Nominal Output Voltage, UPS on Utility

1. 400/230, or 380/230 or 415/240VAC, Selectable through front panel or through serial port connection with power management software

2. Output power factor rating: 0.7 lagging to 0.9 leading without de-rating.

3. Voltage regulation: +/-1% of selected output voltage in steady state

Transient Voltage Response: Meets Class 1 performance of IEC62040-3 and VFI-SS-111; +/-5% for 100% step load change; recovery in <20ms.

2. Voltage THD:
 - a. 2% Total Harmonic Distortion (THD) maximum phase to neutral into a maximum rated linear load (5% phase to phase)
 - b. 5% THD maximum phase to neutral and phase to phase into a non-linear load
3. Nominal Frequency: 50 or 60 Hz selectable
4. Frequency Regulation:
 - a. 50/60 Hz +/- 4Hz, +/-1 to +/- 4 Hz selectable, synchronised to mains, +/- 0.005 Hz free running (single module) or +/- 0.07 Hz (parallel system)
5. Slew rate:
 - a. 0.5 Hz per second
 - b. Selectable up to 7 Hz/s for single units, <0.5 Hz/s for parallel units
 - c. Generator Mode (6 / 7 Hz/s) for single units selectable through software parameters that can be configured via LCD and service PC interface
6. Output Current: Full load output current (at nominal output voltage) for the UPS shall be:
 - a. Example : 200 kVA system: 289 A @ 400 V
7. Current Overload Capability without Bypass:
 - a. 102-125% for 10 min
 - b. 126-150% for 1 min
 - c. >151% for 150 ms
8. Short Circuit conditions: current limit at 2.5x nominal FL current for 300 ms. (as per UPS Capacity)
9. Current Overload Capability with Bypass enabled:
 - a. 102-125% for 10 min
 - b. 126-150% for 1 min
 - c. >151% for 150 ms
 - d. Short Circuit conditions: immediate transfer to bypass; then 115% continuous, with transient capability of 10x nominal for 20 ms.
10. Bypass:
 - a. Automatic bypass shall provide an alternate path to power in the case of overload, inverter failure or other UPS failure
 - b. Transfer time to and from any internal bypass shall be no-break, when UPS and Utility are in sync
 - c. Unit shall be able to detect bypass module failure.
11. Efficiency:
 - a. In Normal Mode, 100% linear load, with nominal line condition: $\geq 94.0\%$
 - b. In Normal Mode, 75% linear load, with nominal line condition: $\geq 93.8\%$
 - c. In Normal Mode, 50% linear load, with nominal line condition: $\geq 93.0\%$
 - d. In High Efficiency mode: $\geq 98\%$ at 100% linear load; $\geq 97\%$ at 50% linear load
12. System Output, Battery Mode
 - a. Nominal Output Voltage: This shall be the user-selected output voltage

- b. Voltage Regulation: +/-1% phase to neutral of selected nominal voltage (+/-2% phase to phase)
- c. Transient Voltage Response
- d. Meets Class 1 performance of IEC62040-3
- e. +/-5% for 100% step load change; recovery in <20ms
- f. Voltage THD:
- g. 2% Total Harmonic Distortion (THD) maximum into a maximum rated linear load
- h. 5% THD maximum phase to neutral into a maximum rated non-linear load (7.5% phase to phase)
- i. Frequency Regulation: +/-0.1 Hz of selected nominal frequency
- j. Current Overload Capability
- k. 102-125% for 1 min
- l. 126-150% for 30 sec
- m. >151% for 150 ms

1.11 CONSTRUCTION

A. The UPS system is initially provided as a single-module, non-redundant system. The UPS shall be field-upgradeable with additional parallel capacity up to 3+0 modules, or for redundant operation, up to 3+1 modules.

Single UPS modules shall be capable of parallel operation and shall not require any hardware modifications in order to be paralleled with other modules in future.

B. Converter (rectifier): Incoming power shall be filtered and converted to DC by a sine-wave rectifier. The rectifier utilises IGBT technology to correct the input power factor to 0.99 and draws sinusoidal current (with less than 5% THD) from the utility. In the event of utility failure, the DC-DC converter shall be supplied power without interruption from the external batteries. In the event of utility sag down to -50% of nominal voltage the UPS shall continue to operate at up to 100% load in a power share mode that draws power from the utility and the battery.

C. Inverter: The inverter utilises IGBT technology and Digital Signal Processing to convert the DC power from the rectifier or converter to regulated AC power for output to critical loads.

1. Output Voltage: The inverter output voltage is specified in section 1.12.B.
2. Voltage Regulation: The inverter steady state voltage regulation is +/- 1% phase to neutral, 2% phase to phase. Dynamic regulation meets Class 1 performance of IEC62040-3.
3. Frequency Control: The inverter steady state frequency regulation is +/-0.1 Hz, free running in steady state. UPS is synchronised to the Utility bypass in normal operation.

D. Mechanical Construction

1. All materials and components of the UPS shall be new, of current manufacture, and shall not have been in prior service except as required during factory testing. The UPS shall be constructed of replaceable subassemblies. All active electronic devices shall be solid-state.

2. The UPS unit is comprised of an input rectifier, battery charger, inverter, bypass, and battery consisting of the appropriate number of sealed battery modules, and shall be housed in a single freestanding enclosure. The UPS cabinet shall be cleaned, primed, and painted with the manufacturer's standard color. Wheels and leveling feet shall be provided as standard on systems.

3. The UPS cabinet shall have a rating of IP20.

4. The UPS shall be designed for forced-air cooling. Air inlets shall be on the front of the unit and shall be fitted with washable dust filters. Air outlets shall be at the rear. A minimum of 600mm rear clearance for ventilation and access to terminations for systems.

5. Cable access shall be through the bottom or rear of the UPS cabinet
6. Dimensions of standard UPS cabinets:

<u>Enclosure</u>	<u>Dimensions (H x W x D)</u>	<u>Weight</u>
Mention in below datasheet		

1.12 UPS IN PARALLEL CONFIGURATIONS

A. UPS modules shall be capable of being paralleled to increase system power levels or to provide redundant power. The UPS shall be field-upgradeable with additional parallel capacity up to 3+0 modules, or for redundant operation, up to 3+1 modules. It shall be possible to convert a single module to a parallel module without any hardware modification. The parallel system shall have intelligence to automatically recognise the need for capacity and/or redundancy. Parallel systems shall utilise autonomous UPS power modules that do not rely on any control interconnections for synchronised operation. The individual modules shall operate in a peer-to-peer manner to provide automatic load sharing, synchronisation, and selective tripping capabilities. "Master-slave" configurations are not acceptable.

B. The parallel system shall utilise a communications network to provide system information and status, such as operating mode and meter data. This network shall provide individual module information as well as total system information, and individual module information shall be available from any module's front panel display. The loss of this system information network shall not cause the parallel units to transfer to bypass or drop the critical load.

1.13 SYSTEM INPUT & OUTPUT CONNECTIONS

A. AC Input:

1. All UPS units shall be capable of utilising hardwired input. Input, Bypass, and/or output terminals may be placed in Option cabinets as determined by system configuration. Wiring between Option or external battery cabinets and UPS to be supplied by others.
2. The building/Utility input neutral is required for proper UPS operation unless input transformer option is used.

B. AC Output:

1. All UPS units shall be capable of utilising hardwired output

C. Extended Battery Connection: UPS module will include terminations for External battery cabinets, if used.

D. Remote Emergency Power Off (REPO) Connection: The UPS shall provide a built-in landing for field connection of a Remote Emergency Power Off circuit. Upon initiation of the REPO circuit, the UPS shall open its input relays, and disengage the battery converter, preventing power from being delivered to the attached loads.

E. Serial (RS-232) Communication Interface: A 9-pin sub-D connector and USB connector shall provide capability for communicating with manufacturer's servicing software package. The UPS shall also provide plug-in communication options to provide signals for remote indication of UPS alarm status.

F. (2) Communication Card Slots: The UPS shall provide (2) communication mini-slots in the front of the UPS allowing for optional plug-in connectivity options, including SNMP/Web interface, 4x relay contacts & RS232 port, and Modbus capabilities.

G. (3) Programmable Input Connections: The UPS shall provide built-in inputs for field connection (environmental input). The inputs shall be parameter programmable to suit the needs of the application.

1.14 USER INTERFACE

A. Front Panel Display: The UPS shall include a front panel display consisting of a graphical LCD display with backlight, four status LED's, and a six-key keypad.

1. Graphical LCD display: Includes basic language (English and local selectable language), display of unit function and operating parameters. It shall be used to signify the operating state of the UPS, for indicating alarms, for changing operations control parameters and set points.

2. Four status LED's, which indicate:

- a. Alarms, with a red LED
- b. On Battery, with a yellow LED
- c. On Bypass, with a yellow LED
- d. Power On, with a green LED

3. Six-Key Multifunction Keypad: UPS shall have keypad to allow user to adjust UPS parameters, view alarm and inverter logs, change UPS operational modes, and turn the UPS on and off. Keys will be marked as UP, DOWN, LEFT, RIGHT, ESC and ENTER

4. Meters: When selected, the front display shall show individual screens of input parameters, output parameters or bypass parameters including; voltage, current, frequency, true power, apparent power and power factor. The display shall also show DC Voltage and current.

B. Power Management Software Package: The UPS shall offer optional communications interface that provides the following communication capabilities:

1. Monitor and graphically display input and output voltage and other operating characteristics

2. Notify end-users in the event of a power anomaly via network, E-mail or page.

3. Communication Ports:

a. Communication Card Slots: The UPS shall provide (2) communication mini-slots in the back of the UPS allowing for additional connectivity options, including SNMP/Web interface, 4x relay contacts, and RS-232 capabilities.

b. Serial communications (via RS-232 or USB) with manufacturer's service software package

1.15 BATTERIES

A. Battery Type: 12V, Valve Regulated Lead Acid (VRLA), 10 year standby design life at 25°C with minimum two-year warranty. Approved makes : Exide / Rocket / Amara Raja

B. Holdover Time (Runtime): Each UPS system shall have the option of capability for matching battery cabinets to increase the holdover time. Please refer to datasheet for a list of runtimes. The battery times listed there are approximate and may vary depending on load configuration, temperature, battery age, and state of battery charge.

C. Battery Recharge Time: UPS system will have a typical recharge time of 10 times the length of the outage to 90% usable capacity @ nominal line voltage.

D. Battery Protection:

1. Short Circuit Protection: Over-current protection shall protect the batteries from all short circuit fault conditions

2. Battery Module Protection: Internal battery contactor shall be provided

3. Under-voltage Protection: Battery operation shall be terminated when the battery voltage drops to the 1.67 VPC set point
4. Over-voltage Protection: If the UPS system's battery bus voltage exceeds the predetermined set point then the UPS will disable the charger and alarm a "check battery" condition

E. Battery Management System:

The UPS shall contain a battery management system which has the following features:

1. The battery management system shall charge the batteries using an intermittent charging cycle. The active battery charger states are constant-current (charge mode), constant-voltage (float mode) and no-charge (rest mode). The charge mode shall equalise and charge the batteries to near full capacity before entering into float mode. In float mode a constant voltage float charge shall charge the batteries for a minimum of 48 hours or until the batteries are fully charged. The batteries are then put into rest mode. The battery shall be monitored whilst in rest mode and the charge cycle shall automatically re-start should the battery voltage drop below pre-determined levels. The charging control system shall activate an alarm should the battery capacity drop below the pre-determined levels. The charge cycle will automatically restart after a utility disturbance. The batteries shall not be physically disconnected from the UPS DC bus during the charge cycle and shall be available at all times to supply the inverter.
2. Battery Runtime Monitoring: UPS shall monitor batteries and provide status to end user of battery remaining capacity via front panel icon, remote communications, or both. Runtime calculations to be based on load demand and analysis of battery health.
3. Battery Health Monitoring: UPS shall periodically test and monitor battery health and provide warnings visually, audibly and/or remotely when battery capacity falls below 80% of original capacity. Battery testing may also be user initiated via front panel or serial communications.

1.16 NAME PLATES

- A. Provide a printed nameplate for each UPS.

1.17 ENVIRONMENTAL CONDITIONS

- A. The UPS shall meet IEC 61000-4-6 Level 3, and IEC 62040-2 C3, and FCC A15J for Emissions

B. Audible Noise:

1. Less than or equal to 70 dB (A weighted) at one (1) metre from all sides in normal mode at less than or equal to 75% load.

C. Ambient Temperature

1. Operating: UPS: 0 deg C to +40 deg C, (preferred temperature for batteries: 15 to 25 deg C).
2. Storage: UPS -25 deg C to +55 deg C.
3. Transportation: -25 to 60 deg C

D. Relative Humidity

1. Operating: 5 to 95% non-condensing.
2. Storage: 5 to 95% non-condensing.
3. Transportation: 5 to 95% non-condensing

E. Altitude

1. Operating: To 1000 metres, de-rating or reducing operating temperature range may be required for higher altitudes
 2. Transit: To 10,000 metres
- F. Electrostatic Discharge: The UPS shall be able to withstand a minimum 8 kV without damage and without affecting the critical load

PART 2 EXECUTION

2.01 FACTORY TESTING IF APPLICABLE

A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

1. Standard Computer-automated UPS system test

2. Hipot test

2.02 INSTALLATION

A. The Contractors shall install all equipment per the manufacturer's recommendations.

2.03 FIELD QUALITY CONTROL

A. Provide the services of a qualified factory-trained manufacturer's representative to assist the Contractor in installation and start-up of the equipment specified under this section for a period of XX working days. The manufacturer's representative shall provide technical direction and assistance to the contractor in general assembly of the equipment, connections and adjustments, and testing of the assembly and components contained therein.

B. The Contractor shall provide three (3) copies of the manufacturer's field start-up report.

Datasheet of 10 KVA Online UPS Systems with 30 min battery back up time

Sr No.	Description	Technical Specification	Vendor Compliance (Yes / No)	Details if any deviations
1	Rating (in KVA)	10 KVA / 9 kW		
2	Make	APC/EATON/NEWAGE		
3	Model	Vendor to Specify		
[A]	Input			
1	Nominal Voltage	230 V AC		
2	Nominal Frequency	50 Hz		
3	Input Power Factor	0.99		
4	Input Voltage Range	176 ~ 276 VAC		
5	Frequency Range	45 to 55 Hz		
6	THDi	< 5%		
[B]	Output			
1	Invertor Design	IGBT Based Technology		
2	Voltage	208 V / 220 V / 230V / 240 VAC		
3	Voltage Regulation	< 2%		
4	Waveform	Pure Sine wave		
5	Total Harmonic Distortion	< 2% for linear load & ≤ 5 % for non linear load		
6	Crest Factor	3 :1		
7	Overload capacity	105% ~ 125% for 2 min, 125% ~ 150% for 30 Sec.		
8	Cold Start	Required		
[C]	Environmental			
1	Operational Temperature	0 to 40 Deg.		
2	Relative Humidity	0 ~ 90% (Non Condensing)		
[D]	Physical			
1	Enclosure Protection	IP 20		
2	Cooling	Forced Air Cooling		
3	Colour	Vendor Specify		
[E]	Bypass			
1	Static Bypass	Auto & Manual		
2	Maintenance Switch	Facility required		
3	Transfer	No Break		
[F]	Battery			
1	Type	Sealed Maintenance Free		
2	DC Voltage	Vendor Specify		
3	Recharge Time	8-10 hrs		
4	VAH Required	10080 VAH		
5	Battery Backup	30 Min		
6	Minimum Charger Capacity	10% of the battery AH capacity		
[G]	General			

1	Overall Efficiency on Full load	> 92%		
2	High Efficiency mode	98%		
3	Acoustic Noise (in dbA)	< 50 dbA @ 1 Meter		
4	Alarms	Audible Alarm required for Mains Failure, Low Battery, Inverter Trip, Over Temperature, Over Load		
5	Display Panel	LCD Display with Measurements (Input / Output/BypassV& Hz, Battery Voltage & % Capacity, time, and level indicator, Alarm Codes)		
6	Battery Rack	M.S. Angle with upper Cover		
7	Parallel Option	Yes		
[H]	Communications			
1	Power Management Software	Software CD		
2	Connection type	USB		
3	SNMP Interface	Intelligent slot for SNMP / AS400/ Modbus		
[I]	Approx. Dimensions(mm)			
A.	UPS (mm)			
1	Width	Vendor Specify		
2	Depth	Vendor Specify		
3	Height	Vendor Specify		
4	Approx. Weight (Kg)	Vendor Specify		
B.	Battery Stand (mm)			
1	Width	Vendor Specify		
2	Depth	Vendor Specify		
3	Height	Vendor Specify		
4	Approx. Weight (Kg)	Vendor Specify		
[J]	Standard			
1	Standard	ROHS		
2	Safety	IEC 62040-1		
[K]	Protection			
1	Battery Over voltage	Required		
2	Battery Under Voltage	Required		
3	DC High	Required		
4	Output Over/Under Voltage	Required		
5	O/P short Circuit	Required		
6	Inv Over Temp	Required		
7	Surge	Required		
[L]	Warranty			
	UPS	2 Years		
	Battery	2 Years		

Measurement

The Measurement unit is in Nos.

Transportation, Delivery & Storage:-

The prices shall be F.O.R. site basis including packing & forwarding charges. The quoted price must include all the costs for necessary mode of transportation up to the final location of site store. All incidental expenses during transportation shall be part of quoted prices including transit insurance. The charges for loading and unloading of equipments at site should form part of offer.

Guarantee:-

The Bidder shall stand guarantee for the performance of entire equipment and components for twelve (12) months from the date of commissioning or eighteen (18) months from the date of dispatch, whichever is earlier, as agreed up on and as reproduced in the purchase order within the tolerance specified or as permitted by the relevant standards for the equipment in his scope of supply.

Goods requiring warranty replacements must be replaced on free of cost basis to the Client.

TECHNICAL SPECIFICATIONS FOR HVAC WORKS:

SCOPE OF WORK:-

1. The bidder shall undertake the supply and the installation of the Air Conditioners for
2. The bidder shall supply ISI Marked & BEE labeled machines with maximum warranty periods.
3. The bidder shall ensure that the equipments are fabricated and installed free from any defects and faulty workmanship.
4. Supply & fabrication should be made properly with complete technical specifications as per our requirements and after installation a satisfactory demo shall be compulsory.
5. The Competent Authority reserves the right to inspect the site/ Equipments being manufactured or stored.

SPECIFICATION:-

HIGH WALL UNITS:

High Wall (Wall Mounted) Units shall be vertical units, with SA grille near the bottom of the unit and RA grille at the front. Pipe connections shall be from the rear or from one side, to be concealed after installation. The unit shall be with oscillating louvers for even distribution of air, and corded or cordless full-function remote control as specified in Schedule of Quantities.

CASSETTE UNITS:

Ceiling suspended, 4-way Units shall be internally grooved evaporated coil. The unit shall be with oscillating louvers for even distribution of air, and corded or cordless full-function remote control as specified in Schedule of Quantities.

CONDENSING UNITS:

Condensing unit (outdoor unit) shall be with reciprocating or rotary/scroll type compressor, air cooled draw-through type condenser coil with copper tubes & aluminium fins, low noise axial fan, safety cut-outs & high/low pressure cut-outs, weather proof housing, hot-dip alvanized or epoxy coated angle or channel frame structure. The unit shall be suitable for installation on wall/slab/floor as required. Rubber pads shall be provided below the unit for effective vibration isolation.

GENERAL :

All A/C machines to be kept covered to prevent dusting & filter/coil choking till commissioning.

NO	ITEM DESCRIPTION	Specifications
1	Split Type Air Conditioner	<p>Nominal Capacity : 1 ,1.5 & 2 ton (Split AC)-5 star Rating Electricity in put : 230V/50Hz/Single Phase Noise level Indoor unit : Less than 45 db Outdoor unit : Less than 65 db Function modes : Auto/Cool/Fan/Dry – shall have sleep and power saving modes Other features : - Automated vertical swing for horizontal louvers. - Antifreeze thermostat Compressor : Rotary type, Outdoor Copper Condenser, Copper Pipeline, All Pipelines with insulation, With Out Door Stand. Body surface finish : powder coated/high quality paint finish. Air filtering unit : Activated carbon cartridge, dust proof and anti bacteria filter Length of tubings : 15 m or as per the installation requirement Remote handset : LCD display Warranty :- 5 Years</p>
2	Cassette Type Air Conditioner	<p>Nominal Capacity : 2 ton 4-way (Cassette AC)-5 star Rating Electricity in put : 230V/50Hz/Single Phase Noise level Indoor unit : Less than 35 db Outdoor unit : Less than 65 db Function modes : Auto/Cool/Fan/Dry – shall have sleep and power saving modes Other features : - Automated vertical swing for horizontal louvers. - Antifreeze thermostat Compressor : Rotary/scroll ,Internally grooved evaporator coil type , Outdoor Copper Condenser, Copper Pipeline, All Pipelines with insulation, With Out Door Stand. Body surface finish : powder coated/high quality paint finish. Air filtering unit : Activated carbon cartridge, dust proof and anti bacteria filter Length of tubings : 15 m or as per the installation requirement Remote handset : LCD display Drain pump to be provided Warranty :- 5 Years</p>

SCHEDULE OF INSTALLATION

NO	LOCATION	Specifications	QTY
1	Assistance Manager, Auditor Cabin, Server Room, Lunch Room, Meeting Room	1ton, 5 star Split Air Conditioner	05
2	Branch Manager/Field Office Cabin	1.5 ton, 5 star Split Air Conditioner	02
3	Conference Room	2 ton, 5 star Split Air Conditioner	01
4	Exe.officer	1.5 ton, Cassette Air Conditioner	02
5	Reception/	2 ton, Cassette Air Conditioner	01
	TOTAL		11 Nos.

TECHNICAL SPECIFICATIONS FOR PLUMBING WORKS:

1.1. GENERAL INSTRUCTIONS

The detailed specifications given hereinafter are for the items of works described in the schedule of quantities attached herein, and shall be guidance for proper execution of work to the required standards. It may also be noted that the specifications are of generalized nature and these shall be read in conjunction with the description of item in schedule of quantities and drawings. The work also includes all minor details of construction which are obviously and fairly intended and which may not have been referred to in these documents but are essential for the entire completion in accordance with standard Engineering practice. Unless specifically otherwise mentioned, all the applicable codes and standards published by the Indian Standard Institution and all other standards which may be published by them before the date of receipt of tenders, shall govern in all respects of design, workmanship, quality and properties of materials and methods of testing, method of measurements etc. Wherever any reference to any Indian Standard Specification occurs in the documents relating to this contract, the same shall be inclusive of all amendments issued there to or revisions thereof, if any, up to the date of receipt of tenders. In case there is no I.S.I. specification for the particular work, such work shall be carried out in accordance with the instructions in all respects, and requirements of the Engineer-in-Charge. The work shall be carried out in a manner complying in all respects with the requirements of relevant bye-laws of the Municipal Committee/ Municipal Corporation/ Development Authority/ Improvement Trust etc. under the jurisdiction of which the work is to be executed or as directed by the Engineer-in-Charge and, unless otherwise mentioned, nothing extra shall be paid on this account. Samples of various materials, fittings etc. proposed to be incorporated in the work shall be submitted by the contractor for approval of the Engineer-in-charge before order for bulk supply is placed. The contractor shall take instructions from the Engineer-in-Charge regarding collection and stacking of materials in any place. No excavated earth or building materials shall be stacked on areas where other buildings, roads, services, compound walls etc. are to be constructed. The contractor shall maintain in perfect condition all works executed till the completion of the entire work allotted to him. Where phased delivery is contemplated, this provision shall apply to each phase. The contractor shall give a performance test of the entire installation(s) as per standard specifications before the work is finally accepted and nothing extra whatsoever shall be payable to the contractor for the test. The contractor shall clear the site thoroughly of all debris, surplus excavated materials and rubbish etc. left out of his work and dress the site around the building to the satisfaction of the Engineer-in-Charge before the work is considered as complete. The Chief Engineer, DCSE, DAE, shall be the sole deciding authority as to the meaning; interpretations and implications for various provisions of the specifications and his decision in writing shall be final and binding on all concerned. In case any difference or discrepancy between the specifications and the description in the schedule of quantities, the schedule of quantities shall take precedence. In case of any difference or discrepancy between specifications and drawing, the specifications shall take precedence. In case any difference or discrepancy between the specifications for civil works and specification for Public Health Engineering works, specifications for civil works shall take precedence.

