बेटी बचाओ
बेटी पढ़ाओ

भारतीय रिज़र्व बैंक
RESERVE BANK OF INDIA

Notice Inviting e-Tender (NIT)

e-Tender No: RBI/Kolkata Regional Office/Estate/3/25-26/ET/141[RBI Kolkata 3rd Flr Renovation]

Renovation of Bank's Main Office Building, 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)

Tender Notice

Online e-Tenders in two parts (part I and II) are invited for **"Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata - Phase I (ZTC)".** The tenders shall be submitted in online manner at https://mstcecommerce.com website.

1. The firms which do not comply with the following pre-qualification criteria and/or do not submit EMD will not be considered for opening of their tender Part-II (Price Bid):

   a) The intending bidder must have minimum 5 years of experience of executing similar nature of works viz. for renovation of a premise and its allied works.

   b) The bidder should have experience of satisfactorily completed similar work(s)* during last 5 years ending April 2025 from May 2020, should be either of the following:

      i) Three completed similar works* each costing not less than the amount equal to 40% of the estimated cost i.e. ₹1.6 Crore.

      or

      ii) Two completed similar works* each costing not less than the amount equal to 50% of the estimated cost i.e. ₹2 Crore.

      or

      iii) One completed similar work* costing not less than the amount equal to 80% of the estimated cost i.e. ₹3.2 Crore.

   c) Minimum yearly turnover of 100% of the estimated cost i.e. ₹3.99 Crore during last 3 financial years ending March 2025, supported by audited financial statements.

d) Should furnish solvency certificate issued by applicant's Banker for the estimated cost of work i.e. the tenderers should have a Solvency of value not less than 100% of estimated cost of the work i.e. ₹3.99 crore.

e) Should have proper full-fledged service setup in Kolkata or at nearby city.

2. In addition to above, intending bidders shall also submit following details and supporting documents along with PQ papers for Bank's examination:

(a)	Composition of the firm	Full particulars (whether contractor is an individual, or a partnership firm, or a company etc.,) of the composition of the firm of contractors in details should be submitted along with name(s) and address (es), of the partner's copy of the Articles of Association / Power of Attorney / such relevant document.
(b)	Work experience & Completion of similar works of specified value during the specified period	Copies of the **detailed work orders indicating date of award, value of awarded work, time given for completing the work etc.** and the corresponding **completion certificates** indicating actual date of completion and actual value of executed similar works should be enclosed in proof of the work experience. The details along with documentary evidence of previous experience, if any, of carrying out works for the Reserve Bank of India at any Centre, should also be given.
(c)	Turnover	**Audited financial statements** for last three financial years i.e. 2022-23, 2023-24 and 2024-25 along with a **certificate of Chartered Accountant** indicating the turnover for these financial years.
(d)	Credit worthiness of the contractor and their turnover during the specified period	Copies of the Income Tax Clearance Certificates/Income Tax Assessment Orders along with the latest final accounts of the business of the contractor duly certified by a Chartered Accountant should be enclosed in proof of their creditworthiness and turnover for last three years.
(e)	Name(s) and address(es) of the Bankers and their present contact executives	Written Information about the names and addresses of their bankers along with full details, like names, postal addresses, e-mail IDs, telephone (landline and mobile) nos., fax nos., etc. of the contact executives (i.e. the persons who can be contacted at the office of their bankers by the Bank, in case it is so needed) should be furnished.

(f)	Details of bank accounts	Full particulars of their bank accounts, like account no. type, when opened etc., should be given.
(g)	Name(s) and address(es) of the Clients and their present contact executives	Written information about the names and addresses of their clients along with full details, like names, postal addresses, e-mail IDs, telephone (landline and mobile) nos., fax nos. etc., of the contact executives (i.e. the persons who can be contacted at the office of their clients by the Bank in case it is so needed) should be furnished.
(h)	Details of completed works (Annex 8)	The client-wise names of work(s), year(s) of execution of work (s), awarded and actual cost (s) of executed work (s), completion time stipulated in the contract (s) and actual time taken to complete the work (s), Name(s) and full contact-details of the officers/authorities/departments under whom the work(s) was/were executed should be furnished.
(i)	Details of office setup	Address and contact details of the office set up.
(j)	Details of registration and copies of registration certificate/ documents for	PAN GST Office of Labour Commissioner, if applicable

In the event of intending bidder's failure to comply prescribed conditions, Bank reserves the right to not allow him to participate in tendering process.