1.1.1. APPROVAL

The materials for P.H. Engineering works which are to be supplied by the contractor shall conform to the relevant IS specifications and on the latest approved list of Mumbai Municipal Corporation/ Local bodies if any, and shall be approved by the Engineer-in-Charge prior to installation of fixture and the approved samples shall be maintained at site till the completion of work. The approved makes of main items are, PAGE 5 OF 79 however specified in the list of approved makes of materials here in before.

1.1.2. PRECAUTIONS

While carrying out pipe line work in case the contractor encounters any interference with other services such as cables, conduits etc, he shall take sufficient precautions in order to prevent any damage to them. If any damage occurs, it shall be rectified to its original condition at his own cost to the satisfaction of the officers concerned with such services. The contractor shall ensure that all inserts, pipe lines embedded in structural members or sleeves are placed in position in co-ordination with civil work. All public health engineering services shall be handed over to Engineer-in-charge complete in all respects on completion of the work. Incomplete work will not be taken over. Any loss or damage to these services due to any reasons by anybody whatsoever before handing over will be at contractor's risk and cost. Any damage to any structural/finishing work done during the testing or rectification shall be made good by the contractor at his own cost and risk.

1.1.3. COST TO BE COVERED

The rates quoted by the tendered under this contract shall cover the cost of all the following elements.

1.1.4. MISCELLANEOUS WORK

The contractor carrying out the construction work shall take effective measures to carefully open out all existing channels, culverts, bridges, pipelines, conduits, water courses, sewer, drains, electrical cables, transmission lines and their supports and all works buried or otherwise where such services have to be interfered with the purpose of the construction of the works. He shall provide and arrange all necessary temporary supports and diversions if necessary across/under/even through along sides of the trenches and all other parts of construction work for all such channels, culverts, bridges, pipe lines, conduits.

1.1.5. CLEARANCE FOR ROADS AND FOOT PATHS

The contractor shall arrange to carry out all works with least interference practicable with public footpath and vehicular traffic and with existing waste water or storm water drainage arrangements and provide all necessary road barriers, fences, notices, lights, gangways, access crossings, diversions for traffic, temporary drains, dewatering channels, chutes pumping or water lifting arrangements and all other facilities for the proper execution of the works to the approval and satisfaction in all respects of the Engineer-in-Charge. Any work carried out by the contractor in this connection shall be deemed as temporary works incidental to the construction work.

1.1.6. LOCATION

The rates quoted by the tendered under this contract shall be applicable for the work at all floor and locations.

1.1.7. DEWATERING

The rates quoted by the tendered under this contract shall include bailing or pumping out all the water which may accumulate during the progress of the work either through seepage, springs, rain or any other cause.

1.1.8. WATER SUPPLY MAIN

The cost includes for transport charges and testing charges prescribed by the municipal Corporation. Water mains thus laid shall be tested to a pressure as specified in the schedule and specifications. Contractor has to get the pipe line laid hydraulically tested by the Municipal Authorities. Contractor has to bear the Municipal hydraulic testing charges.

1.1.9. FORMALITIES WITH STATUTORY BODIES

The work shall be carried out in a manner complying in all respects with requirement of relevant bye-laws of the Municipal Committee/ Municipal Corporation/ Development Authority/ Improvement Trust under the jurisdiction of which the work is to be executed or as directed by the Engineer-in- Charge and, unless otherwise mentioned, nothing extra shall be paid on this account. The contractor has to satisfy all the requirement of fire brigade, drainage and hydraulic engineering department of Municipal Corporation. Note: In case a separate item is included in the schedule of quantities, contractor shall engage a licensed P.H. Engineer/ licensed plumber and obtain all the above certificates from Municipal Corporation.

1.2. LIST OF INDIAN STANDARDS

The following IS codes shall be referred in execution of PH Engineering works.

IS CODE	SUBJECT
269- 1989	Specifications for 33 grade Ordinary Portland Cement
407- 1981	Brass tubes for General purposes
456- 2000	Code of practice for Plain & Reinforced concrete.
458- 2003	Specifications for Concrete Pipes.
554- 1999	Dimensions for pipe thread where pressure tight joints are required.
638- 1979	Sheet rubber jointing & rubber insertion jointing
651- 1992	Specifications for Salt glazed stoneware pipes & fittings.
771 (Pt. I &VII)	Glazed Fire Clay Sanitary Appliances.
771- 1979 (Pt. I)	General requirements
771- 1985 (Pt. II)	Specific requirements of kitchen & laboratory sinks
771- 1985 (Pt. III/ Sec2)	Specific requirements of urinals (section 2- Stall urinals)
775- 1970	Cast iron brackets and supports for wash basin and sink.

778- 1984	Specifications for copper alloy gate & Globe check valves for water works
779- 1994	Water meters (domestic type)
781- 1984	Specifications for cast copper alloy screw down bib taps & stop cocks for water services
783- 1985	Code of practice for laying concrete pipes.
784- 2001	Pre-stressed concrete pipes.
1172- 1993	Code of basic requirements for water supply, drainage and sanitation
1200-1979 (Pt. 16)	Method of measurements for Laying of water and sewer lines including appurtenant items.
1200-1981 (Pt. 19)	Method of measurements for Water supply, plumbing and drains.
1700- 1973	Drinking fountains
1703- 2000	Ball valve (horizontal plunger type) including floats for water supply.
1711- 1984	Self closing taps.
1726- 1991	Cast iron manhole covers and Frames.
1729- 2002	Cast /ductile iron drainage pipes & fittings for over ground NP pipeline S/S series.
1742- 1983	Code of practice for building drainage
1795- 1982	Pillar taps for water supply purposes
2065- 1983	Code of practice for water supply in buildings.
2326- 1987	Automatic flushing cistern for urinals
2373	Specification for Water Meter (Bulk type)
2379- 1990	Color code for identification of pipe lines.
2401- 1973	Code of practice for selection, installation & maintenance of domestic water meters
2470 (Pt. I to II)	Code of practice for installation of septic tanks
2470- 1985 (Pt. I)	Design criteria & construction
2470- 1985 (Pt. II)	Secondary Treatment & disposal of septic tank effluent
2527- 1984	Code of practice for fixing rain water gutters and down pipes for roof drainage.
2548- 1996(Pt. I)	Plastic water closet seats and covers.
2548- 1996(Pt. II)	Plastic water closet seats and covers.
2556 (Pt. 1 to XV)	Specification for Vitreous (Vitreous China) sanitary appliances.
2556- 1994 (Pt.1)	General requirements
2556- 1994 (Pt.2)	Specific requirements of wash down water-closets
2556- 2004 (Pt.3)	Specific requirements of squatting pans
2556- 2004 (Pt. 4)	Specific requirements of wash basins
2556- 1994 (Pt.5)	Specific requirements of laboratory sinks
2556- 1995(Pt.6)	Specific requirements of urinals & partition plate
2556- 1995 (Pt.7)	Specific requirements of accessories for sanitary appliances
2556- 1995 (Pt.8)	Specific requirements of pedestal close coupled & wash down and siphon water closets
2556- 2004 (Pt.9)	Specific requirements of pedestal type bidets
2643- 1999	Type Threads where pressure tight joints are not mase on the threads dimension, tolerances and designation
2951 (Pt. I to II)	Recommendation for estimate of flow of liquids in closed conduits.
2951- 1965 (Pt. I)	Head loss in straight pipes due to frictional resistance
2951- 1965 (Pt. II)	Head loss in valves & fittings.
3006- 1979	Specification for Chemically resistant glazed S.W. pipes and Fitting
3076- 1985	Low density polyethylene pipes for potable water supply
3114- 1994	Code of practice for laying of Cast Iron pipes.
3311- 1979	Waste plug & its accessories for sinks & wash basins.
3597- 1998	Method of test for concrete pipes.
4038- 1986	Foot valves for water works purposes.
4111 (Pt. I to V)	Code of practice for ancillary structures in sewage system.
4111- 1986 (Pt. I)	Manholes
4111- 1985 (Pt. II)	Flushing tanks
4111- 1985 (Pt. III)	Inverted siphon
4111- 1968 (Pt. IV)	Pumping stations & pumping mains (rising mains)

4111- 1993 (Pt. V)	Tidal out-falls
4120- 1967	Tubs and baths.
4127- 1983	Code of practice of laying of glazed stone ware pipes.
4350- 1967	Specification for concrete porous pipes for under drainage.
4733- 1972	Methods of sampling & test for sewage effluents
4854 (Pt. I to III)	Glossary terms for valves and their parts
4854- 1969 (Pt. I)	Screw down stop, check & gate valves & their parts
5329- 1983	Code of Practice for sanitary pipe work above ground for building
5455- 1969	Cast iron steps for manholes
6295- 1986	COP for water supply & drainage in high altitude & / or sub-zero region
6418- 1971	Cast Iron & malleable flanges for general engineering Purpose
7231- 1994	Specifications for Plastic Flushing Cisterns for water closet & urinals
7634 (Pt. I to III)	Code of Practice for Plastic pipe work for potable water supplies
7634- 1975 (Pt. I)	Choice of materials & general recommendations
7634- 1975 (Pt. II)	Laying & jointing polyethylene (PE) pipes
7634- 2003 (Pt. III)	Laying & jointing un plasticized PVC pipes
7740- 1985	Code of Practice for road gullies
7834 (Pt. I to VIII)	Injection molded PVC socket fittings with solvent cement joints for water supplies
7834 - 1987(Pt. I)	General requirements
7834- 1987 (Pt. II)	Specific requirements for 45 0 elbows
7834- 1987 (Pt. III)	Specific requirements for 90 0 elbows
7834- 1987 (Pt. IV)	Specific requirements for 90 0 tees
7834- 1987(Pt. V)	Specific requirements for 45 0 tees
7834- 1987 (Pt. VI)	Specific requirements for sockets
7834- 1987(Pt. VII)	Specific requirements for unions
7834- 1987 (Pt. VIII)	Specific requirements for caps
8008 (Pt. I to VII)	Injection molded HDPE fittings for potable water supplies
8008- 2003 (Pt. I)	General requirements for fittings
8008- 1976 (Pt. II)	Specific requirements for 90 0 bends
8008- 2003 (Pt. III)	Specific requirements for 90 0 tees
8008- 2003 (Pt. IV)	Specific requirements for reducers
8008- 2003 (Pt. V)	Specific requirements for ferrule reducers
8008- 2003 (Pt. VI)	Specific requirements for pipe ends
8008- 2003 (Pt. VII)	Specific requirements for sandwich flanges
8727- 1978	Specifications for vitreous enameled steel wash basin
8835- 1978	Guideline for planning and design of surface drains.
9758- 1981	Flush valves and Fittings for water closets and urinals
9762- 1994	Specifications for polyethylene floats for float valves
9763- 2000	Specifications for Plastic Bib taps, pillar taps, angle valves and stop valves for hot & cold water service.
10500- 1991	Specification of Drinking water
11632 - 1986	Rehabilitation of Tube well
12183- 1987 (Pt. I)	Code of practice for Plumbing in multi-storied buildings (for water supply)
12231 - 1987	UPVC pipes for section & delivery lines of agricultural pumps-Specification.
12235 - 1986	Method of test for UPVC pipe for potable water supply
12288 - 1987	Code of practice for use and laying of Ductile Iron pipes.
12469 - 1988	Specifications for pumps
12592- 2002	Precast concrete frame & cover (SFRC frame & cover)
12701-1996	Specifications for rotational molded polyethylene water storage tanks
12709 - 1994	Glass fiber reinforce plastic(GRP) pipes, joints & fittings for use for potable water supply – Specification.
12818 - 1992	Spn. for UPVC ribbed screen casing & plain casing pipes for bore / tube well
12820 - 1989	Dimensional Req. of Rubber Gaskets for Mechanical Joints & push in joints for use with Cast Iron Pipes & fittings for carrying water, Gas & sewage.
13095 - 1991	Butterfly valves for general purposes

13114 - 1991	Spn. for forged brass gate, globe & check valves for water works purposes
13382-2004	Cast Iron specials for mechanical & push-on flexible joints for pressure pipelines for water, gas & sewage
13592- 1992	Specifications for PVC soil, waste & rain water (SWR) including ventilation pipes
13593 - 1992	UPVC pipes fittings for use with section and delivery lines for Agricultural pumps – Specification.
13983-1994	Specifications for stainless steel kitchen sinks & drain boards for domestic purpose
14735-1999	UPVC injection molded fittings for UPVC – SWR pipes – Specifications.
14846- 2000	Specifications for sluice valve for water works purposes (50 to 1200 mm size)
15265 – 2003	Specifications for flexible PVC pipes or polymer reinforcement thermo plastic hoses for suction and delivery lines for Agricultural pumps.
15328 – 2003	UPVC non pressure pipes for use in underground drainage and sewerage system – Specifications.
15450- 2004	Polyethylene/Aluminum/Polyethylene composite pressure pipes for hot and cold water supplies – Specifications.

1.3. MINIMUM WEIGHT OF MOST COMMONLY USED SANITARY APPLIANCES & WATER FITTINGS

The minimum unit weight of each fitting shall not be less than as given in the following table and tolerance for weight shall be as per relevant IS code.

SR	ITEM DESCRIPTION	NOMINAL SIZE/ THICKNESS	IS CODE	MIN UNIT WEIGHT
1	Brass non-fancy type Bib Tap Please see Table under relevant item for other sizes.	15mm	781- 1984	400 Grams
2	C.P. brass fancy type Bib Tap	15mm	8931- 1993	550 Grams
3a	Brass non-fancy types Stop cock – Internally threaded	15mm	781- 1984	330 Grams
3b	Brass non-fancy types Stop cock – Externally threaded	15mm	781- 1984	400 Grams
4	C.P. brass fancy types Stop cock	15mm	8931- 1993	550 Grams
5	C.P. brass concealed typed Stop cock	15mm	8931- 1993	750 Grams
6	C.P. brass fancy Pillar Tap	15mm	1795- 1982	650 Grams
7	C.P. brass waste coupling	32mm	3311- 1979	200 Grams
8	C.P. brass waste coupling	40mm	3311- 1979	250 Grams
1	C.P. brass fancy Shower rose	15mm		125 Grams
2	C.P. brass bottle trap	32mm.		500 Grams
3	C.P. brass bottle trap	40mm		550 Grams
4	C.P. brass Liquid soap dispenser			250 Grams
5	C.P. brass coat and hat hook			150 Grams
6	C.P. brass Towel rod bracket [pair]			100 Grams
7	C.P. brass Towel rod [600 mm long]	20mm		150 Grams
8	G.I. Clamps thickness for GI piping	2 MM		
9	MS Clamps thickness for CI piping	3 MM		
10	Rain water lead sheet flashing			38.00 kg/sqm
11	C.I. frame and cover for Gully Trap			7.50 kg.
12	S.S. grating for Nahani Trap			50 Grams
13	C.P. brass grating for Nahani Trap			190 Grams
14	C.P. Brass Dome shape grating			275 Grams

3. SANITARY INSTALLATIONS

3.1. EUROPEAN/ ANGLO INDIA WATER CLOSET

3.1.1. GENERAL

The item pertains for providing white or color glazed vitreous chinaware European or Anglo Indian water closet with seat and cover of size and color as specified in the schedule including fixing.

3.1.2. MATERIAL

European type water closet shall be washing down pattern unless otherwise specified. Water closet shall be vitreous china conforming to IS 2556 (Part-I & II). The closet shall be of one piece construction and shall have minimum two hole of 6.5 mm diameter for fixing closet to floor. Closet shall have integral flushing rims of self draining type. Each water closet shall have an integral trap with either 'S' or 'P' outlet with and trap shall be uniform and smooth in order to enable an efficient flush. Plastic seat and cover shall be of black color or as specified, they shall have conformity to IS: 2548 Part I & II.

3.1.3. FIXING

The water closet pan shall be placed in position as shown in the drawing. If the pan trap is damaged during handling or fixing, it shall be replaced by the contractor at his own cost. The pan, soil pipe shall be jointed in 1:1 Cement Mortar with hemp yarn caulked. The gap between W.C. and floor shall be finished with white/matching cement and sand as directed. Seat and cover shall be fixed to the Pan by two corrosion resistance hinge with 65 mm shank and threaded to within 25 mm from of flange. Seat shall be fixed in level by providing the washers of rubber with non ferrous or stainless steel washer to bolt.

3.1.4. THE RATE INCLUDES FOR:

1. European type water closet with an integral 'P' or 'S' trap, plastic seat cover, etc. Jointing in 1:1 cement mortar with hemp yarn caulked.
2. Cutting hole in wall / slab / beam etc. wherever required. And making all damages good to original condition after completion of work
3. Testing the entire system and rectification of defect if any.
4. All necessary labor, material and use of tools.

3.1.5. MODE OF MEASUREMENT

The measurement shall be for each unit of W.C. fixed.

3.1.6. MODE OF PAYMENT

The contract rate shall be for each unit of W.C. fixed.

3.2. WASH BASIN

3.2.1. GENERAL

The item pertains for providing color or white glazed vitreous chinaware wash basin with or without pedestal of size and color as specified in the schedule including fixing.

3.2.2. MATERIAL

Wash basins shall be of vitreous china conforming to IS : 2556(Part-IV) of flat back or angle back as specified shall be of one piece construction including combined over flow, basin shall be provided with single or double tap holes of size 28 mm square or 30 mm rounded. Each basin shall have circular waste hole or 5 sq.cm slot type over flow. Pedestals for wash basin shall be exactly same glazing that of basin. Pedestal shall be capable of supporting the basin and completely recessed at the back to accommodate supply and waste pipes and fittings. The basin shall be supported on pan of C.I cantilever brackets conforming to IS 775. Use of MS angle or Tee Section as bracket is not permitted.

3.2.3. FIXING

The wash basin shall be fixed in position as indicated in the drawing. Basin shall be supported on a pair of C.I brackets which is embedded in cement concrete (1:2:4) block 100 x 75 x 150 mm. Oval shape or round shape wash basins are required to be fixed in RCC platform with stone tapping either fully sunk in stone top or flush with stone topping. The wall plaster on seat shall be cut to rest over the top edge of the basin so as not to leave any gap for water seepage through between wall plaster & skirting of basin. The gap between basin

and wall shall be finished with white matching cement.

3.2.4. THE RATE INCLUDES FOR

1. Wash Basin with pair of C.I bracket as required.
2. Cutting hole in wall / slab / beam etc. wherever required. And making all damages good to original condition after completion of work.
3. All necessary material, labor and use of tools.

3.2.5. MODE OF MEASUREMENT

The measurement shall be for each unit of wash basing fixed.

3.2.6. MODE OF PAYMENT

The measurement shall be for each unit of wash basin fixed.

3.3. URINAL

3.3.1. GENERAL

The item pertains for providing color or white glazed vitreous chinaware urinal in single or range (1, 2 & 3) and size as specified in the schedule with necessary fittings and appliances including fixing.

3.3.2. MATERIAL

3.3.2.1. BOWL TYPE (WITH FLUSHING RIM)

Urinal basin shall be flat back or corner wall type lipped in front. The vitreous china conforming to IS 2556 (Part VI). Urinal shall have and integral flushing rim and inlet or supply horn for connecting flush pipe. Flushing rim and inlet shall be of the self draining type. At bottom of basin and outlet horn for connecting outlet shall be provided. The inside surface of the urinal shall be uniform and smooth throughout to ensure efficient flushing

3.3.2.2. BOWL TYPE FLAT BACK WITHOUT FLUSHING RIM

They shall be of vitreous china conforming to IS:2556 (Part-VI) constructed in one piece with providing slot or alternative fixing arrangement at flat back and where the integral flushing rim is not provided, they shall be provided with ridges inside the bowl to divert towards the front line of the urinal.

3.3.2.3. STALL URINALS

The stall urinal and its screen shall be glazed fire clay conforming IS: 771 (Part-III, Sec-2). The inside surface of stall and screen shall be regular and smooth throughout to ensure efficient flushing.

3.3.2.4. CP BRASS FLUSH PIPE

The flushing arrangement to urinals for single or in range shall be of CP brass with CP brass spreader of 15 mm dia conforming to IS: 407. The capacity of flush pipe for urinal in a range shall be as follows:

Nos. of urinals in	Capacity of flush tank	Size of C.P. brass Flush pipe Main	Size of C.P. brass Flush pipe Distribution
One	5 liters	15mm	15
Two	10 liters	20 mm	15
Three	10 liters	25 mm	15

3.3.3. FIXING:

3.3.3.1. BOWL TYPE FLAT BACK URINAL WITHOUT FLUSHING RIM (Single or Range)

Urinal shall be fixed in position by using rawl plug, wooden plug, C.P screws etc. It shall be fixed at height of 65 cm from the standing level to the top of the lip of urinal or as directed by the Engineer-in-charge. Each urinal shall be connected with 32 mm size waste pipe which shall discharge into channel or a floor trap.

3.3.3.2. STALL URINALS

The lip of the stall urinal shall be flush with the finished floor level. The stall urinal shall be laid over a fine sand cushion on average 25 mm thickness. The gap between wall surface, finished floor level and urinals shall not be more than 3mm and filled with water proofing plastic compound.

3.3.3.3. CP BRASS FLUSHING ARRANGEMENT

The flushing arrangement to urinal in single or range shall be of CP brass from 25 mm dia to 15 mm dia and CP brass spreader of 15 mm size to each urinal including the cost of CP brass elbows, tees, coupling, crosses, clamps, clips, union CP brass check nut and screws etc.

3.3.4. THE RATE INCLUDES FOR

1. Glazed Urinals (single or in range) and CP brass pipe flushing arrangement including the cost of jointing material.
2. Cutting hole wherever required and making all damage good to original condition after completion of work.
3. Testing the entire system and rectification of defects if any.
4. All necessary materials, labor and use of tools.

3.3.5. MODE OF MEASUREMENT

The measurement shall be for each unit of urinal set (single or range) fixed.

3.3.6. MODE OF PAYMENT

The contract rate shall be for each unit of urinal set (single or range) fixed.

3.4. DIVISION PLATE / PARTITION PLATE

3.4.1. GENERAL

The item pertains for providing white or color glazed vitreous chinaware division plate of size and color as specified in the schedule including fixing.

3.4.2. MATERIAL

Division plate shall be white or color glazed of size as specified in the schedule, and shall conform to IS: 2556 PART VI

3.4.3. FIXING

Division plate shall be fixed vertically in position at proper height with expandable anchor fasteners, CP Brass screws, wooden plugs etc.

3.4.4. THE RATE INCLUDES FOR

1. Glazed division plate including the cost of CP brass screws, wooden plugs, expandable anchor fasteners etc.
2. All necessary labor, material and use of tools.

3.4.5. MODE OF MEASUREMENT

The measurement shall be for each unit of division plate fixed.

3.4.6. MODE OF PAYMENT

The contract rate shall be for each unit of division plate fixed. PAGE 28 OF 79

3.5. PVC WATER INLET CONNECTION

3.5.1. GENERAL

The item pertains to providing color or white PVC water inlet connection for cistern and wash basins.