2. A pre-bid meeting will be held at **11:00 Hrs on June 23, 2025** at **Estate Department, 3rd Floor, RBI, Kolkata** to discuss/clarify anything about the tender. No separate communication will be sent for this meeting. All the intending tenderers are advised to be present and study the tender documents **and site visit will be facilitated to provide the first feel of the work and site.**
3. Tenderers are required to submit the details of the works carried out by them during last 5 years along with the name and contact no. of the users of the equipment in the enclosed format.
4. A tender submitted by a firm who is found to be not submitting the above details will be rejected.
5. Tenders shall be submitted online in two parts viz. Part-I containing technical and commercial details of the offer and Part-II containing prices only. **Part-I will be opened on or after 11:30 hrs. of July 07, 2025 and techno-commercial evaluation of the same will be done**. **Firms who are meeting all the criteria will be considered for opening the Part-II (Price Bid). Part II will be opened online on subsequent date, which will be intimated to the tenderers in advance.**
6. The Reserve Bank of India reserves the right to accept or reject any or all the tenders, in full or in part, without assigning any reason thereof. The Bank also reserves the right to accept the tender of any firm. Tenderers are requested to quote

unit rates and amounts separately. They are also requested to use the enclosed proforma only (and not to use their own format).

7. The tenderers shall pay as Earnest Money a sum of **₹7,98,000/- (Rupees Seven Lakh Ninety-Eight Thousand only)** by NEFT or BG in favor of Reserve Bank of India, Kolkata, drawn on a scheduled bank along with **tender eligibility papers and statements / Annexures mentioned in Part-I of the tender and Pre-Qualification papers as given above**. After receiving the EMD and other Pre-Qualification papers, firms will be allowed to continue in the online tendering process. Last date of submission of the Pre-Qualification papers online is up to **July 07, 2025 up to 11:00 hrs**. The Earnest Money Deposit of the successful tenderer shall be released without any interest on issue of virtual completion certificate. The Earnest Money Deposit of unsuccessful tenderer shall be released to them without any interest after award of work.
8. The tenders shall be valid for a period of 90 days from the date of **opening of Part-I of the tender.**
9. The rates quoted shall be inclusive of all taxes, duties, transport, packing, forwarding, insurance etc. and shall be for the complete work duly installed and commissioned at site. The prices quoted shall remain firm for the entire period of contract and shall not be subjected to any variations in the foreign exchange or variations of any other taxes, levies, duties etc. No import license will be furnished by the Bank. The tenderers shall make their own arrangement for import of any part or components, if any, required for completion of the work. Tenderer should have GST registration number. Tenderers must quote their rates including GST levied by the Central Government and State Government. The Bank is not responsible for payment of GST for the service rendered by the contractor. It is the responsibility of the contractor to pay the GST to the tax authority.
10. The entire work of renovation of the premise shall be completed within a period of **09 calendar months from the 14th day of date of issue of work order**.
11. **The tenderers shall indicate details of the service center at Kolkata or nearby city, the staff strength, contact numbers and the availability of spares for the system.**

Place: KOLKATA

Date: May 27, 2025

Regional Director, KOLKATA

SCHEDULE OF TENDER (SOT)