3.5.2. MATERIAL

PVC water inlet connection shall conform to IS specifications and shall be of standard pattern with nylon insulation of minimum 450 mm long with CP brass check nut at both the end and shall be able to withstand the testing pressure of 1 MPa (10 kg/sq.cm.)

3.5.3. FIXING

The PVC water inlet connection shall be fixed in position as indicated in the drawing or as directed by the Engineer-in-charge for flushing cistern and wash basins

3.5.4. THE RATE INCLUDES FOR

1. Supplying and fixing of PVC water inlet connection.
2. All necessary labor, material and use of tools.

3.5.5. MODE OF MEASUREMENT

The measurement shall be for each unit of water inlet connection fixed.

3.5.6. MODE OF PAYMENT

The contract rate shall be for each unit of PVC water inlet connection fixed.

3.6. STAINLESS STEEL SINK

3.6.1. GENERAL

Item includes providing the stainless steel sink with or without drain board of size as specified in the schedule including fixing.

3.6.2. MATERIAL

The sink shall be manufactured from stainless steel of Salem or equivalent steel conforming to IS: 13983. Stainless steel sink shall be of one piece construction molded out of 19 SWG (1mm) stainless steel sheet of grade AISI 304 (18/8) with stainless steel choke – stop strainer (waste coupling) check nuts conforming to IS: 13983.

3.6.3. FIXING

The sink shall be fixed in position as indicated in the drawing. The sink shall be placed over the brackets or on the platform. Gap between sink and platform / wall shall be finished with white / matching cement.

3.6.4. THE RATE INCLUDES FOR

1. S.S. sink with waste coupling cement sand etc.
2. All necessary labor, material and use of tools.

3.6.5. MODE OF MEASUREMENT

The measurement shall be for each unit of Stainless Steel sink fixed.

3.6.6. MODE OF PAYMENT

The contract rate shall be for each unit Stainless Steel sink fixed.

3.10. SOAP DISH

3.10.1. GENERAL

The item includes providing white or color glazed chinaware type soap dish of size as mentioned in the schedule including fixing.

3.10.2. MATERIAL

Soap Dish shall be of CP brass or vitreous China on specified and of size, design as approved by the Engineer-in-charge. Soap Dish shall conform to relevant IS standard and should have ISI certification mark.

3.10.3. FIXING

Soap Dish shall be fixed in position by means of C.P brass covers and rawl plug embedded in the wall. Vitreous china Soap Dish shall fixed into the wall with 1:2 cement mortar. The pocket shall be cut in wall, if not left, finishing the gap with white/matching cement.

3.10.4. THE RATE INCLUDES FOR

1. Soap dish, cement, sand, curing etc.

2. Cutting the pocket if they are not left.
3. All necessary labor, material and the use of tools.

3.10.5. MODE OF MEASUREMENT

The measurement shall be for each unit of soap dish fixed.

3.10.6. MODE OF PAYMENT

Contract rate shall be for each unit of soap dish fixed.

3.11. TOWEL ROD/TOWEL RING

3.11.1. GENERAL

The item includes providing Towel rod/ towel ring of size as mentioned in the schedule including fixing.

3.11.2. MATERIAL

Towel rail shall be of C.P brass with two CP brass bracket coated with chromium plating of thickness not less than grade No.2 of IS 4827. The size of rail shall be 600 mm x 20 mm dia unless otherwise specified in the schedule. Towel ring of CP brass with one CP brass bracket with thickness not less than Grade No.2 of IS 4827. The diameter of the ring shall be 175 mm unless otherwise specified in the schedule. The diameter of ring rod shall not be less than 8 mm. PAGE 31 OF 79

3.11.3. FIXING

The towel rod/ ring shall be fixed to proper line and level as indicated in drawing with CP brass screws, wooden raw plug, drilling hole etc. and making good the wall to original condition after fixing the towel rod.

3.11.4. THE RATE INCLUDES FOR

1. Towel rod rail/ring CP brackets & screws etc.
2. All necessary labor, material and the use tools.

3.11.5. MODE OF MEASUREMENT

The measurement shall be for each unit of towel rod fixed.

3.11.6. MODE OF PAYMENT

The contract rate shall be for each unit of towel rod fixed.

3.12. SHOWER ROSE

3.12.1. GENERAL

The item pertains to provide chromium plated brass shower rose of specified dia with accessories including fixing.

3.12.2. MATERIAL

The shower rose shall be CP brass of approved and heavy quality. Its accessories shall conform to IS: 1239 Part II.

3.12.3. FIXING

Shower rose shall be fixed to be water supply pipe line with necessary G.I fittings etc. as required by the Engineer-in-charge. Jointing shall be done with the zinc, spun yarn etc. A few turns of fine hemp yarn dipped in linseed oil shall be taken over the threaded ends to obtain complete water tightness. Leaky joint shall be remade to make it leak proof at his risk & cost.

3.12.4. THE RATE INCLUDES FOR

1. Shower rose, bend, socket, union/nuts, nipple etc.
2. All necessary labor, material and the use of tools.

3.12.5. MODE OF MEASUREMENT

The measurement shall be for each unit of shower rose fixed.

3.12.6. MODE OF PAYMENT

The contract rate shall be for each unit of shower rose fixed.

3.13. BIB TAP, STOP COCK & ANGLE STOP COCKS

3.13.1. GENERAL

The item pertains to provide chromium plated brass bib tap and stop cock and angle stop cocks, free flanges (if joined to concealed pipe) including fixing

3.13.2. MATERIAL

Bib cock (Bib tap) is drawn off tap with a horizontal inlet and free out let and a stop cock is a valve with a suitable means of connections for insertion in a pipe line for controlling or stopping the flow. These shall be of size 15 mm sizes or as specified and shall be of screw down type. The closing device shall work by means of disc. Carrying a renewable non-metallic washer with shuts against the water pressure on seating right angles to the axis of the threaded spindle which operates it. The handle shall be crutch, butterfly or fancy design type securely fixed to the spindle. The tap shall open anti clock wise direction.

Brass bib taps and stop cocks and angle stop cocks shall conform to IS 781, they shall be polished bright. The minimum finished weight of different sizes of bib tap weight of 15 mm size bib tap and stop cock shall be as per table given below. They shall be sound and free from taps, blow whole and fitting. Internal & External surface shall be clean, smooth and free from sand and neatly dressed. Taps shall be nickel chromium plated and thickness of coating shall not be less than service grade No.2 of IS 4827 and plating shall be capable of taking high polish which shall not be easily tarnished. Every tap complete with its component shall with stand an internally applied hydraulic pressure of 2 MPa (20 kg/sq.cm) maintained for a period of 2 minutes during the period it shall neither leak nor sweat. Leaky joint shall be remade to make it leak proof without any extra cost from contractor.

3.13.3. FIXING

Bib tap stop cock shall be fixed to the pipe line with C.P. brass or G.I. specials, if required or as ordered by Engineer-in-charge. Jointing shall be done with white zinc, spun yarn etc. A few turns of fine hemp yarn dipped in linseed oil shall be taken over the threaded ends to obtain complete water tightness.

3.13.4. THE RATE INCLUDES FOR

1. Bib tap and stop cock, special etc.
2. All necessary labor, material and the use of tools.

3.13.5. MODE OF MEASUREMENT

The measurement shall be for each unit of bib tap and stop cock fixed.

3.13.6. MODE OF PAYMENT

The contract rate shall be for each unit of bib tap or stop cock angle stop cock fixed.

3.15. PILLAR TAP (Non fancy & Fancy Type)

3.15.1. GENERAL

The item pertains to provide chromium plated brass pillar tap including fixing.

3.15.2. MATERIAL

The pillar tap shall be 15 mm nominal size or as specified in the schedule. Fancy type pillar tap shall be of C.P. brass approved quality and shall conform to I.S. 8931. Non fancy pillar tap shall be chromium plated-brass and shall conform to IS 1795. The nominal size of Pillar tap shall be 15 mm or as specified. Casting of Pillar tap shall be sound and free from laps, blow hole and pitting. External and internal surface shall be clean, smooth and free from sand and be neatly dressed. All the parts fitted to pillar tap shall be axial, parallel and cylindrical with surfaces smoothly finished. The minimum of finish weight of Pillar tap shall not be less than 650 grams (body weight 250 gms, washer plate loose valve 150 gms and back nut 40 gms. Thickness of C.P coating shall not be less than service grade no.2 of IS 4827 and plating should be capable of taking high polish which shall not easily tarnish or scale.

3.15.3. TESTING

Pillar tap shall withstand and internally applied hydraulic pressure of 2 MPa (20 kg/sq.cm) for period of 2 minutes during which period, it shall neither leak nor sweat. Leaky joint shall be remade to make it leak proof without any extra cost from the contractor.

3.15.4. FIXING

Pillar tap shall be fixed to the pipe line as indicated in the drawing with necessary special as required or as ordered by Engineer-in-charge. Jointing shall be done with white zinc, spun yarn etc. A few turns of fine hemp yarn dipped in linseed oil shall be taken over the threaded ends to obtain complete water tightness.

3.15.5. THE RATE INCLUDES FOR

1. Pillar tap including fixing.
2. All necessary labor, material and the use of tools.

3.15.6. MODE OF MEASUREMENT

The measurement shall be for each unit of pillar tap fixed.

3.15.7. MODE OF PAYMENT

The contract rate shall be for each unit of pillar tap fixed.

3.16. FLUSH VALVE

3.16.1. GENERAL

The item pertains to provide chromium plated brass flush valve or brass concealed type flush valve with necessary accessories including fixing. (Free flanges if joined to concealed pipes)

3.16.2. MATERIAL

The Flush valve shall be nominal diameter as specified in the schedule of quantities. It shall be of C.P. brass approved and heavy quality, and shall conform to I.S. 9758. The fresh valve shall have working pressure of 0.15 to 0.5 MPa. The valve shall be tested to a Hydraulic pressure of 2 MPa for 2 minutes.

3.16.3. FIXING

Flush valve shall be fixed to the pipe line as indicated in the drawing with necessary special as required or as ordered by Engineer-in-charge. Jointing shall be done with white zinc, sun yarn etc. A few turns of fine hemp yarn dipped in linseed oil shall be taken over the threaded ends to obtain complete water tightness. Leaky joint shall be remade to make it leak proof

3.16.4. THE RATE INCLUDES FOR

1. Flush valve, connecting pipe, socket, union, nipple and wall flanges if connected to concealed pipe.
2. All necessary labor, material and the use of tools.

3.16.5. MODE OF MEASUREMENT

The measurement shall be for each unit of flush valve fixed.

3.16.6. MODE OF PAYMENT

The contract rate shall be for each unit of flush valve fixed.

3.17. WASTE COUPLING

3.17.1. GENERAL

The item pertains to provide chromium plated brass waste coupling including fixing.

3.17.2. MATERIAL

Waste Coupling shall conform to IS 3311. Waste fittings shall be of CP with thickness of CP coating not less than service Grade No.2 of IS 4827 which is capable of receiving polish and will not easily scale off. The fitting shall conform in all respect to IS 2963 and shall sound, free from laps below, holes and fittings and other manufacturing defects. External and internal surface shall be clean and smooth. They shall be neatly dressed.

The waste fitting for wash basin shall be of nominal size of 32 mm and for sink shall be nominal size 50 mm.

3.17.3. FIXING

Waste coupling shall be fixed to wash basin, sink or urinal as ordered with necessary specials. Jointing shall be done with white zinc, yarn etc. A few turns of fine hemp yarn dipped in the linseed oil shall be taken over the threaded ends to obtain complete water tightness. Leaky joint shall be remade to make it leak proof.

3.17.4. THE RATE INCLUDES FOR

1. Waste coupling with necessary specials.
2. All necessary labor, material and the use of tools.

3.17.5. MODE OF MEASUREMENT

The measurement shall be for each unit of waste coupling fixed.

3.17.6. MODE OF PAYMENT

The contract rate shall be for each unit of waste coupling fixed.

3.18. BOTTLE TRAP

3.18.1. GENERAL

The item pertains to provide chromium plated brass bottle trap including fixing.

3.18.2. MATERIAL

Bottle trap shall be of C.P with thickness of CP coating not less than service grade No. 2 of IS 4827 which is capable of receiving polish and will not easily scale off. The fitting shall conform in all respect of IS 2963 and shall be sound, free from laps below, holes and fittings and other manufacturing defects. External and internal surface shall be clean and smooth. They shall be neatly dressed and be truly machined so that nut smoothly moves on the body. The Bottle trap for wash basin shall be of nominal size of 32 mm and for sink shall be nominal size 50 mm.

3.18.3. FIXING

Bottle trap shall be fixed to wash basin, sink or urinal as indicated in the drawing with necessary specials or as ordered by the Engineer-in-charge. Jointing shall be done with white zinc, spun yarn etc. A few turns of fine hemp yarn dipped in linseed oil shall be taken over the threaded ends to obtain complete water tightness. Leaky joint shall remake to make it leak proof.

3.18.4. THE RATE INCLUDES FOR

1. Bottle trap with necessary specials.
2. All necessary labor, material and the use of tools.

3.18.5. MODE OF MEASUREMENT

The measurement shall be for each unit of bottle trap fixed.

3.18.6. MODE OF PAYMENT

The contract rate shall be for each unit of bottle trap fixed

3.19. COAT AND HAT HOOK

3.19.1. GENERAL

The item pertains to provide chromium plated brass coat and hat hook including fixing

3.19.2. MATERIAL

Coat & Hook shall be of three way type of approved and heavy quality. Coat & Hat Hook shall be CP brass and three way hook type or minimum six ways Patti type of 125 mm x 30 mm x 6mm size. CP coating shall not be less than service grade No.2 of IS 4827.

3.19.3. FIXING

The Coat and hat hook shall be fixed to proper line & level as indicated in drawing with CP brass screws.

3.19.4. THE RATE INCLUDES FOR

1. Coat and hat hook with CP screws etc.
2. All necessary labor, material and the use of tools.

3.19.5. MODE OF MEASUREMENT

The measurement shall be for each unit of coat and hat book fixed.

3.19.6. MODE OF PAYMENT

The contract rate shall be for each unit of coat and hook fixed.

3.20. FLUSHING CISTERN

3.20.1. GENERAL

The item pertains to provide white or color glazed chinaware / PVC / Cast Iron flushing cistern with all inside symphonic fitting including fixing.

3.20.2. MATERIAL

The flushing cistern shall be automatic or manually of rates high level or low level as specified for water closets and urinals. Cisterns shall be of cast iron, vitreous china, enameled pressed steel conforming to IS 774 for Flushing Type and IS 2326 for Automatic flushing cistern and Plastic (IS 7231). Cistern shall be mosquito proof. All working parts shall be designed to operate smoothly and efficiently. The cistern shall have removable covers which shall fit closely on it and be screwed against top displacement where operating mechanism is attached to the cover. This may be made in two sections, but the section supporting the mechanism shall be securely fitted or screwed to the body. The outlet fitting of the cistern shall be securely connected to the cistern. The nominal internal diameter of the cistern outlet shall not be less than 32 mm and 38 mm for high level and low level respectively. Length of outlet cistern shall be 37 +/- 2 mm. Ball valve shall be screwed type 15 mm in diameter and shall confirm of IS 1703. The flat shall be made of polyethylene as specified in IS 9762. A high level cistern is intended to operate with minimum height of 125 cm and a low level cistern with maximum height of 30 cm between the top of the pan and under side of the cistern. A G.I chain strong enough to sustain a sudden applied pull of 10 kg or a dead load of 50 kg without any apparent or permanent deformation of the chain rings shall be attached to the ring or hook of the level manually operated high level C.I cistern. In case of low level cistern handle shall be of CP brass. In case of Plastic cistern, operation of cistern shall be through Push Button at the top for dual system and beyond plastic handle. The discharge rate of the cistern as per IS 774 shall be 10 +/- .5 liters 6 second and 5 +/- .5 liters in 3 second for cistern capacity 10 liters And 5 liters respectively. Flush pipe shall be of class 'B' G.I pipe of 32 +/- mm diameter for high level. Polyethylene flush pipe shall be low density confirming to IS 3076 or high density confirming to IS 4984 or UPVC pipe confirming to IS 4965 of 40 mm outer diameter. Over flow pipe shall be of G.I. / PVC with mosquito proof jali of 15 mm dia.

3.20.3. FIXING

The chinaware flushing cistern shall be placed over a pair of C.I. brackets. C.P. brass flush pipe shall be fixed to cistern and W.C. pan using check nut, spun yarn, cement mortar etc. The cast iron flushing cistern shall be placed over a pair of C.I. or G.I. or PVC flush pipe of specified diameter shall be fixed to cistern and W.C. pan by using check nut, white zinc, spun yarn, cement mortar etc. The PVC flushing cistern shall be placed or fixed as recommended by the manufacturer, PVC flush pipe of specified diameter shall be fixed to cistern and W.C. pan by using check nut, white zinc, spun yarn, cement mortar etc.

3.20.4. THE RATE INCLUDES FOR

1. Supply and fixing flush tank, flush pipe and over flow pipe.
2. Painting all the metallic parts with two coats of flat oil paint over a coat of primer.
3. Cutting hole in wall / slab / beam etc. wherever required and making good the same to original condition after fixing.
4. Cost of jointing materials such as zinc, spun yarn, cement mortar 1:1 etc.
5. Testing the entire system and rectification of defects, if any.

6. All necessary materials, labor and use of tools.

3.20.5. MODE OF MEASUREMENT

The measurement shall be for each unit of flushing cistern fixed as a whole.

3.20.6. MODE OF PAYMENT

The contract rate shall be for each unit flushing cistern fixed as a whole.

3.21. C.I. BRACKET

3.21.1. GENERAL

The item pertains to provide a pair of Cast Iron bracket for wash basin, sink, flushing cistern etc. including fixing.

3.21.2. FIXING

Brackets shall be embedded into or fixed to the wall with plugs, screws, nails etc. Hole shall be made in the wall, if they are not left for fixing the brackets and shall be made good after fixing. The gap shall be filled with 1:2 cement mortar and finishing shall be done with white / matching color cement.

3.21.3. THE RATE INCLUDES FOR

1. Supplying and fixing the brackets.
2. Painting brackets with two coats of flat oil paint over a coat of primer.
3. Cutting hole in wall beam etc. wherever required and making good the same to original condition after fixing.
4. All necessary materials, labor and use of tools.

3.21.4. MODE OF MEASUREMENT

The measurement shall be for each pair of bracket fixed included in the items of sink, wash basin, cistern etc. as specified in schedule of quantities.

3.21.5. MODE OF PAYMENT

The contract rate shall be for each pair of bracket fixed.

4. WATER SUPPLY SYSTEM:

4.1. PVC PIPING WORK FOR WATER SUPPLY

4.1.1. GENERAL

The item includes supplying of CPVC pipes with fittings of specified diameter including laying, fixing, cutting, joining, painting etc. for vent, over flow, waste water pipe line etc.

4.1.2. MATERIAL

The pipes and fittings shall conform to ASTM-D-1785, CPVC pipes and fittings shall be free from cracks, flaws and defects and shall be able to withstand a pressure as mentioned in the schedule of quantities.

4.1.3. EXAMINING

Before laying the pipe line, it shall be first examined for damages and cracks, No cracked or damaged pipe and fittings shall be used in the work and they shall be removed from the site by the contractor at his own cost and charge.

4.1.4. CLEANING

All the pipes and fittings shall be thoroughly cleaned with brush and washed if necessary to remove any accumulated stone, soil or dirt inside and outside surfaces.

4.1.5. TRENCHES

The trench bottom shall be carefully examined for the presence of hard objects such as flints, rock projection

or tree roots etc. Pipe shall be embedded in sand or soft soil, free from rock & gravel, back fill 150mm above the pipe shall also be of fine sand or soft soil. Pipe shall not be painted. The width of trench shall not be less than outside diameter of pipe plus 300 mm in case of gravel soils. Pipe shall be laid at-least 900 mm below the ground level (measured from the surface of the ground to the top of pipe).

4.1.6. LAYING

The pipes shall be carefully laid straight to the correct alignment in gradients as indicated in the drawing. The entire pipe shall be used in standard length as far as possible. Cut length may be used only where it is necessary to make up exact length. The entire length of pipe shall be evenly supported on bed of the trench throughout. Care shall be taken to prevent any sand, earth or other materials from entering into the pipes during laying. At the end of day's work the open end shall be suitably plugged.

4.1.7. FIXING

The pipe line shall be fixed in position as shown in the drawing or as directed by the Engineer-in-charge. The pipe shall be fixed with G.I. clamps not less than 2 mm thick or with suitable PVC clamps, The clamps shall be fixed into the wall with G.I. nails not less than 40 mm long and wooden gutties. Spacing between clamps for fixing internal piping shall be as given below:

Pipe diameter	For Horizontal Runs	For Vertical Runs
20 mm	700 mm	1050 mm
25 mm	750 mm	1125 mm
32 mm	825 mm	1240 mm
40 mm	975 mm	1460 mm
50 mm	975 mm	1460 mm

5. DRAINAGE SYSTEM

5.1. UPVC- SWR PIPING WORK

5.1.0. GENERAL

The item includes supplying of UPVC soil, waste and rain water (SWR) and ventilation pipes with fittings of specified diameter including laying, fixing, cutting, joining, painting if required etc.

5.1.1. MATERIAL

The pipes shall conforming to IS 13592, UPVC - SWR (Type A or B as specified) and fittings conforming to IS 13591 shall be free from cracks, flaws and defects and shall be U. V. stabilized and able to withstand a pressure as mentioned in the schedule of work. Rubber sealing rings conforming to IS 5382 with lubricant for sliding socket joints as mentioned in the schedule of work.

5.1.2. EXAMINING

Before laying the pipe line, it shall be first examined for damages and cracks, No cracked or damaged pipe and fittings shall be used in the work and they shall be removed from the site by the contractor at his own cost and charge.

5.1.3. CLEANING

All the pipes and fittings shall be thoroughly cleaned with brush and washed if necessary to remove any accumulated stone, soil or dirt inside and outside surfaces.

5.1.4. LAYING

The pipes shall be carefully laid straight to the correct alignment in gradients as indicated in the drawing. The entire pipe shall be used in standard length as far as possible. Cut length may be used only where it is necessary to make up exact length. The entire length of pipe shall be evenly supported on bed of the trench throughout. Care shall be taken to prevent any sand, earth or other materials from entering into the pipes during laying. At the end of day's work the open end shall be suitably plugged.

5.1.5. FIXING

The pipe line shall be fixed in position as shown in the drawing or as directed by the Engineer-in-charge. The pipe shall be fixed with G.I. clamps not less than 2.0 mm thick or with suitable UPVC clamps/clips. The clamps/clips shall be fixed into the wall with G.I. nails not less than 40 mm long and wooden gutties keeping the pipe about 15 mm clear of the wall.

5.1.6. MAKING JOINT

The jointing of pipes and fittings generally shall be done with approved cement solvent including making surface rough or rubber sealing rings with lubricant for sliding socket joints. The pipe shall be cut to desired length. Care shall be taken that the profile or cut surfaces shall not be changed and the fibrous material shall be removed with scraper or knife.

5.1.7. DETACHABLE JOINT

Detachable joints shall be made where pipes of different materials have to be jointed or as specified in the schedule. The flanges are first pushed over the pipe ends and jointing shall be made by cement solvent.

5.1.8. PAINTING

In case of underground piping, the pipe line shall be painted with two coats of approved oil paint of matching color over a coat of primer.

5.1.9. DEWATERING

In case of underground pipes, the contract rate shall include bailing or pumping out all the water till completion of work if accumulated during the progress of work either from seepage, springs, rain or any other cause.

5.1.10. TESTING

The joints shall be tested by either smoke test for vertical stacks or 2.5 m head of water at the highest point of the section under test for horizontal drainage pipes. Smoke shall be pumped into the pipes at the lowest end from a smoke machine which consists of a bowl and burner. The material usually burnt is greasy cotton waste which gives out a clear pungent smoke which is easily detectable by sight as well as by smell, if there is leak at any point of the drain. The water head test shall be carried out by suitably plugging the lower end of the drain and the ends of the connection if any and filling the system with water. A knuckle bend shall be temporarily jointed to it so as to provide required test head, or the top may be plugged with a connection to a hose ending in a funnel which could be raised or lowered till the required head is obtained and fixed suitable for observation. The leaky joints shall be remade and section re-tested at no extra cost.

5.1.11. THE RATE INCLUDES FOR

1. Supplying of UPVC-SWR pipes and fittings of specified diameter.
2. Laying and cutting the pipe wherever necessary and wastage.
3. Fixing the pipe line with G.I. clamps not less than 2mm thick and G.I./M.S. nails length not less than 40mm or with UPVC clamps, screws, wooden gutties etc.
4. Making the solution joint and painting if mentioned in schedule of work the pipe line.
5. In case of underground pipes, dewatering if necessary till completion of work.
6. All necessary materials, labor and use of tools.

5.1.12. MODE OF MEASUREMENT

The measurement shall be for unit running meter length of pipe line laid or fixed. The measurement shall be taken along the center line of pipe. No measurement shall be recorded separately for fittings, making joint, painting if mentioned in schedule of work and testing.

5.1.13. MODE OF PAYMENT

The contract rate shall be for unit running meter length of pipe line laid or fixed.

5.2. PVC PIPING WORK

5.2.0. GENERAL

The item includes supplying of PVC pipes with fittings of specified diameter including laying, fixing, cutting, joining, painting etc. for vent, over flow, waste water pipe line etc.

5.2.1. MATERIAL

The pipes and fittings shall conform to series IV of IS 4985, PVC pipes and fittings shall be free from cracks, flaws and defects and shall be able to withstand a pressure as mentioned in the schedule

5.2.2. EXAMINING

Before laying the pipe line, it shall be first examined for damages and cracks, No cracked or damaged pipe and fittings shall be used in the work and they shall be removed from the site by the contractor at his own cost and charge.

5.2.3. CLEANING

All the pipes and fittings shall be thoroughly cleaned with brush and washed if necessary to remove any accumulated stone, soil or dirt inside and outside surfaces.

5.2.4. LAYING

The pipes shall be carefully laid straight to the correct alignment in gradients as indicated in the drawing. The entire pipe shall be used in standard length as far as possible. Cut length may be used only where it is necessary to make up exact length. The entire length of pipe shall be evenly supported on bed of the trench throughout. Care shall be taken to prevent any sand, earth or other materials from entering into the pipes during laying. At the end of day's work the open end shall be suitably plugged.

5.2.5. FIXING

The pipe line shall be fixed in position as shown in the drawing or as directed by the Engineer-in-charge. The pipe shall be fixed with G.I. clamps not less than 2 mm thick or with suitable PVC clamps, the clamps shall be fixed into the wall with G.I. nails not less than 40 mm long and wooden gutties. Spacing between clamps for fixing internal piping shall be as given below

6.1. REVERSE OSMOSIS SYSTEM

Reverse Osmosis (RO) is a water purification technology that uses a semi-permeable membrane. This membrane technology is not exactly a filtration method. In reverse osmosis, an applied pressure is used to overcome osmotic pressure, a colligative property that is driven by chemical potential which is a thermodynamic parameter. Reverse osmosis through a semi-permeable membrane can remove many types of molecules and ions from solutions, and is used in both industrial processes and the production of potable water. Reverse osmosis is most commonly known for its use in drinking water purification from seawater and those areas where water contamination includes viruses and chemicals like metal ions, lead, arsenic, fluoride, radium, sulfate, magnesium, potassium, nitrate, fluoride and phosphorus.

6.1. Working of RO (Reverse Osmosis) :

Reverse Osmosis works by using a high pressure pump to increase the pressure on the salt side of the RO and force the water across the semi-permeable RO membrane, leaving almost all (around 95% to 99%) of dissolved salts behind in the reject stream. The amount of required pressure depends on the salt concentration of the feed water. The more concentrated the feed water, the more pressure is required to overcome the osmotic pressure.

6.1..1 SCOPE

The scope of this section on comprises the supply, installation, testing and commissioning of RO plant suitable for Raw Water Intake & with Treated Water Outlet chemical parameter in acceptable limits of SP: 35 and Indian Standards.

6.2 RO System Requirements

1. The capacity of the plant shall be:-

- Domestic RO+UV Filter 20 LPH & Min 8 Liter Storage capacity- 1 NOS.
- 20 liters per hour (LPH)- 1 NOS.

2. The technical specifications of each component of RO system for the capacity ranging from 50 LPH are given in technical specifications.

3. The bidder is advised to analyze the water samples on their own before quoting their rates. No extra claim will be entertained after the allotment of the work on this account.

4. The reject water generated from reverse osmosis technology should be appropriately treated/ recycled and is the responsibility of the deploying firm/ bidder.

5. Re-generation of ion- exchange resins in ion-exchange technology, re-generation of adsorbents in adsorption/precipitation technology in an environment friendly manner is the responsibility of Bidder.

6. The bidder has to design supply, install, and commission, operate and maintain the Pure drinking water system and water dispensers for five years including the housing structure.

7. This offer should include all the possible expenses towards spares, replacement of membranes, consumables and repairing/ reconditioning if any required during the specified period of five years.

8. The bidder should have their own field testing kit facilities for water testing at site.

9. The bidder would analyze the water sample for all parameters as per BIS: 10500:2012 norms once in a month, from their own lab located at Head Quarters or some reputed lab and maintain proper record at site. In addition to this, the bidder shall make available at plant site, at all the time, a digital TDS meter for on the spot testing of product water.

10. The water quality must conform to BIS 10500:2012 standards (read with clause above). Water quality will be periodically evaluated maximum with an interval of one month and the system should perform consistently.

11. The bidder has to ensure that supply / operation of tube well / water source is maintained all times, during the period of 5 Years.

12. Where raw water is taken from existing tube well, independent electricity meter for Pure drinking water plant will be installed by the bidder and payment of electric bill will be made by the bidder / Panchayat for electricity consumed for running of Pure drinking water plant.

13. The system should be able to adopt the variable feed water characteristic such as varying amount of fine particulate / silt etc. in the raw water and varying Contamination levels throughout the design period.

14. The use of cleaning chemicals in the system should be minimal. The RO membranes shall be cleaned every time when the flow rate of product water decreases by 15% of the flow rate of the product water on commissioning of the RO plant after installation of complete. For that purpose, the bidder will maintain a Log book at site in which daily flow rate of the product water shall be entered. The consultant or ECGC's

representative may check the log book randomly. Otherwise in normal conditions of flow rate , RO membranes shall be cleaned after every 3 months. Membrane cleaning sequence shall be as under: a. Acid Cleaning b. Flush c. Alkaline Cleaning d. Flush e. Sanitizing f. Flush The minimum life of membrane should be not less than 3 years.

15. The system should ensure prevention of fouling of the downstream RO Membranes caused by the presence of organic and microbiological foulants in the raw water.

16. The system should ensure prevention of a majority of physical foulants from entering into RO membranes so as to ensure clean RO membranes delivering consistent performance.

17. The system should generate minimal amount of effluents thus giving an environment-friendly solution.

18. The dependence on operator for day to day functioning should be minimal.

6.3 Making connection for raw water:- The bidder shall be responsible for executing works for making connection for raw water from the source provided including cost of all materials and labour etc.

6.4 Disposal of Reject Water:- The bidder shall be responsible for proper and scientific disposal of reject water from the Pure drinking water plant site by appropriate treatment/recycling. Re-generation of ion- exchange resins in ion-exchange technology, re-generation of absorbents in adsorption/precipitation technology in an environment friendly manner is the responsibility of deploying firm/Bidder.

7.0. WATER COOLER

7.2.0. SCOPE

This section of Contract involves the design, supply, installation, testing and commissioning of Water Cooler system with all piping & necessary fittings, Valves, foundation, auto cut off system etc. All installation work shall comply with the latest rules and regulations.

7.2.1. FEATURES

1. Faster Cooling
2. Eco friendly
3. In situ power saving PUF insulation
4. Sturdy compressor and trouble free operation
5. Silent operation

7.2.2. MODEL SPECIFICATION

1. Stainless Steel body
2. Stainless Steel tank
3. Easy Controls
4. Speedy Drainage
5. Storage Capacity as per design
6. Adjustable cold water thermostat
7. Mechanically expanded condenser
8. Auto cut out
9. Over load compressor protection
10. Minimum 2 nos of Outlet

8. PLUMBING APPROVED MAKE LIST

SR	ITEM DESCRIPTION	MAKE
01	Sanitary ware	Cera/Kohler/Hindware
02	C P Fittings & Bathroom Accessories	Jaquar/Grohe/Kohler /Cera
03	Stainless Steel Sink	Nirali/Neelkanth/Futura
04	C P Grating	Chilly/ Futura
05	Ball Valve	Sant/Zoloto/Leader
06	Gun Metal Wheel Valve	Sant/Zoloto/Leader
07	Pressure Reducing Valve	Sant/Zoloto/Leader
08	Butterfly Valve	Sant/Zoloto/Leader
09	Gun Metal Non Return valve	Sant/Zoloto/Leader
10	UPVC Pipes/ Fittings	Supreme/Astral/Prince
11	CPVC Pipes/ Fittings	Supreme/Astral/Prince
12	SWR Pipes/Fittings	Supreme/Astral/Prince
13	Composite Pipes/Fittings	Kitec or Equivalent
14	Water Meter	Sant/Kranti/Capstant
15	Water Level Indicator	Sant/Sigma/Gelco
16	Water Cooler	USHA/Blue Star/Voltas /ion exchange
17	Domestic R.O. System	Power H2O/Eureka Forbes / ion exchange

GENERAL LIST OF APPROVED MAKES

The following are approved brand makes/manufacture's makes listed below. However approved equivalent material and finishes of any other specialized brand names/ manufacturer's makes may be used with the prior approval of the ECGC/ Architect. Permitting or not permitting such deviations from the approved make shall be the absolute discretion of the ECGC / Architect, and shall not be open to arbitration.

S.NO	PRODUCT	APPROVED BRAND
1	Aluminum Section	Jindal, Hindalco. Indal,
2	Anti-termite Emulsifiable Concentrate	Lindane 20% E.C., Chloropyriphos 20% E.C., of any ISI brand
3	Blinds - Venetian Blinds	Vista-Levolor, Aerolux, Mac, Sun, Parytex
4	Blinds - Vertical Blinds	Vista-Levolor, Aerolux, Mac, Sun, Parytex
5	Blinds - Roller Blinds	Vista-Levolor, Aerolux, Mac, Sun, Parytex
6	Boards - Block (IS 303, IS 710)	Mayur, Euro, Century, Star.
7	Board - Gypsum	India Gypsum , Saint Gobain
8	Boards - Laminate	Vir, Sundek, Archid
9	Board - MDF	Deco Board, Eco board, Novapan or Appr. eq.
10	Board - Mineral Fiber	Armstrong,
11	Boards - Particle (IS 303 / IS 710)	Sitapur, Deco Board, Eco board, Novapan or Appr. eq.
12	Boards - Ply (IS 303 / IS 710)	Mayur, Euro, Century, Star.
13	Boards - Pre Laminated Particle	Duratuff, Novapan, Nuwood (Exterior EWP Grade) OR Approved equivalent
14	Boards - Soft	Sitapur, Deco Board, Eco board, Novapan or Appr. eq.
15	Boards - Veneer	Mayur, Euro, Century, Star.
16	Bricks	Good quality available from approved Local source.
17	Cement - Admixtures	Fosroc, Roff, Cico, Mc-bauchemie, Choksey,
18	Cement - O.P.C.(43/53 grade)	Sanghi, JK, Ambuja, L&T, ACC,
19	Cement - PPC	Sanghi, JK, Ambuja, L&T, ACC,
20	Cement - White	JK white, Birla white,
21	C.I Covers (heavy)	Bharat, Kaplesh
22	Coarse Aggregates	From approved local source
23	Doors - Flush(IS 2202)	Mayur, Euro, Century
24	Doors & Windows- PVC Section	Vensterplus, Sintex,
25	Doors & Windows - Pressed steel section	Steel plast, Agew, Jackson Engg.
26	Doors & Windows - Z section	AGEW
27	Foam - Rubber (high density) foam	Geo foam,
28	Foam - (40 density) U foam	Geo foam,
29	Glass - Float	Saint Gobain, Asahi, Modi, Tata, Gujarat Guardian
30	Glass - Plain Sheet	Triveni, Modi, Haryana, Atul,
31	Glass - Mirror	Atul, Belgium, Atul, Commander, Sun, PILCO, Patel, Rabbit, Globe
32	Hardware - Anodized Aluminum Matt finished Hardware fitting (Heavy)	Belu, Paramount, Diamond

33	Hardware	Earlbehari, Aries, C.H. Aluminium, J.S.Enterprise
34	Hardware - Brass Hardware fittings (Heavy)	Rolex, Zodiac, from Jamnagar.
35	Hardware - Cylindrical Locks	Godrej, Europa, Yale
36	Hardware - Doors closer	Godrej, Everite, Hardwin, EBCO, Ozone
37	Hardware - Floor Springs	Godrej, E.G., Ozone, Everite, Hardwin
38	Hardware - Key board Trey	E.G. ,Earl bihari
39	Hardware - Mortice Locks / Latch	Godrej, Europa, Yale
40	Hardware - Screws	GKW, RK, Nettlefold
41	Hardware - S.S. Hinges (Heavy duty)	Royal, Suzu, Honda
42	Paint - Acrylic Emulsion	Asian, ICI, Nerolac, Berger
43	Paint - Cement Based	Snow-cem, Indo-cem
44	Paint - Cement Based wall putty	Birla white, NCL-Alltek ,
45	Paint - Distemper (Oil Bound & Acrylic)	Asian, ICI, Nerolac, Berger
46	Paint - Exterior Texture	Unitex, NCL-Alltek, Sandtex matt, Nitco-tex,
47	Paint - Exterior Emulsion	Apex-Asian Weathershield-ICI, Nerolac, Berger,
48	Paint - Interior Texture	Asian, ICI, Unitex, NCL-Alltek
49	Paint - Plastic Emulsion	Asian, ICI, Nerolac, Berger
50	Paint - Primers	Asian, ICI, Nerolac, Berger, J&N, Shalimar
51	Paint - Red Oxide	BlundelEomite
52	Paint - Synthetic Enamel Paint/Flat/Semi-Gloss	Asian, Nerolac, ICI, Berger, J&N,
53	Pipes & fittings - C.I.	Neco, Bic
54	Pipes & Fittings - C.P. Fittings (water supply)	Jaquar, Esco, ESS, Aquel
55	Pipes & fittings - CPVC /UPVC	Astral, Supreme, Ashirwad
56	Pipes & Fittings- G.I. (B class Pipes)	Tata, Asian, Prakash
57	Pipes & Fittings - G.I.fittings	R- Brand
58	Pipes & Fittings - Gun Metal Wheel Valves	Zoloto
59	Pipes & Fittings - PVC (6 kg & Above)	Supreme, Prince
60	Pipes - Stone ware	Sonya
61	PVC Tiles/Roll	Armstrong, Tusker,
62	PVC - Water tank	Sintex, National
63	Revolving Chairs / sofa	HOF, Anukool, Meet ,Sharda, Furnitech, Godrej.
64	Sand	From approved local source
65	Sanitary Wares (First Quality)	Cera, Hindustan, Perryware
66	Stainless Steel Sink	Nirali, Krishna.
67	Steel - Reinforcement	Sanghi, Electro therm, Kamdhenu,Tata
68	Steel – Structural Section	Sanghi, Electrotherm, Kamdhenu, Tata
69	Steel - Rectangular/Square Hollow Section	Tata
70	Stone - Granite	Lakha Red, RBI Red,TelephoneBlack,Perl Black
71	Stone - Marble	KesariyjiGreen,Rajnagar,Ambaji,
72	Stone - Sand stone	Jaisalmer yellow, Bansipahadpur Red

73	Sun Control Film	Garware
74	Tiles - Glazed /Ceramic	Varmora, City, Asian, Kajaria, Johnson,
75	Tiles - Vitrified	Varmora, City, Asian, Kajaria, Johnson,
76	Tiles - Mosaic	Royal-Rajlot, Alcock-Ahmedabad.
77	Tile - Adhesive	Bal-Endura,Fosroc,Roff,McBauchemie,Choksey
78	Wood - Adhesive	Fevicol, Blucoat,Euro.
79	Wood - Non Teak	Red Saal ,Kapoor, Steam Beach, Chill
80	Wood - Teak	Ghana, Nigeria, C.P.
81	Sign plate	Kitch, Dunex

Special Notes :

- The successful tenderer will have to supply the makes from above in consultation with the Client/Architect/Consultant without any extra cost.
- Tenderer should have to specify the list of makes considered in the tender while quoting the rates in the tender, in covering letter of separate letter enclosure. However, the final decision for accepting make specified by tenderer would be of client/Architect/Consultants.
- As far as possible, the successful tenderer will have to place order directly to the manufacturer OR its authorized dealer.
- The Client/Architect/Consultants have right to check the challans of supplier.
- Make of components required to be used by contractor to complete the installation, if not mentioned anywhere, shall be required to GOT IT APPROVED by Client/Architect/Consultant before installation in writing manner.
- Within a week of work order, the contractor shall submit the sample of each item / component of above mentioned approved make for the approval of the Client/Architect/Consultant.

Sign & Seal of Contractor

ECGC LIMITED

(Formerly Export Credit Guarantee Corporation of India Ltd)

TENDER DOCUMENTS

ENVELOPE NO. 2 (COMMERCIAL BID)

**PROJECT NAME : CIVIL, INTERIOR FURNISHING AND ALLIED ELECTRICAL WORKS
FOR AHMEDABAD EXPORTER BRANCH
AT THEIR NEW PREMISES NO. 401, HERITAGE,
NEAR GUJARAT VIDYAPITH, USMANPURA
ASHRAM ROAD, AHMEDABAD, GUJARAT, INDIA**

Schedule of Rates

SR.NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	AMOUNT (Rs.)
A	INTERNAL CIVIL SCOPE OF WORKS				
I	DISMANTLING & DEMOLITION				
1	Dismantling 9" thk, brick wall carefully by using chisel to cut & making good wall edges with 1:4 cement plaster including removal of debris from site.	1.00	JOB		
2	Dismantling and removing doors windows and ventilation wherever required in a manner which facilitates easy fixing of new doors and windows without undue expense. the rate shall include removal of debris from site.				
3	Dismantling marble, granite, kota, marble mosaic, ceramic tile flooring & dado including skirting and excavation up to 6" in plinth wherever required, etc. In a manner which facilitates laying of new flooring without undue extra expense. The rate shall include removal of debris from site.				
4	Dismantling existing wall panelling, partitions and false ceiling with frame work . The rate shall include removal of debris from site.				
5	Dismantling existing Electrical fittings, wires, Data cables, fittings etc. including removal of debris from site				
5	Exsiting sanitary fixtures				
	Removing existing sanitary fixtures such as wash basin, EWC etc from each toilet , & carting away the debris				
6	Exsiting drainage lines				
	Removing existing drainage lines from each toilet & kitchen and carting away the debris				
7	Exsiting Plumbing lines				
	Removing existing Plumbing lines from each toilet & kitchen and carting away the debris				
	TOTAL FOR DISMANTLING & DEMOLITION				
II	BRICK WORK & CONCRETING WORKS				
1	4.5" THK BRICK WALL WITH PLASTER	177.75	S.FT		
	Constructing 4.5" thk. Brick wall in 1:6 cement mortar. Brick used shall be of best quality kiln burnt, having sharp edges & giving clear ringing sound when struck against each other. The rate shall be inclusive of plastering the walls with ¾" thk. 1:4 cement plaster on both sides. A 4 ½" R.C.C. Patti Beam shall run horizontally @ 3'-0" c/c. The rate shall be inclusive of any scaffolding required, curing etc, complete.				
2	9" THK BRICK WALL WITH PLASTER	51.75	S.FT		
	Specification same as xiii - 1 except for a 9" x 4-1/2" r.c.c. patli shall run horizontally @ 3'-0" c/c.				
3	PLASTERING OF WALLS & CEILING	200.00	S.FT		

	Providing & applying cement sand plaster of 1:4 proportion to existing brick / RCC walls & ceilings in single coat of avg. ¾" thk. Finished rough to receive plaster of paris levelling coat. The rate shall include necessary scaffolding, curing etc. Complete.				
4	CIVIL WORKS FOR ELECTRICAL	1.00	L.S.		
	Providing & making all the works for the smooth execution of electrical works by breaking walls, cutting partitions, floors etc.				
	Rate shall include the doing good of all the areas affected with the required material.				
5	CIVIL WORKS FOR AIR CONDITIONING	1.00	job		
	Providing & making all the necessary works for the smooth execution of air-conditioning works by breaking walls, cutting partitions, floors etc.				
	Rate shall include the doing good of all the areas affected with the required material.				
	TOTAL FOR BRICK WORK & CONCRETING WORKS				
III	FLOORING / SKIRTING / CLADDING WORKS				
1	FLOORING / DADO	1,800.00	S.FT.		
	Providing & fixing 2mm thick PVC Vinyl flooring conforming to IS 3462-1986 of Armstrong/ Atco equivalent make & colour/pattern for flooring and any other specified area in correct level / slope at all levels as per architectural drawings and manufacturer's specifications & instructions. Vinyl shall be fixed with approved adhesive properly, avoid bubbles in flooring including cleaning the surface, pressing the vinyl by appropriate roller properly, cutting and filling/ welding the joints by approved and matching colour welding rod properly etc. completed as per the instructions of the engineer. Joints shall be finished properly so that area shall look continuously and joint less.				
2	GLAZED TILE FLOORING / DADO	497.00	S.FT.		
	Providing and fixing 12" x 18" approved plain shade of Glazed tiles as per pattern for flooring / dado from FFL using CM 1:4 in proper line and level as directed by the Client / Architect as shown in the drawings. The rate shall include necessary backing material, dural nosing for edges, water proofing and joint filling compound of the same shade as that of the ceramic tiles. All sanitary fittings shall be located on the joints or junctions of the tiles.				
2	PANTRY PLATFORM IN JET BLACK (WITH SINK & COCK)	7.00	R.FT.		