e-Tender no.	RBI/Kolkata Regional Office/Estate/3/25-26/ET/141[RBI Kolkata 3rd Flr Renovation]
Mode of Tender	Open Tender through e-Procurement System (Online Part I - Techno-Commercial Bid and Part II - Price Bid through https://mstcecommerce.com/eprocn)
Publication of NIT in press	May 27, 2025
Bank's Estimated Value	₹3,99,00,000/- (Rupees Three Crore Ninety-Nine Lakhs only)
Publication of NIT on Bank's website	May 27, 2025, 17:00hrs onwards
Availability of tender on MSTC eProcurement portal https://mstcecommerce.com/eprocn	May 27, 2025, 17:00hrs onwards
Availability of tender for viewing	Up to June 16, 2025
Pre-Bid meeting	June 23, 2025 at 11:00 hrs at Estate Department, RBI Kolkata, 3rd Floor, BMOP, Kolkata - 700 001
Publication of minutes of Pre-Bid meeting/addendum, if any	On or before June 25, 2025
Last date of submission of EMD	July 06, 2025
Last date of availability of tender (Part-I and Part-II) for submission including Pre-Qualification (PQ) documents	July 07, 2025 up to 11:00 hrs
Earnest Money Deposit by NEFT / BG	EMD @2% of the total estimated cost of the tender i.e. ₹7,98,000/- has to be submitted by each bidder in the form of BG and in favour of Reserve Bank of India, Kolkata which is to be delivered in physical form at Estate Department, RBI Kolkata or through NEFT to - A/c No – 186003001. IFSC CODE – RBIS0KLPA01
Date & time of opening of Part-I i.e. Techno-Commercial Bid (Subject to fulfilling the PQ criteria). Part II of the online tender will be opened on same day or subsequent date, which will be intimated to the tenderers in advance.	On or after July 07, 2025, 11:30 hrs
Transaction Fee	Details available on the MSTC Portal

भारतीय रिज़र्व बैंक / RESERVE BANK OF INDIA

संपदा विभाग / ESTATE DEPARTMENT

कोलकाता / KOLKATA

Address: 15, NS Road , Kolkata 700001
Email: estatekolkata@rbi.org.in

RBI/Kolkata Regional Office/Estate/3/25-26/ET/141[RBI Kolkata 3rd Flr Renovation]

e-TENDER FOR

Name of work: Renovation of Bank's Main Office Building

3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)

Part I (Techno-Commercial Bid)

बोलीकर्ता का नाम/Name of Bidder _____

पता/Address_____

अनुमानित लागत / Estimated cost: ₹3.99 crore

बोली पूर्व बैठक की तारीख
Date, time and venue of Pre-Bid meeting

कार्यक्रम-स्थल / Venue: Estate Department, RBI Kolkata, 3rd Floor, BMOP, Kolkata - 700 001 at 11:00 hrs on June 23, 2025

ई-निविदा जमा करने की नियत तिथि और समय:
Due Date and time of Submission of e-Tender : 11:00 hrs on July 07, 2025

ई-निविदा खुलने की तिथि
Date of opening of e-Tender: On or after 11:30 hrs on July 07, 2025

Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)

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DISCLAIMER

Reserve Bank of India, Kolkata has prepared this document to give background information on the Project for **Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)** to the interested parties. While Reserve Bank of India has taken due care in preparation of the information contained herein and believes it to be accurate, neither Reserve Bank of India nor any of its authorities / agencies / concerned officers, employees/ agents / advisors give any warranty or make any representation, express or implied as to the completeness or accuracy of information contained in this document or any additional information which may be provided later in connection with the project.

The information is not intended to be exhaustive. Interested parties are required to make their own inquiries and respondents will be required to confirm in writing that they have done so and they do not rely only on the information provided by RBI in submitting the Tender. The information is provided on the basis that it is non – binding on Reserve Bank of India or any of its authorities /agencies / concerned officers / employees / agents / advisors.

Reserve Bank of India reserves the right not to proceed with the Project or to change the configuration of the Project, to alter the timetable reflected in this document or to change the process to be applied with due notice. It also reserves the right to decline to discuss the matter further with any party expressing interest. In such scenario no reimbursement of cost of any type will be made to persons or entities expressing interest based on this document.

Notice Inviting e-Tender (NIT)

RBI/Kolkata Regional Office/Estate/3/25-26/ET/141[RBI Kolkata 3rd Flr Renovation]

Renovation of Bank's Main Office Building, 3rd floor,
Reserve Bank of India, Kolkata- Phase I (ZTC)
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c) Minimum yearly turnover of 100% of the estimated cost i.e. ₹3.99 Crore during last 3 financial years ending March 2025, supported by audited financial statements.

d) Should furnish solvency certificate issued by applicant's Banker for the estimated cost of work i.e. the tenderers should have a Solvency of value not less than 100% of estimated cost of the work i.e. ₹3.99crore.

e) Should have proper full-fledged service setup in Kolkata or at nearby city.

2. In addition to above, intending bidders shall also submit following details and supporting documents along with PQ papers for Bank's examination:

(a)	Composition of the firm	Full particulars (whether contractor is an individual, or a partnership firm, or a company etc.,) of the composition of the firm of contractors in details should be submitted along with name(s) and address (es), of the partner's copy of the Articles of Association / Power of Attorney / such relevant document.
(b)	Work experience & Completion of similar works of specified value during the specified period	Copies of the **detailed work orders indicating date of award, value of awarded work, time given for completing the work etc.** and the corresponding **completion certificates** indicating actual date of completion and actual value of executed similar works should be enclosed in proof of the work experience. The details along with documentary evidence of previous experience, if any, of carrying out works for the Reserve Bank of India at any Centre, should also be given.
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(e)	Name(s) and address(es) of the Bankers and their present contact executives	Written Information about the names and addresses of their bankers along with full details, like names, postal addresses, e-mail IDs, telephone (landline and mobile) nos., fax nos., etc. of the contact executives (i.e. the persons who can be contacted at the office of their bankers by the Bank, in case it is so needed) should be furnished.
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(i)	Details of office setup	Address and contact details of the office set up.
(j)	Details of registration and copies of registration certificate/ documents for	PAN GST Office of Labour Commissioner, if applicable

In the event of intending bidder's failure to comply prescribed conditions, Bank reserves the right to not allow him to participate in tendering process.

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5. Tenders shall be submitted online in two parts viz. Part-I containing technical and commercial details of the offer and Part-II containing prices only. **Part-I will be opened on or after 11:30 hrs. of July 07, 2025 and techno-commercial evaluation of the same will be done**. **Firms who are meeting all the criteria will be considered for opening the Part-II (Price Bid). Part II will be opened online on subsequent date, which will be intimated to the tenderers in advance.**
6. The Reserve Bank of India reserves the right to accept or reject any or all the tenders, in full or in part, without assigning any reason thereof. The Bank also reserves the right to accept the tender of any firm. Tenderers are requested to quote unit rates

and amounts separately. They are also requested to use the enclosed proforma only (and not to use their own format).

7. The tenderers shall pay as Earnest Money a sum of **₹7,98,000/- (Rupees Seven Lakh Ninety-Eight Thousand only)** by NEFT or BG in favor of Reserve Bank of India, Kolkata, drawn on a scheduled bank along with **tender eligibility papers and statements / Annexures mentioned in Part-I of the tender and Pre-Qualification papers as given above** . After receiving the EMD and other Pre-Qualification papers, firms will be allowed to continue in the online tendering process. Last date of submission of the Pre- Qualification papers online is up to **July 07, 2025 up to 11:00 hrs**. The Earnest Money Deposit of the successful tenderer shall be released without any interest on issue of virtual completion certificate. The Earnest Money Deposit of unsuccessful tenderer shall be released to them without any interest after award of work.
8. The tenders shall be valid for a period of 90 days from the date of **opening of Part-I of the tender.**
9. The rates quoted shall be inclusive of all taxes, duties, transport, packing, forwarding, insurance etc. and shall be for the complete work duly installed and commissioned at site. The prices quoted shall remain firm for the entire period of contract and shall not be subjected to any variations in the foreign exchange or variations of any other taxes, levies, duties etc. No import license will be furnished by the Bank. The tenderers shall make their own arrangement for import of any part or components, if any, required for completion of the work. Tenderer should have GST registration number. Tenderers must quote their rates including GST levied by the Central Government and State Government. The Bank is not responsible for payment of GST for the service rendered by the contractor. It is the responsibility of the contractor to pay the GST to the tax authority.
10. The entire work of renovation of the premise shall be completed within a period of **09 calendar months from the 14th day of date of issue of work order**.
11. **The tenderers shall indicate details of the service center at Kolkata or nearby city, the staff strength, contact numbers and the availability of spares for the system.**