	Providing and laying platform of 2'-0" width (clear) and at 2'-8" height (top) above FFL. of approved 20 mm thick granite with bull nosed edges. It shall be supported on RCC slab with vertical brick wall supports. A 2" granite fascia should be provided below the bull nosed edge of granite platform. Rate shall be inclusive of making cutouts and polishing the edges for 18 " x 18 " S. S. Nirali sink without drain board (medium) or equivalent make). A flexible pipe from sink to the nahani trap shall be provided. Rate shall also include one jaguar continental C P SWAN NECK TAP with swinging casted spout (no. 347).				
3	LUNCH PLATFORM (2' 9" WIDE) IN JET BLACK	0.00	R.FT.		
	Providing and laying platform of 13.5'x2.75' (as per the design given) and at 3'-6" height (top) above FFL. of approved 20mm thick granite single slab (Black Galaxy) with double edged with half round machine polished. It shall be fixed with necessary gum on BWR Plywood(19mm thick) supported on metallic flat fitted over 4" SS pipe Buff finished 18 gauge 304 Grade for verticals (4 Nos) with 8" dia top and bottom Stainless Steel plates (16 Gauge - 304 Grade)(Heavy type) to be bolted to floor. 9" wide 19mm thick Ply to be provided below the entire lunch counter (with centre partition so that shelf can be utilised from both sides of table) for shelves for keeping tiffin boxes. 19mm thick ply finished with Black oil paint etc. complete.				
4	WASH BASIN COUNTER (2'-0" WIDE) (BLACK GALAXY)	9.00	R.FT.		
	Providing and laying platform of 2'-0" width (clear) and at 2'-8" height (top) above ffl. Of approved 20mm thick granite with bull nosed edge. It shall be supported on wall as shown in the drg. Rate shall include the profile cutting and fixing of below counter wash basin and polishing the exposed edges of granite. A 2" granite fascia shall be provided below the nosed edge.				
	TOTAL FOR TILING WORKS				
	TOTAL FOR CIVIL WORK				

SR.NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	MOUNT (Rs.)
B	INTERIOR FURNISHING WORKS				
I	CARPENTARY WORKS				
1	OVERHEAD STORAGE ABOVE PANTRY	17.50	S.FT.		
	Providing and fixing over-head storages which consist of 18mm thk. Comm. ply shutter with box type hinges of approved make & Steam beach lipping with approved laminate on all the edges. The shutter should be made of 18mm thk. Comm. Ply top, sides, rear and bottom. All the external surfaces shall be finished with 1.0mm thk. Laminate (suede finish) of approved make.				
	Division of the shutters shall be made equally according to the length of the storage. The edges of the shutters shall be provided with steam beach lipping. One Ply shelf of 18mm thick comm.ply removable type supported on side steam beach wood battens on both sides (divided equally) shall be provided. All inner surfaces shall be finished with laminate including the shutters.. Rate shall be inclusive of all necessary approved fittings like box type hinges, locks, tower bolts, 100mm SS Brush finished handle etc.				
2	SHUTTERS BELOW GRANITE COUNTERS IN PANTRY	43.75	S.FT.		
	Providing and fixing 19mm thk. BWR ply shutters with ply frame, skirting gap as shown in the drg. shall be maintained. Division of shutters shall be made equally according to the length of the counter.				
	Shutters shall be hinged to the framework and finished with 1.0mm thk. Laminate (suede finish) of approved shade from outside, applied with approved oil paint from the inside and edges of shutters with steam beach lipping. Rate shall be inclusive of all necessary approved fittings like hinges, ball catch, handle, and any necessary hardware items.				
3	MIRRORS IN TOILET	18.00	S.FT.		
	Providing and fixing 6mm thk. of approved make clear mirror (First QUALITY) on 12mm thk. Marine ply. Mirror shall have a frame of 25mm x 25mm steam beach wooden moulding finished in mellamine. The rate shall be inclusive all necessary fixtures and fittings.				
4	SIDE / CORNER TABLES				
a.	CORNER TABLES(2'-0" x 2'-0" x 1'-6"HT.)	4.00	NOS.		
	Size 2'0"L X2'0"Wx 1'6' H , to be made from Teak wood /Steam beach framing using 2.5"x1.5" size of members for horizontal framing and 1.5"x1.5" size members for vertical supports, melamine polish having 12mm thick glass top, as per instructions of the Architect/ECGC..				
b.	CENTER TABLES (1'-6" X 2'-0" X 1'-6"HT)	1.00	NOS.		

	Providing and making corner / side tables of above mentioned size as per drwng. Table top shall consist of 12 mm. Thk.float glass with champhered edge(bevelled edge) fitted to the frames with necessary arrangement. The base shall be made up of Steam beach wood frame as directed by the ECGC / Architect. It should be with 4 Nos of 35mmx35mm for vertical members tied to each other with horizontal members of 20mm x 35mm frames at bottom and All wooden frames to be finished with melamine.				
5	PIN-UP BOARDS (3'x2')	45.00	S.FT.		
	Providing and fixing pinup boards. It consist 12mm thick soft boards of good density to be mounted over 12mm thick comm. ply. The soft board will be covered with a plain fabric (appox Rs.250 /Rmts. of approved colour) from front and edges. Suitable steam beach moulding 25mm x 25mm size to be fixed on all four sides and will be finished in melamine polish.				
	Note : Only soft bords provided on other than the partitions will be measured and soft board made in the partitions will be the part of the partition measurement (rate) and not consider separately.				
6	CONFERENCE ROOM TABLE				
	Addition / alternation and renovation work of existing Conference Table In Laminate finish (Basic Cost Rs.60 to Rs.70 / Sft.)	1.00	NOS.		
	all external surfaces to be finished with laminate (approved shades)finished with melamine of approved finish				
7	DISCUSSION TABLE - (1'-6" TO 2'-0" READIUS X 2'6"HT)	1.00	NOS.		
	Providing and making a table of over all size of top as mentioned above. It shall consist of ¾" thk. Comm. Ply top as per design (double edge on outer edge with 1 1/2" thk half round moulding on the edges) supported on ¾" thk. Comm. Ply verticals.supported on wooden base (as designed by the architect). Suitable wooden moulding as architect design with mellamine shall be provided to the edge of the top. All external surfaces to be finished in 1.5 mm laminate.				
8	RECEPTION TABLE - (5'.5' X2'6")				
a.	IN LAMINATE FINISH	1.00	NOS.		

	Providing and making a table of over all size of top as mentioned above and as per design given. It shall consist of 18mm thk. Comm. Ply top finished with GALAXY MARBLE 12mm (Engg. Marble) thick with edge moulding and a 3 drawer unit with locks, handles etc. on the end of the table as shown in the drawing.(as approved by ECGC / architect). The drawer unit finished top should be at a lower level of 25mm below the finished counter top. The front modesty panel should be finished 18 mm Comm. ply with laminate (as approved colour / shade) with Metallic laminate. The customer side top should be at a height of 1 feet with 18mm thick ply above which GALAXY MARBLE (Engg.Marble) of approved colour to be provided. The inside of drawer units, and the tables should be finished with laminate of approved shade.				
9	TABLES				
a.	BRANCH MANAGER (6'-0" X 2'-6")	1.00	NOS.		
b.	OFFICER (5'-0" X 2'-6")	4.00	NOS.		
c.	STAFF (5'-0" X 2'-0")	4.00	NOS.		
	Providing and laying a desk of over all size of top as mentioned. It shall consist of ¾" thk. Comm. Ply top as per design (double edge on the front and back with 1 1/2" thk half round moulding on the edges) supported on ¾" thk. Comm. Ply verticals. Suitable (as per Architects design) wooden moulding with mellamine shall be provided to the edge of the top. A ¾" thk. Comm. Ply apron shall be provided as per Architects design with necessary pattern. The Table top should be finished with 1.5mm Laminate (suede finish) of approved make and all other external to be finished in 1.0 mm. Thk. Laminate (suede finish). Each top should be provided with 3" dia PVC wire manager of approved quality near the CPU / Monitor position as shown in drawing.				
	1 no. Shelf for CPU to be provided below the desk as shown in the drg. All the inner surfaces shall be finished with 1mm thick white laminate.				
	1no. Computer key board tray (either ready made PVC Type / made to the order as per architects design using 3/4" thk comm ply base and 1" x 2" round edged moulding on the front fixed with telescopic/double(Hafele/Albihari/solo make) approved sliders)				
	A drawer unit as shown in the drg shall be provided. 3 nos of drawers with 1.0 mm. Thk. Laminate shall be provided. Height of drawers shall be 4", 4" and 11". Drawer shall consist of ½" thk. Comm. Ply sides, back and ¼" thk. Comm. Ply base. Facia of drawers shall be of ¾" thk. Comm. Ply finished in 1.0 mm. Thk. Laminate (suede finish) and with a wooden moulding on top/bottom edge for handle. 1" gap to be maintained between each drawer. Each drawer shall slide on a pair of telescopic drawer sliders(Hafele/ebco). The inside portion of draws to be finished with white laminate.				

	Rate shall be inclusive of all necessary approved fittings like locks(Godrej make/Vijayan) for drawers and any miscellaneous hardware items.				
10	SIDE CREDENZA:				
a.	1'-6" DEPTH X 3'-0" LT X 2'-4.1/2" HT.:	8.00	Nos		
	Providing and laying side credenzas of above mentioned sizes and as per drg. It shall consist of 3/4" thk. ply top, 3/4" comm. ply sides, bases and 1/2" thk. ply backs. The edge of top will be provided with a suitable (as per Architects design) wooden moulding finished with mellamine.				
	Rate shall be inclusive of all necessary approved fittings like sliding roller, locks(Godrej make/Vijayan), hinges, tower bolts and any miscellaneous hardware items.				
18	SHUTTERS WITH FRAME FOR ELECTRICAL PANELS	73.50	S.FT.		
	Providing and fixing 18mm thk. Com ply shutters with same ply frame. Division of shutters shall be made equally according to the length. Shutters shall be hinged to the framework and finished with 1.0mm thk. Laminate of approved colour and shade on outer side and inside finished with 2 coats of enamel paint of app colour and shade. Rate shall be inclusive of all necessary approved fittings like hinges, ball catch,150 mm long SS Brush Finish handle, tower bolts, locks, Aluminium powder coated air vent grills and necessary hardware fittings complete, etc.,				
	TOTAL FOR CARPENTRY WORKS				
II	DOORS				
1	ENTRANCE DOORS - IN SEASONED STEAM BEACH WOOD				
a.	DOORS - WITH DORMA FITTINGS & WITH FLOOR SPRING	28.00	S.FT.		
	Providing and fixing fully glazed doors at the main entrance as shown in the drg. Door shall consist of wooden sections steam beach wooden sections 6" x 2 " for top, bottom rails & vertical styles rails, & 10mm thk. approved make clear float glass shall be provided and fixed in the framing. Rate shall include necessary etching film / LOGO, 1 pair of 12" long C Shaped S. S. Handles (DORMA MAKE NO:TG 9300 EQ -S 25MM DIA), floor springs(DORMA MAKE - BTS 75) & Dead Lock (DORMA MAKE - No 778) and mellamine polish for the wood frame..				
2	PARTLY GLAZED DOORS - WITH OUT FRAMES				
a.	IN LAMINATE FINISH - With door closer (With all Hardware DORMA MAKE)	210.00	S.F.T.		
	Specification same as for solid doors except for 8mm thk. Approved make clear float glass shall be provided at 2'-6" from ffl with steam beach moulding finished with melamine. The door shutter shall be finished in 1mm thk. Laminate on both sides. The rate shall include necessary etching film / LOGO.				

3	TOILET DOORS (2'-6" X 7'-0" SIZE) (with hardware fittings MAKE EVERITE / GOLDEN /HARDWIN /EVEREST)				
a.	2'-6" x 7'-0" - IN LAMINATE FINISH - (WITH 2" x 3.5" WOODEN FRAME) With door closure	52.50	S.F.T.		
	Providing and fixing solid doors of sizes as shown in the drawing. The door shutter shall of 30 mm thick BWP Grade flush shutter of approved make and finished with 1mm thick approved laminate on both sides. The edges finished with steam beach lipping with melamine polish. A door frame of 2" x 3.5" Steam Beach wood section shall be provided finished in enamel paint. Rate shall include approved door closure, door stopper, a pair of handles 9" SS Brushed finished, 5" hinges 4 Nos., buffers, tower bolts, etc with necessary hardware items and with or with out door frames as mentioned above				
	TOTAL FOR DOORS				
III	ALUMINIUM FABRICATION WORKS - IF PLAIN ALUMINIUM FRAME IS PROVIDED COST WILL BE REDUCED BY 10%				
1	ALUMINIUM LOUVERS VENTILATOR FOR TOILETS (3'X 2' WITH CUT OUT FOR EXHAUST FAN)				
a.	WITH ANODISED SECTIONS (As per Colour Specified by ECGC)	18.00	S.F.T.		
	Providing and fixing louvered Ventilators consists of 2" x 1" box type heavy duty(14 Guage) approved make aluminium anodised window frame. Adjustable alluminium louver system of same guage to have a 4" wide 6mm frosted glass for privacy. Provision for exhaust fan to be made and fixed frosted glass to be provided to adjustant to. Rate is inclusive all necessary fixtures and fittings, glass etc. complete in all respect.				
	NOTE : Proper slots for exhaust fan should made in the lowered window in consultation with the Electrical Contractor				
2	ALUMINIUM SLIDING WINDOWS				
a.	WITH ANODISED SECTIONS (As per Colour Specified by ECGC)	241.00	S.F.T.		
	Providing and fixing aluminium sliding powder coated / anodized window. The Frame should be 2" x 1 1/2" wide sections with tracks on all the sides & drain tray system for the bottom frame. The shutters should be of suitable 2" x 1" sections for top & bottom member & 1 5/8" x 1" for vertical with 6 mm. Thk. approved make clear float glass and beading shall be used. The tracks will be fixed on 2" x 1" aluminium BOX frame. - (Heavy Duty 2" thick frames(14 guage) - approved make)				
	Note : rate shall be inclusive of necessary fittings, locks, handles, best quality rollers, necessary hardware items, etc.				
	TOTAL FOR ALUMINIUM FABRICATION WORKS				
IV	PARTITIONS				

	Note :- The rate shall be include of frame work above false ceiling level. Measurement should be taken up to false ceiling level and visible portion only.				
1	FULL HT SOLID PARTITION				
a.	WITH BOTH SIDE LAMINATE	670.50	S.FT.		
	Addition / alternation and renovation work of existing partition as well as Providing and fixing new partition framing shall consist of 2" x 2" teakwood/steam beach members @ 600mm c/c both ways Horizontally and Vertically. The vertical alternate frames to be fixed to the ceiling with necessary fixtures. The framing shall be finished with 8 mm thk. Commercial ply on both side and finished with 1.00 mm thk. Laminate / Vineer finished with melamine polish. The shade of laminate / vineer and polishing finish to be got approved from ECGC / Architect. The skirting should be as per approved laminate as per drawing and direction. Rate shall be inclusive of necessary hardware items, etc. Complete. The edge beadings with steam beach wood should be finished with melamine.				
2	PARTLY GLAZED PARTITION				
a.	WITH BOTH SIDE LAMINATE	933.75	S.FT.		
	Specification same as 1 above except for 8mm approved make clear float glass shall be provided above 2'-6" from ffl or as advised by architect with necessary steam beach moulding finished with melamine. The rate shall include necessary etching film / LOGO.				
3	SEMI HT. PARTITION IN LAMINATE				
a.	WITH BOTH SIDE LAMINATE	206.25	S.FT.		
	Specification same as 2 above but of low ht as per the drawing. A 70mm x 15mm steam beach moulding with chamfered edge is to be provided on all external edges & finished in mellamine as per details. Providing and Fixing inserted Soft board / White boards / Glass maintaining the vertical surface lines and no extra measurements would be taken for the soft boards / white boards / Glass.				
	TOTAL FOR PARTITIONS				
V	PANELLING				
1	PANELLING ON WALLS - with frame				
a.	WITH LAMINATE	88.00	S.FT.		
	Providing and fixing panelling on wall. Framing shall consist of Heavy duty Aluminium Box Sections 50mm x 25 mm @ 600mm c/c Both ways horizontally and vertically on the wall.This framing would be covered by 8mm thk. comm. Ply finished in approved 1.0 mm. Thk. Laminate / Vineer finished in melamine polish. Wooden moulding, lipping etc. as directed by ECGC / architect shall be provided wherever required.				
2	PANELLING ON WALL IN GYPSUM				

a.	WITH FRAME	65.25	S.FT.		
	Providing and fixing panelling on wall. Framing shall consist of Aluminum Section 50 mm x 25 mm (Wall Thickness 2 mm approved make) @ 600MM C/C. Both ways horizontally and vertically on the wall. This framing would be covered by 6mm thk. Ply and 12mm thk gypsum board.				
	TOTAL FOR PANELLING				
VI	FALSE CEILING AND P.O.P. WORK				
1	FALSE CEILING - GYP BOARD	700.00	S.FT.		
	Providing and fixing ½" thk. Gypsum India board false ceiling at levels as shown in the drg. From FFL. Rate shall be inclusive of all Gypsum India components contained G.I. perimeter channels of size 0.55 thick having one flange of 20mm and another flange of 30mm and a web of 27mm alongwith perimeter of ceiling, screw fixed to brickwall/partition with the help of nylon sleeves and screws, at 610mm centres. The suspending G.I.intermediate channels of size 45mm, 0.9mm thick with two flanges of 15mm each from the soffit at 1220mm centres with ceiling angle of width 25mm x 10mm x 0.55 thick fixed to soffit with G.I. cleat and steel expansion fastners at every 610mm c/c. Ceiling sections of 0.55mm thickness having knurled web of 51.5mm and two flanges of 26mm each with lips of 10.5mm are then fixed to intermediate channel with the help of connecting clip and in direction perpendicular to the intermediate channel at 457mm centres. 12.5mm tapered edge Gypboard is then screw fixed to ceiling section with 25mm drywall screws driver or drilling machine with suitable attachment.				
	The boards are to be jointed and finished so as to have a flush look which includes filling and finishing the tapered and square edge of the boards with jointing compound & joint paper tape. Rate shall be inclusive of Cut outs for A/c machiness, spot lights, light fixtures, A/C. Grills, fire and security systems cut outs, All Sections should adhere to the manufacturers guidelines. Vertical sides visible will be measured.				
2	MODULAR FALSE CEILING - ARMSTRONG / equivalent make	1,100.00	S.FT.		
	Providing and fixing Armstrong (Fine Fissured Micro Look with Tagular Edge using 15mm Grid sections) false ceiling of size 24"x24" at levels as shown in the drwng. from FFL. Rate shall be inclusive of providing the total system with installation etc.. The contractor has to maintain all tiles in good order and replace the defected tiles (at his own cost) before handing over the site for Branch Operations (till Inauguration).				
	TOTAL FOR FALSE CEILING & P.O.P WORKS				
VII	PAINTING				
1	PLASTIC EMULSION	2,042.50	S.FT.		

	Providing & applying plastic emulsion paint on walls, columns & ceilings. The rate shall include scrapping, levelling & preparing the surface. Primer coat + (minimum) 3 coats to get evenly spread quality finish (roller finish) of approved make , quality & finish shall be provided.				
2	ENAMEL PAINT on door frames	370.00	S.FT.		
	Providing & applying 1st quality oil paint of approved make, quality & shade. The rate shall include scrapping, levelling & preparing the surface with primer quote.				
3	TEXTURED FINISH	94.00	S.FT.		
	Providing & applying a coat of textured finish on walls and columns. The rate shall include scrapping, levelling & preparing the surface. Primer coat + (minimum) 3 coats of approved make, quality & shade shall be provided.				
	TOTAL FOR PAINTING				
VIII	MISCELLANEOUS / BROUGHT OUT ITEMS				
1	VERTICAL BLINDS WITH SCOTCH GUARD	241.00	S.FT.		
	Providing & fixing in place 100 mm. Vertical blinds of approved make, quality and colour shade & pattern. Rate shall include necessary scotch guard treatment on both sides. The overlaps should be uniform & adequate.				
2	3M SYNTHETIC DOOR MATS	3.00	NOS.		
	Providing & laying in place Synthetic Door Mats (3M) of sizes not less that 4' x 2').				
3	FROST FILM / ETCHING FILM OVER GLASS	450.00	S.FT.		
	Providing and fixing etching film as directed by ECGC/ Architect for excess area (for additional area other than 1feet depth and full length of glass, along with portion spec.) to proper level, with out air bubbles / cuts / folds etc. complete.				
4	SIGNAGE	12.00	NOS.		
	Providing & Fixing SS Etching Name Plate of made of SS 304..2mm of Size - 300 X 120 X 2mm, fixing with SS BLOCK method.				
	TOTAL FOR MISCELLANEOUS / BROUGHT OUT ITEMS				
IX	BROUGHT OUT FURNITURE				
1	SOFA SETS				
a.	SINGLE SEATER	1.00	NOS.		
b.	DOUBLE SEATER	0.00	NOS.		
c.	THREE SEATER	3.00	NOS.		

	Providing and fixing sofa set to detail as shown in drawing about 60cm wide and about 68cm high comprising second class SAL WOOD framework using 50 x 40 with 8mm thick com plywood covering on all sides. Seats finished with spring hooked to MS plate 25mm width fixed to the seat frame. Both seat frame and back covered with layer of jute cloth and 75mm latex rubber (2 layer for seat alone) finished with 12mm foam lining and upholstered to shape with fabric (basic price Rs.300/m) for the rear of the back also and the under surface of the seat finished with Gada cloth 8mm ply below seat. Note: (For sofas materials like foam, latex rubber, gada cloth, spring ,fabric etc., to be approved by the Architects / ECGC).				
2	CHAIRS				
	Providing and supplying medium back chairs as per following specification (1). The chairs has a back inner / outer shell made out up of polypropylene having snap type fittings . (2). Moulded foam (48 DENSITY) is used on the seat and back. (3). A hot presses plywood seat (12 MM THICK) is used as base (4). The arm rest used is made up of soft polyurethane (250 density) having mild steel insert (5).The tilting mechanism used is having only back movement lockable at the front position. (6). The seat to back connecting mild steel plate is 10 MM thick. The handle connecting mild steel plate is 5 MM thick. (7). A seat outer made up of POLYPROPYLENE is used for asthetic appeal. (8). An imported gas lift mechanism is used for seat height adjustment. (9). A mild steel powder coated base (630 MM WIDE) is used having a load capacity of 800 KGS. (10). Twin wheel nylon castore are used having a load bearing capacity of 50 Kgs. Per Caster.				
A	BR-IN-CHARGE(HIGH BACK) WITH REVOLVING AND TILTING ARRANGEMENT AS PER ABOVE SPECIFICATION	1.00	Nos		
B	OFFICERS/STAFF CHAIR(MEDIUM BACK) WITH REVOLVING AND TILTING ARRANGEMENT as per above specification.	8.00	Nos		
C	VISITORS CHAIR /AGENT/ DISCUSSION ROOM CHAIRS - Specification same as above but the Chairs have Fixed back having no tilting mechanism . Only revolving facility would be available.	34.00	Nos		
D	BAR STOOL FOR PANTRY ROOM	1.00	Nos		
E	DINING TABLE (SIZE 4'0" X 2'6" X 2'6" HEIGHT)	2.00	Nos		
	A.Table top to be made of 19mm thick MR Grade plywood of 5'0"x2'6" size, finished with 1.0mm thick laminate of approved make & shade.The top will have at bottom a border of at least 4" width of 19mm ply such that the over all thickness of 39mm shall be visible from outside.. The top will be supported on s.s. /chrome plated stand as per design, All exposed edges of the top to be covered with first class teakwood /steam beach border of 1" x 1 ½". and melamine polished in finish approved by the Architect/ECGC.				
F	DINNING CHAIRS :	8.00	Nos		

	Supplying S.S / Crome finished dining chairs having 19 mm th. Melamine polished Ply wood for seat & back.				
G	COMPACTOR				
1	Single Static 1 bay Push Pull	1.00	Nos		
	Depth (mm) 381 x Width(mm) 915 x Height (mm) 1980 (Body) Height With Undercarriage & Rails (mm) 1980 + 65 + 35 = 2080mm. Rigid Knock Down construction made out of 0.8 thk. CRCA Steel conforming to IS: 513 Gr.D.Each unit has 5 loading levels formed by 4 nos. adjustable shelves. Body units are bolted to undercarriage. Optimizer Height from ground is 2080 mm (1980 body + 65 undercarriage + 35 channel system).Finish: The bodies including shelves are given antirust surface treatment & are powder coated with epoxy polyester powder. It involves an 8 step treatment consisting of Hot water rinse, Knock of degreasing, degreasing, cold water rinse, phosphating, cold water rinse, and passivation & dry off oven treatment. Final finish consists of epoxy polyester powder coating of approved color & shade with a Dry Film Thickness of minimum 40 microns. The testing of paint is done for various physical & chemical properties as per IS: 101. The material is then oven baked with a controlled temperature of 180 deg.C to 200 deg.C.				
2	Single Last 1 bay Push Pull	1.00	Nos		
	Depth (mm) 381 x Width(mm) 915 x Height (mm) 1980 (Body) Height With Undercarriage & Rails (mm) 1980 + 65 + 35 = 2080mm. Rigid Knock Down construction made out of 0.8 thk. CRCA Steel conforming to IS: 513 Gr.D.Each unit has 5 loading levels formed by 4 nos. adjustable shelves. Body units are bolted to undercarriage. Optimizer Height from ground is 2080 mm (1980 body + 65 undercarriage + 35 channel system).Finish: The bodies including shelves are given antirust surface treatment & are powder coated with epoxy polyester powder. It involves an 8 step treatment consisting of Hot water rinse, Knock of degreasing, degreasing, cold water rinse, phosphating, cold water rinse, and passivation & dry off oven treatment. Final finish consists of epoxy polyester powder coating of approved color & shade with a Dry Film Thickness of minimum 40 microns. The testing of paint is done for various physical & chemical properties as per IS: 101. The material is then oven baked with a controlled temperature of 180 deg.C to 200 deg.C.Movement of units achieved by pushing orpulling Chrome plated 'C' handle fitted onto 1.6 mm thk plate (mounted on each double & single movable units) & rigidly fixed at suitable height on body side. Each movableundercarriage has 4 nos. of antifriction ball bearings for rolling onto channels & 4 nos. of antifriction ball bearings for guiding between channels & 'J' section.				