Place: KOLKATA

Date: May 27, 2025

Regional Director, KOLKATA

SCHEDULE OF TENDER (SOT)

e-Tender no.	RBI/Kolkata Regional Office/Estate/3/25-26/ ET/141[RBI Kolkata 3rd Flr Renovation]
Mode of Tender	Open Tender through e-Procurement System (Online Part I - Techno-Commercial Bid and Part II - Price Bid through https://mstcecommerce.com/eprocn
Publication of NIT in press	May 27, 2025
Bank's Estimated Value	₹3,99,00,000/- (Rupees Three Crore Ninety-Nine Lakhs only)
Publication of NIT on Bank's website	May 27, 2025, 17:00hrs onwards
Availability of tender on MSTC eProcurement portal https://mstcecommerce.com/eprocn	May 27, 2025, 17:00hrs onwards
Availability of tender for viewing	Up to June 16, 2025
Pre-Bid meeting	June 23, 2025 at 11:00 hrs at Estate Department, RBI Kolkata, 3rd Floor, BMOP, Kolkata - 700 001
Publication of minutes of Pre-Bid meeting/addendum, if any	On or before June 25, 2025
Last date of submission of EMD	July 06, 2025
Last date of availability of tender (Part-I and Part-II) for submission including Pre-Qualification (PQ) documents	July 07, 2025 up to 11:00 hrs
Earnest Money Deposit by NEFT / BG	EMD @2% of the total estimated cost of the tender i.e. ₹7,98,000/- has to be submitted by each bidder in the form of BG and in favour of Reserve Bank of India, Kolkata which is to be delivered in physical form at Estate Department, RBI Kolkata or through NEFT to - A/c No – 186003001. IFSC CODE – RBIS0KLPA01
Date & time of opening of Part-I i.e. Techno-Commercial Bid (Subject to fulfilling the PQ criteria). Part II of the online tender will be opened on same day or subsequent date, which will be intimated to the tenderers in advance.	On or after July 07, 2025, 11:30 hrs
Transaction Fee	Details available on the MSTC Portal

Important Instructions for E-Procurement

Bidders are requested to read the terms, conditions and specifications of this tender before submitting of online tender.

This is an e-procurement event of RBI. The e-procurement ServiceProvider/Contractor is the MSTC Limited.
You are requested to read and understand the Notice Inviting Tender and subsequent corrigenda if any, before submitting your online tender.

1) Process of E-tender:

A) Registration: The process involves vendor's registration with MSTC e-procurement portal which is free of cost. Only after registration, the vendor(s) can submit his/their bids electronically. Electronic Bidding for submission of Techno-Commercial Bid as well as Price Bid over the internet will be done. The Vendor should possess Class III signing type digital certificate. Vendors are to make their own arrangement for bidding from a P.C. connected with Internet. MSTC/RBI is not responsible for making such arrangement. (Bids will not be recorded without Digital Signature).

SPECIAL NOTE: THE PRICE BID AND THE COMMERCIAL BID HAS TO BE SUBMITTED ON-LINE ONLY AT www.mstcecommerce.com/eprocn/ (Version 3)

1) Vendors are required to register themselves online with www.mstcecommerce.com/eprocn

Register as Vendor --Filling up details and creating own user id and password Submit .
For further details, go to Download Guide /Video /Registration
Vendors will receive a system generated mail confirming their registration in their email which has been provided during filling the registration form. In case of any clarification, please contact RBI/MSTC, (before the scheduled time of the e-tender).

Contact details:

a) Contact person (MSTC) For Vendors:

HO Central Help Desk: (For vendors)
Phone Number : 07969066600
Email ID: helpdeskho@mstcindia.co.in (Please mention "HO Helpdesk" as subject while sending emails)
Availability: 9:30 AM to 5:00 PM on all working days for all Technical issues e-Tenders, System settings etc.

b) Contact person (MSTC)

Shri. Sabyasachi Mukherjee - 7278030407
Email id: smukherjee@mstcindia.co.in
Shri. Kranti Kumar– 9174009882
Email id: kkkumar@mstcindia.co.in
MSTC Help Line:9499054101/2/3/4.
Email id: helpdesk@mstcindia.co.in

c) **Contact person at Estate Department, RBI, Kolkata**

For Technical query

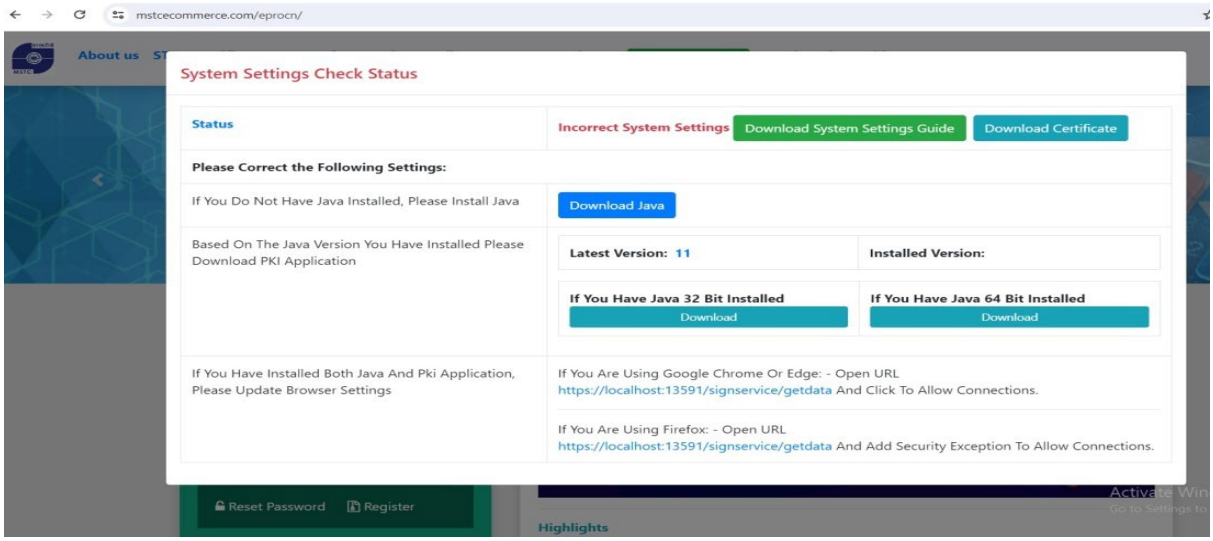
For Technical query - Civil	For Technical query - Electrical
Shri Amit Kumar (AGM – Technical) Mob- 8879996543 Email: kumaramit@rbi.org.in	Shri Rabindra Nath Kisku (Manager – Technical Electrical) Mob- 9831914122 Email: rnkisku@rbi.org.in
Shri Partha Pratim Paul (Manager – Technical Civil) Mob- 9163713817 Email: pppaul@rbi.org.in	Shri Rakesh Kumar Mishra (AM - Electrical) Mob- 8005490248 Email: rkmishra1@rbi.org.in
Shri Swagato Ray, (JE - Civil) Mob - 8017174937 Email: swagatoray@rbi.org.in	Shri Vikas Kumar, (JE - Electrical) Mob - 8587830182 Email: kumarvikas@rbi.org.in

For General Query

Shri. Suresh Manem (AGM, Estate Department)
Mob- 8019557746, manemsuresh@rbi.org.in
Shri Kiran Paul (Manager, Estate Department)
Mob- 9674033358, kiranpaul@rbi.org.in
Shri Suraj Dattatraya Rane (AM, Estate Department)
Mob- 9168828988, surajdrane@rbi.org.in

B) System Requirement:

The detailed manual is available in the link https://www.mstcecommerce.com/eprocn -->System Settings -> Download Guide/Edge Setting (for edge browsers) for configuring the system to participate in e-tender.
For more details, vendor may refer to the **Vendor Guide** and **FAQ** available at **https://www.mstcecommerce.com/eprocn**