3	Twin Mobile 1 bay Push Pull	3.00	nos		
	<p>Compactors Providing & Fixing compactors Supplying a) Storage units shall be One Bay Single Static (SS), Single Last (SL) and twin mobile storage system (915mm x 762mm x 1980 mm) (2 body back to back) with Five loading Levels formed by 4 Nos. adjustable shelves. The unit should have load bearing capacity is 40 Kg uniformly. The main Body Construction should be made out of 0.8 MM thick CRCA steel Confirming to IS 513 Gr D. The height of the Storage System shall be approx. 2080 MM from the ground including rail. Each body block (SS/SL/TTM) building should consist of 1 Main unit .The finish of the bodies including shelves should be given anti corrosive surface treatment & should be powder coated with epoxy polyester Powder. 8-Step treatment consisting of hot water rinse, knock of degrease, degrease, cold water rinse, phosphate, cold water rinse, and passivising & dry off over treatment shall be done. Final finish should consist of epoxy polyester powder coating of approved color & shade with a dry film thickness of minimum 40 microns. f) An undercarriage should be a welded frame made of HR sheet 3.15 MM thick conforming to IS 10748 and suitably fabricated to take the loads based on various configurations. The undercarriage should be well finished with epoxy polyester powder coat of approved color & shade with a dry films thickness of minimum 40 microns. After the unit is moved, before entering into aisle for accessing. End Stoppers are to be provided at the end of channels to prevent derailment. h) All fasteners shall be Galvanized/Zinc plated. i) Guide channels should be of 2 mm thick HR sheet and 25 MM Square Bright Bars properly installed. k) Provision for Label Holders on each unit is to be made. j) Hinge Door should be made of 0.8 thick CRCA steel confirming to IS : 513 grade. It should have recessed Die Cast Handle cum lock giving 3 way locking through a lever & shooting bolts.</p>				
4	Channels	1.00	Job		
	TOTAL FOR MISCELLANEOUS / BROUGHT OUT ITEMS				

BILL OF QUANTITIES FOR ELECTRICAL AND ELV WORKS					
SR. NO.	ITEM DESCRIPTION	UNIT	QTY	TOTAL RATE	TOTAL AMOUNT
2	Distribution Board				
	Supplying, assembling, grouting, levelling, installation, Connecting & testing D.B of specified make but without MCB / RCBO etc. with all internal busbar as per requirement.				
2.1	TPN Distribution Board :				
2.1.1	Supplying, erecting, testing and commissioning of only TPN D.B. with space for FPMCB as incoming and space for DPELMCB and 12 SPMCB as outgoing per phase (i.e. 16 way TPN D.B.) equequivalent to Legrand cat no 607719 with 16 way PPI kit cat no.607894	No.			
2.1.2	Supplying, erecting, testing and commissioning of only TPN D.B. with space for FPMCB as incoming and space for DPELMCB and 8 SPMCB as outgoing per phase (i.e. 12 way TPN D.B.) equequivalent to Legrand cat no 607718 with 12 way PPI kit cat no.607893	No.			
2.1.3	Supplying, erecting, testing and commissioning of only TPN D.B. with space for FPMCB as incoming and space for DPELMCB and 4 SPMCB as outgoing per phase (i.e. 8 way TPN D.B.) equequivalent to Legrand cat no 607717 with 8 way PPI kit cat no.607892	No.	3		
2.2	VTPN Distribution Board				
2.2.1	Supplying,erecting, testing and commissioning of only VTPN D.B. having suitable space for 250 A FP MCCB as incomer and 12 TP MCBs as outgoing equivalent to LEGRAND cat no 607822	No.			
2.2.2	Supplying,erecting, testing and commissioning of only VTPN D.B. having suitable space 160 A FP MCCB as incomer and 12 TP MCBs as outgoing equivalent to LEGRAND cat no 607936	No.			
2.2.3	Supplying,erecting, testing and commissioning of only VTPN D.B. having suitable space for 160 A FP MCCB as incomer and 8 TP MCBs as outgoing equivalent to LEGRAND cat no 607935	No.			
2.2.4	Supplying,erecting, testing and commissioning of only VTPN D.B. having suitable space for 160 A FP MCCB as incomer and 4 TP MCBs as outgoing equivalent to LEGRAND cat no 607933	No.	1		
2.2.5	Supplying,erecting, testing and commissioning of only VTPN D.B. having suitable space for 63 A FP MCCB as incomer and 8 TP MCBs as outgoing equivalent to LEGRAND cat no 607751	No.			
2.2.6	Supplying,erecting, testing and commissioning of only VTPN D.B. having suitable space for 63 A FP MCB as incomer and 4 TP MCBs as outgoing equivalent to LEGRAND cat no 607750	No.	1		
2.3	SPN Distribution Board				

2.3.1	Supplying, erecting, testing and commissioning of SPN D.B. with space for DPELMCB as incoming and 12 SPMCB as outgoing per phase (i.e. 16 way SPN D.B.) equivalent to Legrand cat no. 607713	No.			
2.3.2	Supplying, erecting, testing and commissioning of SPN D.B. with space for DPELMCB as incoming and 8 SPMCB as outgoing per phase (i.e. 12 way SPN D.B.) equivalent to Legrand cat no. 607712	No.			
2.3.3	Supplying, erecting, testing and commissioning of SPN D.B. with space for DPELMCB as incoming and 4 SPMCB as outgoing per phase (i.e. 8 way D.B.) equivalent to Legrand cat no. 607711	No.			
2.4	MCB 's and its Accessories				
	Supplying, Assembling, levelling, connecting & testing following MCB / ELMCB / MCCB /Isolators etc in boards as specified				
2.4.1	6 to 32 A SP MCB	No.	36		
2.4.2	6 to 32 A DP MCB	No.	11		
2.4.3	6 TO 32 A DP ELMCB(30mA)	No.	3		
2.4.4	6 TO 32 A DP ELMCB (100mA)	No.	6		
2.4.5	40 A DP ELMCB (30mA)	No.			
2.4.6	40 A DP ELMCB (100mA)	No.			
2.4.7	63 A DP ELMCB (100mA)	No.			
2.4.8	16 - 32 A TP MCB	No.	3		
2.4.9	63 A TP MCB	No.	1		
2.4.10	16 - 32 A FP MCB	No.	3		
2.4.11	40 A FP MCB	No.			
2.4.12	63 A FP MCB	No.	1		
2.4.12	80 A FP MCB		2		
2.4.13	Sheet steel metal encloser for DP MCB cat no.607882	No.	11		
2.4.14	Sheet steel metal encloser for FP MCB cat no.607884	No.	2		
2.4.15	Blank Plates	No.	5		
2.5	MCCB				
2.5.1	Approved make Four pole moulded case circuit breaker having breaking capacity ICU of 25 KA. at 415 V, having normal current rating up to 25 A to 100A. with Fixed thermal & magnetic release suitable to work on A.C. supply 50 c/s. with all internal connections & complete erected in existing 16 G.M.S. housing. ICS=100% of ICU only Cat III Operational Handle Assembly Complete ,Operating Shaft (Extensible)	No.	1		
2.7	Caution Board :				
2.7.1	Caution boards of size 150 x 150 mm. to be supplied & fixed on the D.B.	No.	1		
2.7.2	Caution boards of size 100 x 100 mm. to be supplied & fixed on the D.B.	No.	4		
	Sub Total 2.0.....				
3	Cables				

	Supply, testing and Laying XLPE steel/GI wire/flat armoured cable of 1100 V grade of Copper Conductor of following sizes in ready made trench or mounted on wall with necessary clamping arrangement or in pre-laid RCC hume pipe with necessary cable identification mark to be provided at distance of 25 mt. The vertical cable on wall shall be drawn in prelaid conduit for vertical mechanical support.				
3.1	Aluminium Cables				
3.1.1	3 1/2 core 95 Sq. mm (50 Sq. mm 1/2 core)	RMt			
3.2	Copper Cables				
3.1.1	16 Sq.mm x 4C Cu. Cable	RMt	5		
3.1.2	10 Sq.mm x 4C Cu. Cable	RMt	15		
3.1.3	6 Sq.mm x 4c Cu. Cable	RMt			
3.1.4	4 Sq.mm x 4c Cu. Cable	RMt			
	Sub Total 3.0.....				
4	Cable Termination				
	Supplying & fixing single compression type Brass glands (single compression for indoor application and double compression for outdoor applications) & making joint with necessary bi metallic crimping socket of long neck type connecting the same to various equipment/panel/DB etc. for the following sizes:				
4.1	Aluminium Cables				
4.1.1	3 1/2 core 95 Sq. mm (50 Sq. mm 1/2 core)				
4.2	Copper Cables				
4.1.1	16 Sq.mm x 4c Cu. Cable	No.	2		
4.1.2	10 Sq.mm x 4c Cu. Cable	No.	8		
4.1.3	6 Sq.mm x 4c Cu. Cable	No.			
4.1.4	4 sq.mm x 4 c Cu.	No.			
	Sub Total 4.0.....				
5	Cable Tray				
5.2	Supplying , fabricating and installation of various sizes cable tray, junction boxes, light fixtures hanger (as per details) made out of 14 gauge sheet with all necessary accessories & hardware etc All the necessary fabrication required will be included in the scope of contractor. Scope also includes two coat of primer and two coat of painting of each items on all the sides complete in all respect.	Kg	15		
	Sub Total 5.0.....				
6	Internal Wiring				
6.1	Wiring of points to be done in open/concealed manner in 25 mm dia medium gauge Rigid PVC FRLS pipe. Wiring shall be done with FRLS type copper flexible wire of 650V/1100V. Separate pipe should be taken for circuit mains. Nos of circuit of the same phases may be taken in same conduit (maximum 2 ckts).The circuit shall be laid in 25/40 mm dia medium gauge rigid PVC FRLS pipe.The point rate shall include all the necessary piping and wiring from sub panel / Distribution board to switch board & switch board to the batten holder / angle holder / connector / ceiling rose all inclusive except sub panel / Dist board.				

	The wiring shall be done as per relevant prevailing standard. The looping of the wiring should be done in the switch boxes or light and fan point outlet boxes to avoid the junction boxes. The junction boxes and switch boxes for the ceiling light point, fan point etc shall be minimum 60/75 deep. All the necessary jarry in brick plastered walls should be done with machine cutter only , also jarry should be filled with cement, sand and wire mesh as required, the material cost for rough finish shall be included in point rate. Whenever pipes are required to be laid in flooring shall be of heavy guage. Wiring should be done as per distribtion details. Each circuit should have dedicated phase, neutral & earth wire. Wire sizes to be used as under.				
	For Light Points /fan point/ wall fan / 6A 3 Pin Plug				
	- DB to SB - 2.5sqmm for Phase & Neutral & 1.5 sqmm for Earth				
	- SB to Point - 1.5 sqmm for Phase & Neutral & Earth				
	For 6A plug point				
	- 1.5 sqmm for Phase, Neutral & Earth				
	For 6/10/16A general purpose plug point				
	- 2.5 sqmm for Phase, Neutral & 1.5 sq. mm Earth				
	For 16A plug point for A/C and Geyser				
	- 4 sqmm for Phase, Neutral & 2.5 sq. mm Earth				
	For 20/32A plug point				
	- 6 sqmm for Phases, Neutral & 4 sq. mm Earth				
	No jarry will be allowed in expose brick work. The conduit shall be provided when the walls are under construction. The pipes in slab shall be laid before the slab is casted.				
6.1.1	One light point controlled by one single way 6 A switch.	No.	38		
6.1.2	One light point controlled by SP MCB.	No.	5		
6.1.3	Loop light point to be controlled from same switch/ MCB.	No.	10		
6.4.1	One light point controlled by two, two way 6 A switch.	No.	1		
6.1.5	One ceiling fan outlet point controlled by one 6 A switch and hum free electronic type step regulator.	No.	2		
6.1.6	One 6 A x 5 pin 250 Volt socket outlet point controlled by one 6 A switch located on switch board.	No.	10		
6.1.7	6 A x 5 pin 250 Volt switched socket outlet point at convenient location.	No.	10		
6.1.8	6/16 A x 250 V Multipurpose switch socket point on one switch box with 2.5 sqmm flexible wires and phase and neutral and 1.5 sq nm flexible Cu. wire as earth wire.	No.	5		
6.1.9	6/16A x 250 Volt switched socket outlet point for A.C./Geyser with 4 sq.mm wire for phase and neutral & 2.5 sq.mm earth wire.	No.	5		
6.1.10	-Do- as above 12.1.8 but switch and socket at different location.	No.	12		
6.1.11	Exhaust fan outlet point with 6A 5 pin socket controlled by one 5 single way switch located at different location.	No.	3		

6.1.16	Supplying and fixing 16 A Switches and 6/16 Plug Socket in enclosure Constructed from extremely robust polycarbonate complete with connections, testing specifically designed for outdoor use IP56 equivalent to MK cat no 86893GRY.	No.			
6.1.17	Buzzer point controlled by Bell push with modular type buzzer same make as switch	No.	2		
6.1.18	SITC of Computer Point(2 Nos. 6 A plug +1 nos. 16A plug with 16A Switch	No.	24		
6.2	MAINS :				
	The mains is considered from the meter/sub panel to the individual distribution boards.				
6.2.1	Supplying and Providing mains with 4 nos. of 10 sq mm Cu. PVC insulated flexible wire with ISI and FIA approval for 650 V/ 1100 V and 2 nos 4 sqmm Cu. PVC insulated flexible wires with ISI approval for 650 V/ 1100 V as earth wires to be drawn in 40 mm diameter rigid PVC conduit of medium guage having ISI and FIA approval with all necessary accessories.	Rmtr	5		
6.2.2	Supplying and Providing mains with 4 nos. of 6 sq mm Cu. PVC insulated flexible wire with ISI and FIA approval for 650 V/ 1100 V and 2 nos 2.5 sqmm Cu. PVC insulated flexible wires with ISI approval for 650 V/ 1100 V as earth wires to be drawn in 40 mm diameter rigid PVC conduit of medium guage having ISI and FIA approval with all necessary accessories.	Rmtr	5		
6.2.3	Supplying and Providing mains with 4 nos. of 4 sq mm Cu. PVC insulated flexible wire with ISI and FIA approval for 650 V/ 1100 V and 2 nos 2.5 sqmm Cu. PVC insulated flexible wires with ISI approval for 650 V/ 1100 V as earth wires to be drawn in 40 mm diameter rigid PVC conduit of medium guage having ISI and FIA approval with all necessary accessories.	Rmtr	5		
6.2.4	Supplying and Laying mains with 2 nos. of 10 sq mm Cu. PVC insulated flexible wire with ISI and FIA approval for 650 V/ 1100 V and 1 no 6.0 sqmm Cu. PVC insulated flexible wires with ISI approval for 650 V/ 1100 V as earth wires to be drawn in 25 mm diameter rigid PVC conduit of medium guage having ISI amd FIA approval with all necessary accessories.	Rmtr			
6.2.5	Supplying and Providing mains with 2 nos. of 6 sq mm Cu. PVC insulated flexible wire with ISI and FIA approval for 650 V/ 1100 V and 1 nos 4.0 sqmm Cu. PVC insulated flexible wires with ISI approval for 650 V/ 1100 V as earth wires to be drawn in 25 mm diameter rigid PVC conduit of medium guage having ISI and FIA approval with all necessary accessories.	Rmtr			
6.2.6	Supplying and Providing mains with 3 nos. of 4 sq mm Cu. PVC insulated flexible wire with ISI and FIA approval for 650 V/ 1100 V and be drawn in 25 mm diameter rigid PVC conduit of medium guage having ISI and FIA approval with all necessary accessories.	Rmtr			

6.2.7	Supplying and Providing mains with 3 nos. of 2.5 sq mm Cu. PVC insulated flexible wire with ISI and FIA approval for 650 V/ 1100 V and be drawn in 25 mm diameter rigid PVC conduit of medium guage having ISI and FIA approval with all necessary accessories.	Rmtr			
6.2.8	Supplying and Providing mains with 3 nos. of 1.5 sq mm Cu. PVC insulated flexible wire with ISI and FIA approval for 650 V/ 1100 V and be drawn in 25 mm diameter rigid PVC conduit of medium guage having ISI and FIA approval with all necessary accessories.	Rmtr			
6.3	Sensor				
6.3.1	Supply, Installation testing & commissioning of surface mounted type digital PIR 360 degree presence detection sensor of range min. 6.0 m Dia coverage. Sensor has built-in adjustable photocell which switches the lighting load as per availability of natural daylight in an area with programmable features of delay time 10 sec - 35 min	No.			
6.3.2	Supplying, erecting, connecting, testing and commissioning of MID Range Directional Microwave Presence detector; Surface Mount; Directional detection up to 20 mtrs unidirectional; 10 Amps, Manually programmable for OFF Delay up to 0- 15 min; Dual Sensitivity for ON Range & OFF Range; Passive Photocell Supplying, erecting, connecting, testing and commissioning of MID Range Directional Microwave Presence detector; Surface Mount; Directional detection up to 20 mtrs unidirectional; 10 Amps, Manually programmable for OFF Delay up to 0- 15 min; Dual Sensitivity for ON Range & OFF Range; Passive Photocell	No.			
	Sub Total 6.0.....				
7	Light Fixtures & Fans				
7.1	Erecting, connecting, testing and commissioning of following type internal Light Fixture with all necessary Hadware, Internal Wiring with Lamp,Ballast etc. all required accessories Complete in all respect.				
7.1.1	Supply, installation,testing and commission of internal light fixture 40W LED-RECESS,EQUIVALENT OT PHILIPS CAT NO. RC365B-40W	No.	14		
7.1.2	Supply, installation,testing and commission of internal light fixture 18W LED -RECESSEQUIVALENT OT PHILIPS CAT NO. DN 193(ROUND)	No.	34		
7.1.3	Supply, installation,testing and commission of internal light fixture led Mirolta light-11W LED	No.	3		
7.1.4	Supply, installation,testing and commission of internal light fixture 40W LED-SURFACE EQUIVALENT OT PHILIPS CAT NO. BN 108C(SURFACE)-40W	No.	2		
7.2	Installation, testing and commissioning following sizes ceiling Fans without fan regulator. With all accessoried down rod etc complete				
7.2.1	Supply, installation,testing and commission of 1200mm sweep fan	No.	2		
7.2.2	Supply, installation,testing and commission of BRACKET FAN	No.	1		

7.3	Supply, installation, testing and commission of 380 mm dia 1400 RPM exhaust fan	No.	4		
	Sub Total 7.0.....				
8	Earthing				
8.1	Providing earthing stations for equipment earthing as shown and specified in drawing for equipment complete with :				
8.1.1	LPI's 3Mtr CBR+20 Kg RESLO Earthing. LPI Copper Bonded Earth Rod 10' x 5/8" made from high tensile low carbon steel and each rod should molecularly bonding 99.9% pure electrolytic copper to the low carbon steel core in accordance with national and international standards such as BS6651, BS7430 and UL467. LPI's Reistance Lowering Compound (RESLO-20Kg) comprises specifically selected compounds, which possess excellent electrical conductivity. Equivalent to Model: LPI 3Mtr CBR+ 20 Kg RESLO.	No.			
8.2	Earth wire/strips :				
	Supply and laying cu. earthing required size strips for interconnecting the earthing stations, panels, DB's etc. in built up trenches, on walls/ceiling, buried in ground generally as specified and shown on drawings complete with :				
	a) Fixing accessories.				
	b) Corrosion protection of buried conductors with bituminous coating and covered with PVC tapes.				
8.2.1	25 x 3 mm GI Strip	kg			
8.2.2	No.8 gauge bare GI. earth wire	kg	50		
8.2.3	Earth Link : 38mm x 6 mm 1ft Long Cu.earth link fixed by necessary screws on wall.	No.			
	Sub Total 8.0.....				
9	Miscellaneous				
9.1	PVC PIPES				
	Supplying and laying following sizes PVC pipe of approved make in open / recess manner including excavation and back filling (if required) as per layout and drawing and re-filling the trenches etc. complete as directed.				
9.1.1.	Heavy gauge pipe in Open / Concealed manner minimum 25 mm dia with GI pulling wire.	Rmtr	5		
9.1.2	Heavy gauge pipe in Open / Concealed manner minimum 32 mm dia with GI pulling wire.	Rmtr	5		
9.1.3	Heavy gauge pipe in Open / Concealed manner minimum 40 mm dia with GI pulling wire.	Rmtr	5		
9.1.4	Heavy gauge pipe in Open / Concealed manner minimum 50 mm dia.	Rmtr	5		
	Sub Total 15.0.....				
10	Telephone And Data Distribution				

	Supply, installation, connection, testing and commissioning of telephone and data network system. The unit rate considered on running meter basis includes supply, laying, connection, testing and commissioning of multipair telephone/data cables through rigid PVC conduit from tag block/HUB of each block to MDF located in the data room/near EPABX system. The telephone cable shall be installed in a concealed manner in the vertical riser including supply & fixing tag block with KRONE type terminal Junction box of specified make.				
10.1	PVC Conduits				
10.1.1	Supply & laying of 25 mm dia. Open/conceal manner heavy gauge rigid PVC pipe.	Rmtr	125		
10.1.2	Supply & laying of 40 mm dia. Open/conceal manner heavy gauge rigid PVC pipe.	Rmtr	25		
10.2	Cabling				
10.2.1	Supplying and Laying of 0.5 mm dia Annealed copper 5 pair armoured telephone cable where ever required in prelaid conduit or clamped in open manner or clamped in open manner	Rmtr			
10.2.2	Supplying and Laying of 0.5 mm dia Annealed copper 10 pair armoured telephone cable where ever required in prelaid conduit or clamped in open manner.	Rmtr	25		
10.2.3	Supplying and Laying of 0.5 mm dia Annealed copper 20 pair armoured telephone cable where ever required in prelaid conduit or clamped in open manner.	Rmtr			
10.2.4	Supplying and Laying of 0.5 mm dia Annealed copper 50 pair armoured telephone cable where ever required in prelaid conduit or clamped in open manner.	Rmtr			
10.3	Tag Blocks				
10.3.1	Supply & fixing of 10 pair tagblock with KRONE with fabricated CRCA powder coated junction box of size 120x170x100 with two no. of pad-lock.	No.			
10.3.2	Supply & fixing of 20 pair tagblock with KRONE with fabricated CRCA powder coated junction box of size 120x170x100 with two no. of pad-lock.	No.			
10.3.3	Supply & fixing of 50 pair tagblock with KRONE with fabricated CRCA powder coated junction box of size 260x225x100 with two no. of pad-lock.	No.	1		
10.4	Telephone / DATA Point Wiring				
10.4.1	Supply and laying of specified make Cat 6 Telephone wire/ data wire to be done in prelaid PVC pipe / raceway , but without the cost of raceway or pipe (the wire is to be drawn from server/switch to outlet point)	Rmtr	125		
10.5	Telephone / Data Outlet Point				
10.5.1	Supplying, installing, testing and commissioning of one telephone point to be done with telephone outlet socket RJ-11 (jack type) and box of the specified make.	No.	20		
10.5.2	Supply and Installation of Single I/O plate with 1 no of RJ 45 Cat 6 I/O socket on same plate and with powder coated MS base box suitable for Computer Data outlet.	No.	20		
	Sub Total 10.0.....				
12	CCTV(Analog system)				

12.1	Supply, Installation, Testing and Commissioning of Analog HD-CCTV with 1/4" CMOS Sensor, 720P AHD, TDN, DNR, DWDR, 24 LED, 3.6mm, IR beam distance 20 m, IR Vandal Dome Camera, 12 VDC with OSD, PAL features and standard accessories for mounting. Provided CCTV system must have Open standard chipset, must be compatible with different AHD OEMs, Support traditional analogue and 960H, also support longer transmission without signal degradation in coaxial cable.	Each	5		
12.2	Supply, Installation, Testing and Commissioning of 8-Channel DVR-with having 720P high resolution recording, H.264 High profile compression, Playback 8 channels simultaneously, Multiple recording options: manual, schedule, motion detection, Pentaplex operation: live view, record, play back, backup and remotely access, HDMI and VGA output simultaneously upto 1080P resolution, 1 SATA HDD interface which can be of maximum 6TB storage capacity, Must support to DHCP, DDNS, IE browser and CMS, On-line user view: maximum 10 users simultaneously, Support for Mobile Android and iOS applications, operating on DC 12V.	Each	1		
12.3	Supply, Installation, Testing and Commissioning of 2-TB Surveillance Hard-disk suitable with above DVR.	Each	1		
12.4	Supply and laying of CCTV (3+1) Copper Cable with standard accessories.	Per Meter	125		
12.5	Supply and laying of PVC Conduit suitable for above cable with standard accessories.	Per Meter	125		
12.6	Supply and installation Junction Box for proper mounting of CCTV.	Per Meter	5		
12.7	Supply and installation SMPS 12 V DC, 5 Amp.	Per Meter	2		
	Sub Total 12.0.....				
13	FAS SSYTEM				

00.1.1	Supply, Installation, Testing and Commissioning of EN-54 Part 2 and Part 4 complying 4-zone conventional fire alarm panel made up of Fire retardant ABS Plastic Moulded enclosure sealed to IP-30, operating on 230 VAC 50 Hz (+/- 15%), with simple and user freindly design, walk-test feature, with each zone capable of supporting 20 detectors , with 2 nos. monitored sounder output circuit, fire and fault relay for simple integration, operating temperature +5 deg C to +45 deg C. The panel shall have a built in power supply and battery charger along with maintenance free 7 AH, 2 x 12 volt SMF Lead acid batteries complete as required.	NOS	1		
00.1.2	Supply, Installation, Testing and Commissioning of EN-54 Part 7:2000 complying and LPCB approved Conventional Smoke Detectors with Low profile design, Low current draw, Automatic drift compensation for reduction in frequency of nuisanse alarm and maintenance savings, Wide operating range of 8 to 30 Volt, Bi-colour LED detector status indicator for Normal and Alarm status, Operating temperature range -30 deg C to +70 deg C, Relatvie Humidity 5% to 95% non-condensing, 2 Wire plug in detector base for detectors with necessary junction box and mounting accessories.	NOS	14		
00.1.3	Supply, Installation, Testing and Commissioning of EN-54 Part 7:2000 complying and LPCB approved Conventional Smoke Detectors with Low profile design, Low current draw, Automatic drift compensation for reduction in frequency of nuisanse alarm and maintenance savings, Wide operating range of 8 to 30 Volt, Bi-colour LED detector status indicator for Normal and Alarm status, Operating temperature range -30 deg C to +70 deg C, Relatvie Humidity 5% to 95% non-condensing, 2 Wire plug in detector base for detectors with necessary junction box and mounting accessories.	NOS	2		
00.1.4	Supply, Installation, Testing and Commissioning of EN-54 Part 11 complying and LPCB approved Conventional Manual Call Point made of ABS material, red colour and resettable type, with antitemper facility, unique plug and play feature, operating range up to 30 Volt, LED status indicator for Alarm status, with 470 ohm resistor, Operating temperature range -10 deg C to +55 deg C, Ingress Protection range IP24D for indoor use, Relatvie Humidity 0% to 95% non-condensing, flush mounting red coloured with flexi element with necessary junction box and mounting accessories. <u>System Sensor / Morley / Honeywell / KAC</u>	NOS	1		

00.1.5	Supply, Installation, Testing and Commissioning of UL Certified Conventional Sounder cum Strobe-Flasher with operating range 12 Volt to 30 Volt DC, Operating temperature range 0 deg C to +49 deg C, with necessary junction box and mounting accessories.	NOS	1		
00.1.6	Supply, Installation Testing and Commissioning of Response indicator having two LED, viewing from an angle of 60 degree minimum and complete as per detailed technical specifications and engineers guide line	NOS	2		
00.1.7	Supply and laying of 2Core x 1.5 Sqmm FRLS Armoured cable with all necessary fixing and cable dressing accessories.	NOS	120		
	Sub Total 13.0.....				
14	ACCES CONTROL SYSTEM				
14.1.1	Supply, Installation, Testing and Commissioning of Access Control Control Panel with necessary accessories Power Supply and Cabinet.	NOS	1		
	Supply, Installation, Testing and Commissioning of Bio-metric Reader with necessary accessories.		1		
	Sub Total 14.0.....				
15	PA SYSTEM				
1	Supply, Installation, Testing and Commissioning of Mixer Amplifier for Voice and BGM-background music application with 3 microphone, 2 aux inputs, 1 line out 100 V/70 V, with Bass & Treble control, Automatic mute function when paging and announcements, speaker output circuit protection.	NOS	1		
2	Supply, Installation, Testing and Commissioning of Condenser type Microphone for public addressing application announcements with high quality, flexible goose neck, ON/OFF switch, XLR connector, frequency response 100-7500 Hz and approx. 10-meter cable for connection with Mixer amplifier.	NOS	1		
3	Supply, Installation, Testing and Commissioning of Wide 6 Watt-Ceiling Speaker with excellent frequency response for speech and music reproduction, excellent crash and rust resistant design, fully ABS plastic with metal grille, 125Hz-16KHz with White colour and 140-mm hole cut size and speaker diameter not more than 166 mm with necessary accessories.	NOS	13		

4	Supply, Installation, Testing and Commissioning of 6-Watt/60-Watt Volume Controller with white colour stylish appearance, 5 degree volume control levels, Applicable to 3-wire, 4-wire and 6-wire systems, Designed to mount on standard 86 × 86 electrical back box.	MTRS	1		
5	Supply and laying of 2Core x 1.5 Sqmm FRLS Armoured cable with all necessary fixing and cable dressing accessories.	MTRS	100		
	Sub Total 24.0.....				
16	projector				
16.3	Microphone & Mixing Console				
16.3.1	Panasonic LCD Projector <ul style="list-style-type: none"> • WXGA Resolution – 1280 x 800 Pixels • Wireless Function • 4000 Lumens Brightness • Contrast Ratio: 10,000:1 	No.	1		
16.3.2	Motorized Projection screen with American Matt White Fabric with HD Series	No.	1		
16.7	Installation				
16.7.1	Installation, Testing, Commissioning, Programming & Implementation Charges for audio video system with video conferencing facility	LOT	1		
	Sub Total 16.0.....				
17	TV SYSTEM				
17.1	PVC Conduits				
17.1.1	Supply & laying of 25 mm dia. Open/conceal manner heavy guage rigid PVC pipe.	Rmtr	25		
17.1.2	Supply & laying of 40 mm dia. Open/conceal manner heavy guage rigid PVC pipe.	Rmtr	15		
17.2	Cabling				
17.2.1	Supplying and Laying of RG 6 TV cable in prelaid conduit	Rmtr	50		
17.2.2	Supplying and Laying of RG 11 TV cable in prelaid conduit	Rmtr	25		
17.3	Junction box / Splitter				
00.1.1 7	Supply & fixing of 3/4 way splitter	No.	1		
17.5	Television Outlet Point				
17.4.1	Supplying, installing, testing and commissioning of one television point to be done with television outlet socket and box of the APPROVED make.	No.	2		
	Sub Total 17.0.....				
18	UPS SYSTEM				
17.1.2	Supply, Installation, Testing and Commissioning of 10 Kva ups with 30 minutes back up	No.	1		
	Sub Total 18.0.....				
19	MISCELLENOUS				

19.1	Supply, Installation, Testing and Commissioning of Panasonic 42" Display • LED Panel • Aspect Ratio : 16:9 • Brightness : 450 cd/sq. m. • Effective Display Area : 928 X 522 mm • Terminals : HDMI In x 2, Audio in, Audio Out, Video Input • Resolution : 1920X1080 pixels • Speaker Output : 20W (10W+10W)	No.	1		
19.2	Supply, Installation, Testing and Commissioning of 240 LTR Freeze	No.	1		
19.3	Supply, Installation, Testing and Commissioning of canon image runner 2420L	No.	1		
19.4	Supply Installation and Testing of EPABX(6 Incoming and 24 Out going Lines)	No.	1		
19.5	Providing and Fixing of standard Telephone instrument	No.	20		
19.6	Providing and Fixing of Digital Phone for Reception, Hotline	No.	1		
19.7	Providing and Fixing of Sinages	No.	1		
00.1.1 9	Providing and Fixing of -D-Link DIR-605L Wireless N300 Cloud Router	No.	2		
	Sub Total 19.0.....				
	TOTAL FOR ELECTRICAL AND ELV WORKS				

BILL OF QUANTITIES FOR AIR CONDITIONER WORKS					
SR. NO.	DESCRIPTION	QTY	UNIT	TOTAL RATE	AMOUNT
1.0	Supply of Air Conditioners				
1.1	Supply of Hitachi / Mitsubishi Electric - Make - Hi Wall type Air Conditioners. - 5 Star Rating				
a)	1.00 Tr. 5 Star	5	Nos.		
b)	1.50 Tr. 5 Star	2	Nos.		
c)	2.00 Tr.5 Star	1	Nos.		
d)	2.00 Tr. - 4 - Way Cassette Unit	1	Nos.		
e)	1.5 Tr. - 4 - Way Cassette Unit	2	Nos.		
2.0	Lifting , Shifting , Installation,Testing & Commissioning of Above Air Conditioners with Vaccum & Gas Charging				
2.1	Hi - Wall Split				
a)	1.00 Tr. 5 Star	5	Nos.		
b)	1.50 Tr. 5 Star	2	Nos.		
c)	2.00 Tr.5 Star	1	Nos.		
d)	2.00 Tr. - 4 - Way Cassette Unit	1	Nos.		
e)	1.5 Tr. - 4 - Way Cassette Unit	2	Nos.		
3	Dismantlig Of Old Split Ac				
a)	1.00 /1.5 / 2.0 Tr.	0	Nos.		
4	Supply Of Indiginous Materials For Hi Wall Type Air Conditioners.				
5	Average Distance Consider between Indoor & Outdoor is 15 Feet				
5.1	Supply, Installation, testing and Commissioning of refrigerant pipe work with Nitriler Rubber Insulation and necessary supports.				
a)	For Split units	180	Rft.		
6	Drain Pipe				
a)	Supply, Installation, testing and Commissioning of UPVC piping complete with fittings, supports.	120	Rft.		
	Drain Pump - If Required	R.O.	Nos		
7	Electrical Work				
a)	Electrical Communication Cable Between indoor and outdoor (1.5 x 3 Core).	220	Rft.		
8	Out door Unit Stand				
a)	Pre-fabricated L - Bracket type Outdoor unit Stand For Hi wall Machine	12	Nos		
b)	Pre-fabricated Platform type Outdoor unit Stand For Hi wall Machine	R.O.	Nos		
9	Zari Work	R.O.	Rft.		
10	Core Cutting in Wall (6" Dia)	R.O.	Nos		
	GRAND TOTAL INCLUSIVE OF ALL TAXES - SPLIT AC				

BILL OF QUANTITIES FOR PLUMBING WORK

SR. NO	ITEM DESCRIPTION	UNIT	QTY	TOTAL RATE	AMOUNT
1a	Providing and fixing concealed center point to wall ceiling & floor CPVC (SDR 13.5) pipe having National Sanitation Foundation (NSF) seal for potable water of following dia. Nominal bore tube fittings and clamps including making good the wall, ceiling and floor etc. complete. [A] 15 mm	Rmt	28		
1b	[B] 20 mm	Rmt	12		
1c	[C] 25 mm	Rmt	12		
1d	[D] 32 mm	Rmt	12		
1e	[E] 40 mm	Rmt	0		
2	Providing, laying and jointing in true line and level 110 diameter U.P.V.C (Type 'B') conforming to IS 13592-1992 with one end plain and other end socketed with rubber ring, & fittings conforming to ISI 14735-1999 if approved make for drainage system pipe line, pipe shall be jointed with each other with rubber lubricant, pipe shall be fixed on wall using of PVC clamp of the size 110 mm diameter X 149 mm length X 145 mm height at every 2000 mm center to center or shall be concealed in walls as directed including necessary fittings such as bends, shoes etc. including testing of pipes and joints with adhesive solvent cement including cost of all materials. & labours	Rmt	15		
3	Providing and fixing in position cowl vent to pipes. (B) 75 mm diameter.	Each	0		
3a	(C) 100 mm diameter.	Each	0		
4	Providing and fixing wash down water closet (European type W.C pan) with integral P or S trap including jointing the trap with soil pipe in cement mortar 1:1 (1 cement : 1 fine sand) (seat and cover to be measured and paid for separately) (A) Vitreous China (I) Long pattern white colour.	Each	3		
5	Providing and fixing water closet squatting pan (Indian type W.C pan) size 580 mm (earthwork, bed concrete, foot rests and trap to be measured and paid for separately) (A) Vitreous China (I) Long pattern white colour.	Each	0		
6	Providing and fixing 100 mm size P or S trap for water closet squatting pan including jointing the trap with the pan & soil pipe in cement mortar 1:1 (1 cement : 1 fine sand) (A) Vitreous China.	Each	0		
7	Providing and fixing in cement mortar 1:3 (1 cement : 3 coarse sand) a pair of white vitreous china 250 mm x 130 mm x 30 mm foot rest for long pattern squatting pan water closet.	Each	0		

8	Providing & fixing white colour china vitreous 12.5 lit. low level flushing cistern with a pair of C.I.or mild steel brackets etc.complete with fittings such as lead valve less syphon 15mm nominal size brass ball valve with polythene float, C.P.Brass handle unions and couplings for connections with inlet,outlet & overflow pipe 40mm dia porcelain enamelled flush bend including cutting holes in walls & making good the same,connecting the flush bend with cistern & closet. (Over flow pipe to be measured and paid for seperately).	Each	3		
9	Providing and fixing plastic seat & cover for wash down water closet with C.P brass hinges and rubber buffers. (B) Black plastic seat & cover.	Each	3		
10	Providing and fixing wash basin with single hole for pillar tap with C.I.or M.S.brackets painted with including cutting holes and making good the same but excluding the fittings. (A) vitreous China (II) Flat back washbasin 550 mm x 400 mm size (I) in white colour.	Each	3		
11	Providing and fixing C.P brass waste for wash basin or sink (A) 32 mm diameter.	Each	4		
12	Providing and fixing 600 mm x 450 mm bevelled edge mirror of superior glass mounted on 6 mm thick A.C sheet or plywood sheet and fixed to wooden plugs with C.P brass screws (B) 600 mm x 20 mm size, having pvc/ wooden frame & hook.	Each	3		
14	Providing and fixing urinal of approved quality including connecting the urinal with waste pipe, trap etc. complete (A) White earthenware flat back or corner type size 430 mm x 260 mm x 350 mm.	Each	2		
15	Providing and fixing chromium plated bottle trap with necessary coupling of approved quality for washbasin.	Each	4		
16	Providing and fixing stainless steel kitchen sink with C.I.or M.S.brackets painted with including cutting holes and making good the same but excluding the fittings.	Each	1		
17	Providing and Fixing 2-Way Brass Bib Tap in Polished Chrome of approved Quality and conforming to Manufacturers Standards. Jaquar ARI-39041 or approved equivalent	Each	3		
18	Providing and Fixing Health Faucet with metal hose and holder in Polished Chrome of approved quality and conforming to Manufacturers Standards. Health Faucet: jaquar ALD-573 or approved equivalent	Each	3		
19	Providing and Fixing Brass Angle Valve 15 mm in Polished Chrome of approved quality and conforming to Manufacturers Standards. Angle Valve. Jaquar ARI-39053 or approved equivalent	Each	4		
20	Providing and Fixing Brass Bib Tap in Polished Chrome of approved quality and conforming to Manufacturers Standards. Bib Tap jaquar ARI-39037 or approved equivalent	Each	5		
21	Providing and fixing Brass Pillar Faucet with lever handle, without drain, in polished chrome for utility area basins, of approved quality and conforming to Manufacturers Standards. Pillar Faucet jaquar ARI-39005B or approved equivalent	Each	3		

22	Providing and Fixing Single lever Deck Mount Kitchen Sink Cock with Swinging spout, in Polished Chrome of approved make and conforming to Manufacturers Standards. Kitchen Sink Cock jaquar ARI-39347 or approved equivalent	Each	1		
23	Providing and Fixing Soap Dish in Polished chrome of approved make and conforming to Manufacturers Standards. Soap Dish jaquar AKP-35731P or approved equivalent	Each	4		
24	Providing & fixing PVC Multi floor trap of self cleansing design haivng water seal not less than 50mm with necessary distance piece & making connection with grating, making necessary slab/ wall holes & cutting walls, grouting with M-15 CC all around with brick masonray support of 350x350 mm up to bottom of trap etc. complete as per specifications & drawing porvided at all places, all levels & all height. 110 mm inlet and 75 mm outlet (5" height). Astral or Equivalent.	Each	3		
25	Providing and Urinal Flush Valve in Polished Chrome of approved quality and conforming to Manufacturers Standards. Urinal Flush Valve: Jaquar PRS-077 or Equivalent.	Each	3		
30	Providing, Fixing, testing & commisssoning 6 kg/ sq. cm PVC Pipe Selfit ISI marked brand as per IS 4985 complete including solvent cement jointing & hydraulic testing the joints & pipes as mentioned in the sepcification etc. and making connection with downtake wherever required to satisfaction of engr / arch with proper care, protecting fittings & pipes till the final handing over etc as directed by E-I-C complete as per specifications & drawing provided for all places, all heights & all levels. Supreme or Equivalent. [A] 40 mm dia	Rmt	8		
30a	[B] 50 mm dia	Rmt	8		
31	Providing, Fixing, testing & commisssoning 6 kg/ sq. cm SWR UPVC Pipe Selfit ISI marked brand as per IS 13592 complete including solvent cement jointing & hydraulic testing the joints & pipes as mentioned in the sepcification etc. and making connection with downtake wherever required to satisfaction of engr / arch with proper care, protecting fittings & pipes till the final handing over etc as directed by E-I-C complete as per specifications & drawing provided for all places, all heights & all levels. Astral or Equivalent. [A] 75 mm dia OD (Type B)	Rmt	15		
37	Supply, installation, testing and commissioning of Localized R.O.. system consisting of R.O. membrance, PP cartridge filter, Activated Carbon filter, drain & back wash arrangement & inlet, outlet & overflow connection etc. Domestic R.O. system. Hardness: As per Water analysis report Output water quality: Drinking Water Capacity; 20 Liter/hr	Each	1		
38	Supply, installation, testing & commissioning of localized S.S. Storage water Cooler system with all piping & fitting valves, with necessary all Fittings, etc complete. Cooling Capacity: 20 Liter	Each	1		

39	Providing and fixing gun metal BALL Valve with C.I. wheel of approved quality (screwed end) : (A) 20 mm diameter		4		
	Total				

FINAL DRAWING

ATTACHED HERE WITH

GENERAL CONDITIONS OF CONTRACT.

The following terms and conditions/guidelines are to be adhered to by the Bidders while quoting. Wherever there is a deviation, it has to be brought out very clearly, if possible with proper explanation. Major deviations from the terms specified herein may result in disqualification.

5.1 Final Acceptance Certificate

- 5.1.1 On completion of all installation and commissioning activities, other than the on-going support covered under the contract, bidder shall submit the Notice of Final Completion to ECGC.
- 5.1.2 On receipt of the Notice of Final Completion from Bidder and on verification of fulfillment of Bidder obligations under the Contract, except for the continuing obligation to provide on-going support as per the terms of the Warranty, ECGC, shall within one week from the receipt of Notice of Final Completion from Bidder, either issue the Final Acceptance Certificate if satisfied as to the fulfillment of all obligations of Bidder, or provide a list of pending work / deficiencies to Bidder, as the case may be. Bidder shall within one week of being intimated of the deficiency/pending work, rectify such deficiencies/complete such pending work. Within one week of satisfactory completion of the pending work / deficiencies, ECGC shall issue Final Acceptance Certificate to the Bidder.

5.2 Warranty

- 5.2.1 Bidder shall provide warranty for the faithful and satisfactory (as decided by ECGC) performance of the entire integrated Facility. Warranty shall include all the work performed by Bidder including supply, erection, installation, integration, testing and commissioning, etc.
- 5.2.2 Warranty shall be for a minimum period of Twelve (12) months (or higher as per OEM policy) from the date of issue of 'Final Completion Certificate' by ECGC to Bidder at the end of the project.
- 5.2.3 Bidder shall arrange to rectify any defects found during warranty period attributable to the Bidder, within reasonable time decided by ECGC, at Bidder's own cost.

5.3 Pricing

- 5.3.1 Validity of the offer shall be minimum 30 days from the closing / due date for receiving the bids.
- 5.3.2 All prices should be in Indian Rupees.
- 5.3.3 Prices shall be considered on the basis of Office sites in ECGC LIMITED. Ahmedabad It shall include all the taxes & duties applicable now and in future such as excise/custom duty, Gujarat VAT, Service Tax, etc. and freight, transit insurance, custom clearing expenses, etc. as applicable.
- 5.3.4 Bidder should clearly indicate various taxes and duties with percentage applicable for individual deliverables and include all of these in their prices. Any bid without bifurcation of specific taxes shall not be treated as valid.
- 5.3.5 Bidder to quote unit cost for all the components of each system, indicate VAT/Service tax and agree to supply additional qty at rates not exceeding the mentioned rates.
- 5.3.6 For prices quoted for material supply under VAT, bidder should have valid **GUJARAT VAT TIN** registration. Copy of **VAT TIN, CST TIN and Service Tax registrations** should be attached with bid. OR otherwise the bidder has to give an undertaking to avail the same.
- 5.3.7 Since the implementation of **GST (Goods & Service Tax)** is around the corner, bidders are requested to consider the same while quoting their prices for supply / installation. The proposed structure of GST is as under:
 - a) There will be CGST (Centralized Goods and Service Tax) where in Custom, Excise, Service Tax etc shall be merged.
 - b) There will be SGST (State Goods and Service Tax) where in VAT, Luxury tax, Entertainment tax etc shall be merged.
 - c) There will be IGST (Integrated Goods and Service Tax) which will be applicable for interstate transactions.
- 5.3.8 Bidder needs to give separate pricing for material and services wherever applicable.

5.3.9 Bidder shall ensure compliance to all applicable prevailing laws.

5.3.10 Bidder to furnish tax registration details as under:

No.	Registration type	Number
1	Permanent Account Number	
2	Gujarat VAT TIN Registration No.	
3	CST Registration No.	
4	Service Tax Registration No.	

5.4 Payment Terms

Payment Terms applicable will be as follows:

80% payment of value of Invoice amount: shall be paid within 30 days on receipt and acceptance of Delivery of material / goods by ECGC for the each system. The delivery of the system shall mean supply of all items stipulated in the BOD for that system. Supplier / Contractor cannot submit more than 1 bill of each category of supply and services in a month.

10% payment on installation of the material / system

Balance 10% payment: After final completion of the project, issuance of 'Final Completion Certificate' by ECGC and receipt of **PBG** for 10% of the total actual value of work valid for warranty period from the Vendor. In absence of PBG, 10% of the total actual value will be retained and shall become payable after completion of the warranty period (date of warranty starts from the date of issuance of Work Completion / Final Test Certificate by ECGC).

Payment will be subject to deduction of tax Including Works contract TDS and Income tax TDS as per applicable law. Terms for Security Deposit (5% of Work Order value) / Retention Money (5% of the Invoice amount) will be applicable in Invoices for Installation work.

5.5 Delay and Non-conformance penalty:

If the specified delivery schedule is not adhered to, or progress of manufacture of supply of the items is not satisfactory, or is not in accordance with progress schedule, ECGC has right to:

- i) Hire for period of delay from elsewhere goods, services which in ECGC's opinion would meet the same purpose as the goods which are delayed and vendor shall be liable to pay Rs.5000/- per day without limitation for the hire and other installation, removal etc. charges; or
- ii) Cancel the Purchase Order in whole or in part without liability for cancellation charges in that event, ECGC may procure from elsewhere goods/services which in ECGC's opinion would meet the same purpose as the goods/services for which order is cancelled and Vendor shall be liable without limitation for the difference between the cost of such substitution and the price set forth in this order for the goods involved; or
- iii) Hire the substitute goods/services vide (i) above and if the ordered goods continue to remain undelivered thereafter, cancel the order in part or in full vide (ii) above.

In the event of rejection of non-conforming goods, Vendor shall be allowed, without any extension of delivery time, to correct the non-conformities. Should, however, vendor fail to do so within stipulated time, ECGC may cancel the order as the non-conforming goods and retain the same right with respect to substitution as are set out in the preceding paragraph and in addition, recover actual expense incurred by ECGC in installing and removing the non-conforming goods. Alternatively, however, ECGC may at its option have or cause the non-conformity to be corrected at vendor's expense.

If vendor fails to perform any of its obligations, ECGC shall be entitled to all remedies provided by law and recover all damaged caused to ECGC by delay or non-supply of the goods or supply of non-conforming goods and to obtain adequate compensation thereof.

ECGC reserves the right to claim damages for use of defective or sub-standard goods supplied by the Vendor irrespective of the fact whether goods were inspected prior to receipt at project site by ECGC or not.

5.6 Indemnity

5.6.10 Mutual Indemnification

Each party shall defend and indemnify the other, its assigns, agents, officers and employees from and against any damages to real or tangible personal property and / or bodily injury to persons, including death, resulting from its or its employees' or agents' negligence or willful misconduct.

5.6.11 Intellectual Property Indemnities

Bidder shall defend and indemnify ECGC from and against any suit, proceeding, or assertion of a third party against ECGC based upon a claim that any of the system or part of the system supplied by the Bidder including third party components, infringes any valid patent, copy right, trade secret, or other intellectual property right under any country's national or international laws.

5.6.12 If a claim pursuant to 5.6. above occurs, Bidder shall take all necessary remedial actions at its own cost. Bidders shall safe guard ECGC business operations and protect ECGC against any penalty and / or liability arising out of such claim.

5.7 Force Majeure

5.7.1 If either party is prevented from performing any of its obligations under the Contract due to any cause beyond the party's reasonable control-if the party's performance is prevented by a superior brute force,- including, without limitation, an act of God, fire, flood, explosion, earthquake, war, strike, embargo, government regulation, civil or military authority, etc., the time for that party's performance will be extended for the period of the delay or inability to perform due to such occurrence; provided however, that if a party suffering a force majeure event is unable to cure that event within a mutually agreed duration, the other party may terminate the contract.

5.7.2 Force majeure does not include party's organizational issues, ECGCruptcy, merger & acquisition issues, solvency, etc.

5.7.3 Force majeure event once faced shall be immediately informed to the other party with the details of event, its likely effect on the contract, etc. Such information should reach to the other party within a period of one week from the time of occurrence of the event.

5.8 Modification and Withdrawal of Bids

a. No bids will be allowed to be modified subsequent to the final submission of bids.

b. No bidder will allowed to withdraw the bids already submitted in the interval between the deadline after submission of bids and the expiry of the bid validity. Withdrawal of a bid during this interval will result in the forfeiture of bidder's EMD.

5.8.1 ECGC reserves the right to change any bid condition of any item even after inviting the bids, with/without prior notification.

5.8.2 ECGC's Right to accept any Bid and to reject any or all Bids - ECGC reserve the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to awarding the Contracts, without thereby incurring any liability to the affected Bidder or bidders or any obligation to inform the affected Bidder or bidders of the grounds for such decision.

5.8.3 The tendered quantities are estimated based on the receipt of the requirement from various Government offices. The quantities may decrease up to 50% of the bid quantity or increase up to 50% of the bid quantity at the time of finalization, depending upon the change in the requirements/grants available with the purchaser(s), which shall be binding to the bidder.

5.8.4 All correction/addition/deletion shall require authorized countersign.

5.8.5 ECGC reserves the right to split the scope of work and award separate contract to different Bidders. Also, Bidder has to confirm that they shall accept part order without any commercial implications.

- 5.8.6** All the information contained in these requisition specifications is the property of ECGC and these are not to be reproduced or disclosed to other parties in any manner without prior permission in writing from ECGC.
- 5.8.7** All other terms & conditions not covered here are mentioned in these documents as well as in case of any dispute, GCC & GCP will prevail. The bidder may request a copy of GCC & GCP for reference.
- 5.9 Governing Law and Jurisdiction**
- 5.9.1** The Contract and the transactions contemplated therein shall be governed by and construed in accordance with the laws of India.
- 5.9.2** The Contract and the transactions contemplated therein shall be subject to the exclusive jurisdiction of the competent Courts in Bharuch, India.
- 5.10 Instruction to Bidders**
- 5.10.1** The closing date & time for receiving the bid response is as mentioned in the cover letter of this RFP.
- 5.10.2** Entry Tax / Octroi (if any) and Transit insurance (till final destination of delivery), if any, shall be borne by the supplier.
- 5.10.3** Bidder shall ensure compliance with all applicable laws and obtain necessary registration/license as may be applicable.
- 5.10.4** The bidder has to specify the tax rate (VAT/CST/Service Tax) for each item and supplier who have opted for lumpsum scheme shall not be eligible for bidding.
- 5.10.5** Bids received after the closing date and time shall not be considered for evaluation.
- 5.10.6** ECGC reserves the right to reject any or all of the bids without assigning reasons.
- 5.10.7** Bids shall be of fixed firm rates and will have a validity of one months, from the closing date for bids, extendable on request of ECGC.
- 5.10.8** Bidders are requested to send request for clarifications, if any, so as to reach ECGC latest by the date & time mentioned in the cover letter of this RFP. Requests received after this date for clarifications may not be entertained.
- 5.10.9** Bidders are requested to send acknowledgement to ECGC as soon as the RFP is received by them.
- 5.10.10** Bidder to inform the contact reference along with the acknowledgement of receipt of RFP to enable ECGC to establish single point of contact at Bidder end.
- 5.10.11** Point of contact at ECGC will be:
Attn.: Mr.
Ahmedabad Exporter Branch
ECGC Limited
1st Floor, Nagindas Chambers
Opposite AUDA Office
Usmanpura, Ashram Road Ahmedabad, Gujarat, India
Phone No. 079-27545446
- 5.10.12** No verbal communication for queries and / or clarifications with any of the Bidders will be entertained by any of ECGC employees and / or representatives with respect to this RFP.
- 5.10.13** After the closing time of submission, ECGC committee will verify the submission of Bid Processing Fees & EMD as per bid terms and conditions. The eligibility criteria evaluation will be carried out of the responsive bids. The technical bids of the bidders who are complying with all the eligibility criteria will be opened and evaluated next. The financial bid of the technically qualified bidders will be opened and financially L1 bidder will be decided from the sum total of prices for all line items in any given sub-category and then called for further negotiations.
- 5.10.14** (n) Code reserves the right to decide L1 on total basis as well as category-wise and it shall be binding on the bidder. The order may be split among a number of technically qualified bidders at the discretion of ECGC. The bidder with overall competitive quote will be given preference on the ordered quantity.
- 5.10.15** Bids shall be valid for 45 days after the date of financial bid opening. A bid valid for a shorter period shall be rejected as non-responsive.

- 5.10.16** Bidders are required to quote all items including optional add-ons as well. Incomplete bids will be treated as non-responsive and will be rejected.
- 5.10.17** The Bidder shall bear all the costs associated with the preparation and submission of its bid, and ECGC will in no case be responsible or liable for these costs, regardless of conduct or outcome of bidding process.
- 5.10.18** The bidder has to submit the compliance letter on its letter head duly signed by the authorized signature & other supporting documents as asked for in the bid in scanned format. Failing to submit the same or noncompliance/deviation from any bid terms and conditions, eligibility criteria or technical specifications may result in rejection of the bid.
- 5.10.19** The Bidder has to examine all instructions, forms, terms, conditions and specifications in the bidding documents. Failure to furnish all information required by the bidding documents or submission of a bid not substantially responsive to the bidding documents in every respect will be at the Bidder's risk and may result in rejection of its bid.
- 5.10.20** Unsuccessful bidder's EMD will be returned as promptly as possible but not later than 15 days after the expiration of the period of bid validity OR upon the successful Bidder signing the Contract, and furnishing the Performance ECGC Guarantee @ 10% of the total order value as prescribed by ECGC, whichever is earlier.
- 5.10.21** In exceptional circumstances, ECGC may solicit the Bidder's consent to an extension of the period of validity. The request and the responses thereto shall be made in writing. A Bidder may refuse the request without forfeiting its EMD. A Bidder granting the request will not be permitted to modify its bid.
- 5.10.22** The EMD may be forfeited:
- (a) If a Bidder withdraws its bid during the period of bid validity
 - (b) In case of a successful Bidder, if the Bidder fails:
 - (i) To accept the PO within stipulated time-frame
 - (ii) To furnish performance ECGC guarantee as mentioned above
 - (iii) If the bidder is found to be involved in fraudulent practices or
 - (iv) If the bidder fails to deliver the required items at the defined locations within defined delivery schedule.

5.11 Termination for Default

- 5.11.1** The Purchaser may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Bidder, terminate the Contract in whole or part:
- i. If the bidder fails to deliver any or all of the Goods within 25 working days from the date of purchase order, or within any extension thereof granted by the Purchaser or
 - ii. If the Bidder fails to perform any other obligation(s) under the Contract/Purchase order.
 - iii. If the Bidder, in the juBranch Management of the Purchaser has engaged in corrupt or fraudulent practices in competing for or in executing the Contract. "Corrupt practice" means the offering, giving, receiving or soliciting of anything of value of influence the action of a public official in the procurement process or in contract execution. "fraudulent practice : a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the purchaser, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the purchaser of the benefits of free and open competition;"
- 5.11.2** In the event the Purchaser terminates the Contract in whole or in part, pursuant to clause above, the Purchaser may procure, upon such terms and in such manner, as it deems appropriate, Goods or Services similar to those undelivered, and the Bidder shall be liable to the Purchaser for any excess costs for such similar Goods or Services. However, the Bidder shall continue the performance of the Contract to the extent not terminated.

5.12 Schedule and Penalty clause for delay

- 5.12.1** Bidder shall start the work within 7 days of "Award of Contract (Work/Purchase Order)" or "LOI".

- 5.12.2 Delay in excess of the stipulated time will be sufficient to cause for termination of the contract. In that case the Performance ECGC Guarantee of the bidder will be forfeited.
- 5.12.3 Bidder shall put all the efforts to complete the job within agreed time schedule. Penalty shall be charged to the Bidder for the delay of work completion. For every day of delay there shall be penalty of 1% of the total order value per day for first 5 days and then onwards 2% per day beyond 5 days.
- 5.12.4 In case, the selected bidder does not supply the ordered items for any reason, he will be liable to pay the difference amount to the purchaser, over and above the performance guarantee, which indenter department has to pay to the next or other selected bidder for purpose of the said items.

5.13 Other Terms and Conditions

- 5.13.1 ECGC reserves the right to split the scope of work and award separate contract to different Bidders. Also, Bidder to confirm that they shall accept part order without any commercial implications.
- 5.13.2 All the information contained in these requisition specifications is the property of ECGC and these are not to be reproduced or disclosed to other parties in any manner without prior permission in writing from ECGC. It is very critical that the knowledge of the ECGC facility is not misused / revealed by Bidder, Bidder's employees, and / or any entity associated with Bidder. This will be the Bidder's responsibility and violation to this shall have serious implications.
- 5.13.3 Bidder to provide details of their experience and client list.

5.14 SPECIAL TERMS & CONDITIONS:

- 5.14.1 Details of all the activities to be carried out under the broad heads are provided below. The contractor shall provide all necessary materials, equipment and labor etc. for the execution and maintenance of work till completion. All materials that go with the work shall be approved by ECGC prior to procurement and use. The materials should of reputed make as given in functional/technical specifications.
- 5.14.2 All the works shall be executed in strict conformity with the provisions of the contract documents and with such explanatory detailed drawings, specifications and instructions as may be approved from time to time to the contractor by ECGC whether mentioned in the contract or not.
- 5.14.3 The materials, design and workmanship shall satisfy the relevant Indian standards, the job specifications contained herein and codes referred to. Where the job specifications stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied.
- 5.14.4 The supplier shall supply the material as specified/prescribed and after doing the necessary verification of its quality and any substandard material/material not as per specification will be liable to be rejected. The supplier shall bear the cost of transportation for taking the substandard/rejected material and doing its replacement. The substandard/rejected material will be kept at the site at the risk of the supplier.
- 5.14.5 ECGC shall have power to make any alterations in omission from, additions to, or substitutions for the schedule of rates, the original specifications, Drawings, Designs and Instructions that may appear to him to be necessary or advisable during the progress of work and contractor shall be bound to carry out such altered / extra / new items of work in accordance with any instructions which may be given to him in writing signed by ECGC and such alterations, omissions, additions or substitutions shall not invalidate contract and any altered, additional or substituted work which contractor may be directed to do in the manner above specified as part of the work shall be carried out by contractor in the same terms and conditions in all respects on which he agreed to do the work.
- 5.14.6 The contractor shall furnish to the ECGC for approval adequate samples of all materials and finishes to be used in the work. Such samples shall be submitted before the work is commenced and in ample time to permit tests and examinations thereof. All materials furnished and finishes applied in actual work shall be fully equal to the approved samples.
- 5.14.7 On completion of work contractor to furnish 2 sets of complete technical documents along with as-built drawings for all the systems as envisaged in the tender document. System-wise report shall be submitted along with the drawings including softcopy.

- 5.14.8 Material supply & Storage:** It shall be the responsibility of the Contractor at his own risks and costs to take delivery of the materials from the stores, factory, rail head or other collection point, as the case may be, and to arrange for its loading, transportation to job site and unloading at the job site or other place of storage. The Contractor shall, in taking delivery, ensure compliance of any conditions of delivery applicable to deliveries from ECGC's or supplier's factory/stores or railways or other transporters concerned, and shall be exclusively responsible to pay and bear any demurrage or penalty or other charges payable by virtue of any failure or delay by the contractor in lifting the suppliers and / or any failure by the Contractor to observe the condition of supply as aforesaid, and shall keep ECGC indemnified from and against all consequences thereof.
- 5.14.9** The Contractor shall hold and store any material(s) supplied by ECGC only at such place and/or premises as may be approved by the Project-in-charge, provided that no such approval shall absolve the Contractor in whole or parts of his full liabilities in respect of such materials, and the Contractor shall be and remain responsible at all times at his own risks and costs to ensure that the materials(s) supplied by ECGC are retained at all times in premises that are air and water tight and otherwise suitable for the storage for the storage of the material so as to prevent damage or deterioration for any cause whatsoever or theft or other loss, and shall arrange such watch and ward staff as shall be necessary to ensure the safety thereof.
- 5.14.10** The Contractor shall at all times be exclusively responsible for any and all loss(es), damage(s) deterioration, misuse, theft or other application or disposal of the material(s) supplied by ECGC or any of them, contrary to the provisions hereof and shall keep ECGC indemnified from and against the same and shall forthwith at his own cost and expense replace any such material. Lost, damaged, deteriorated, misused, stolen, applied and or disposed as aforesaid, with other material of equivalent quality and quantity.
- 5.14.11 Labour Laws & Regulation:** The Contractor shall be responsible for strict compliance of and shall ensure strict compliance by it sub-contractors, servants or agents of all labour and other laws, rules or regulation having the force of law affecting the relationship of employer and employee between the Contractor/Sub-Contractor and their respective employees.
- 5.14.12** The Contractor and Sub-Contractor(s) of the Contractor shall obtain authority(ies) designated in this behalf under any applicable law, rule or regulation including but not limited to the Factories Act and Contract labour (Abolition & Regulation) Act, 1970 (insofar as applicable) any and all such license(s) consent(s), registration(s) and / or other authorisation (s) as shall from time to time be or become necessary for relative to the execution of the work or any part or portion thereof or the storage or supply, of any material(s) or otherwise in connection with performance of the Contract, and shall at all times observe and ensure due observance by the Sub- Contractor, servants and agents of all terms and conditions of the said licence(s), regulation(s) and other authorisation(s) and laws, rules and regulations applicable thereto.
- 5.14.13** The Contractor shall indemnify and keep indemnified the Owner from and against all actions, claims, demands and liabilities whatsoever under and in respect of the breach of any other provisions of GCC's clause 8.3.1.0 to 8.3.3.0 and / or against any claim, action or demand by any workman / employee of the Contractor of any Sub-Contractor and / or from any liability anywise to any workman / employee of the Contractor or any Sub-Contractor under any law, rule or regulation having the force of law, including but not limited to claims against the Owner under the Workmen Compensations Act, 1923, The employees Provident Funds Act, 1952, and / or The Contract Labour (abolition & Regulation) Act, 1970.
- 5.14.14 Safety Regulation, Accident & Damage:** The Contractor shall be responsible at his own cost in and relative to performance of the work and contractor to observe and to ensure observance by his Sub-Contractors, agents and servants of the provisions of Safety Code as hereinafter appearing and all fire, Safety and security regulations as may be prescribed by the Owner from time to time and such other Precautions, measures as shall be necessary and shall employ / deploy all equipment necessary to protect all works, materials, properties, structures, equipments, installations, communications and facilities whatsoever from damage, loss or other hazard whatsoever (including but not limited to fire and explosion) and shall during construction and other operations minimize the disturbance and inconvenience to the Owner, other contractors, the public and adjoining land and property owners and occupiers, and crops, trees and

vegetation and shall indemnify and keep indemnified the Owner from and against all losses and damages and costs, charges and expenses and penalties, actions, claims, demands and proceedings whatsoever suffered or incurred by or against the Owner, as the case may be, virtue of any loss, alteration, displacement, disturbance or destruction or accident to any works materials, properties, structures, equipments, installations communications and facilities and land and property owners and occupiers and crops, trees and vegetations as aforesaid, with the intent that the Contractor shall be exclusively responsible for any accident, loss, damage, alteration, displacement, disturbance or destruction as aforesaid resultant directly or indirectly from any breach by the Contractor of his obligation aforesaid or upon any operation, act or omission of the contractor his Sub-Contractor(s) or agent(s) or servant(s).

5.14.15 The Contractor's liabilities under Clause 8.4.1.0 and otherwise under the Contract shall remain unimpaired notwithstanding the existence of any storage cum erection or other insurance covering any risk, damage, loss or liability for which the Contractor is liable to the Owner in terms of the foregoing Sub-Clause or otherwise and / or in respect of which the Contractor has indemnified the Owner with the intent that notwithstanding the existence of such insurance, the Contractor shall be and remain fully liable for all liabilities and obligations under the contract and indemnified to the Owner, and the Owner shall not be obliged to seek recourse under such policy(ies) in preference to recourse against the Contractor or otherwise to exhaust any other remedy in preference to the remedies available to in under the Contract.

5.14.16 Indemnity & Insurance: In every case in which by virtue of the provision of section 12 sub-section (i) of Workmen's Compensations Act 1923. the owner is obliged to pay compensation to a workman employed by the contractor, in execution of the works, the Owner will recover from the Contractor the amount of the compensation so paid, and without prejudice to the rights of Owner under section 12, sub section 20 of the said Act, Owner shall be at liberty to recover such amount or any part thereof by deducting it from the Security Deposit or from any sum due by the Owner to the contractor whether under this contract or otherwise. The Owner shall not be bound to contest any claim made under section 12, sub section(i) of the said Act, except on the written request of the Contractor and upon his giving to the Owner full security for all cost for which the Owner might become liable in consequence of contesting such claim.

5.14.17 The Contractor shall at all times indemnify and keep indemnified the Owner and its officers, servants and agents from and against all third party claims whatsoever (including but not limited to property loss and damage personal accident, injury or death of/to property or person of any Sub-Contractor and/or the servants of agents of the Contractor, and Sub-Contractor(s) and/or the Owner) and the Contractor shall at his own cost and initiative at all times upon the successful conclusion of the defect liability period specified in Clause 5.4.1.0 hereof take out and maintain insurance polices in respect of all insurable liabilities under this Clause, including but not limited to third party insurance and Act. Personal injuries insurance Act, Emergency Risk Insurance and other with Insurance company(ies) approved by the Owner and such policy(ies) shall be of not less limits hereunder specified with reference to the matters hereunder specified namely:

- a) Workmen Compensation Insurance to the limit to which compensation may be payable under the laws of the Republic of India.
- b) Third Party Insurance body injury and property damage to the limit of not less than Rs.1,00,000/- (rupees one lakh only) in each accident at each job site and to a limit of not less than Rs. 5,00,000/- (rupees five lakhs only) for all accidents at all job sites.
- c) Provides that the limits specified above shall operate only as a specification of minimum limits for insurance purposes; but shall not anyway limit the Contractor's liability in terms of the of this Clause to limit(s) / specified.

5.14.18 Should the Contractor fail to take out and/or keep a foot insurance as provided for in the foregoing Sub-Clause, the Owner shall be entitled (but without obligation to do so) to take out and/or keep a foot such

insurance at the cost and expense of the Contractor, and without prejudice to and other remedies of the Owner in this behalf, to deduct the sum(s) incurred therefore from the dues to the Contractor.

- 5.14.19** In case of default/delay, ECGC reserves the right to make alternative arrangement through available sources and shall recover the entire cost and penalty charges after adding 10% administrative cost from the supplier and it shall be unconditionally binding on him.
- 5.14.20** The Bidder / Contractor shall comply all the terms & conditions mentioned in ECGC's General Conditions of Purchase (GCP) and General Conditions of Contract (GCC) unless otherwise specified separately.
- 5.14.21** Bidder to reimburse Rs.20000/- towards the use of water & electricity at Site. This amount will be adjusted/deducted from the bidder's last running Invoice.

SPECIAL CONDITIONS OF CONTRACT

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