2) The Techno-commercial Bid and the Price Bid shall have to be submitted online at https://www.mstcecommerce.com/eprocn. Tenders will be opened electronically on specified date and time as given in the Tender.
3) All entries in the tender should be entered in online Technical & Commercial Formats without any ambiguity.
4) **Special Note towards Transaction fee:** The vendors shall pay the transaction fee using "Transaction Fee Payment" Link against the specific tender in the "Bid Floor"/through the "Pay Transaction fee" in "Event catalog" through their login. Service Provider / Contractor / Vendor shall have the facility of making the payment either through NEFT or Online Payment. On selecting NEFT, Service Provider / Contractor / Vendor shall generate a challan by filling up a form. Service Provider / Contractor / Vendor shall remit the transaction fee amount as per the details printed on the challan without making change in the same. On selecting Online Payment, Service Provider / Contractor / Vendor shall have the provision of making payment using its Credit / Debit Card / Net Banking. Once the payment gets credited to MSTC's designated bank account, the transaction fee shall be auto authorized.

   Transaction fee is non-refundable. A vendor will not have the access to online e-tender without payment of the transaction fee.

   NOTE: Bidders are advised to remit the transaction fee well in advance before the closing time of the event so as to give themselves sufficient time to submit the bid.

5) Information about tenders / corrigenda shall be sent by email only during the process till finalization of tender. Hence the vendors are required to ensure that their corporate email I.D. provided is valid and updated at the time of registration of vendor with the MSTC Ltd. Vendors are also requested to ensure validity of their class III signing and encryption type of DSC (Digital Signature Certificate).
6) E-tender cannot be accessed after the due date and time mentioned in NIT (Notice inviting tender).

7) Bidding in E-tender:

All bidders need to submit EMD before opening of Part-I of the tender. The process involves Electronic Bidding for submission of Technical and Commercial Bid.

a) The vendors who have submitted transaction fee can only submit their Technical Bid and Commercial Bid through internet in MSTC website www.mstcecommerce.com→e-procurement → New Common Portal → Bid Floor Manager→ live event →Selection of the live event→ Transaction fee->Common terms->Attach Documents->Price Bid.

b) The vendors should allow running JAVA application. This exercise has to be done immediately after opening of Bid floor. Then they have to fill up Common terms/Commercial specification and save the same. After that click on the Technical bid. If this application is not run, then the vendors/ BIDDER will not be able to save/submit his technical bid.

c) After filling the Technical Bid, vendors should click 'save' for recording their Technical bid. Once the same is done, the Commercial Bid link becomes active and the same has to filled up and then vendors should click on "save" to record their Commercial bid. Then once both the Technical bid has been saved, the vendors can click on the "Final submission" button to register their bid.

d) vendors are instructed to use Attach Doc button to upload documents. Multiple documents can be uploaded.

e) In all cases, vendors should use their own ID and Password along with Digital Signature at the time of submission of their bid.

f) During the entire e-Tender process, the vendors will remain completely anonymous to one another and to everybody else.

g) The e-Tender floor shall remain open from the pre-announced date & time and for as much duration as mentioned above. All electronic bids submitted during the e- Tender process shall be legally binding on the vendors. Any bid will be considered as the valid bid offered by that vendors and acceptance of the same by the Buyer will form a binding contract between Buyer and the vendors for execution of supply.

h) It is mandatory that all the bids are submitted with digital signature certificate. otherwise, the same will not be accepted by the system.

i) Buyer reserves the right to cancel or reject or accept or withdraw or extend the tender in full or part without assigning any reason thereof.

j) No deviation of the terms and conditions of the tender document is acceptable. Submission of bid in the e-Tender floor by any vendors confirms his acceptance of terms & conditions of the tender.

k) Any order resulting from this tender shall be governed by the terms and conditions mentioned therein.

l) The tender inviting authority has the right to cancel this e-Tender or extend the due date of receipt of bid(s) without assigning any reason thereof.

m) Vendors are requested to read the vendors guide and see the video in the page www.mstcecommerce.com/eprocn to familiarize them with the system before bidding.

8) Any order resulting from this open e-tender shall be governed by the terms and conditions mentioned therein.

9) No deviation to the technical and commercial terms & conditions are allowed.

10) RBI, Kolkata has the right to cancel this e-tender or extend the due date of receipt of bid(s) without assigning any reason thereof.

11) The online tender should be submitted strictly as per the terms and conditions and procedures laid down in the website https://www.mstcecommerce.com/eprocn of MSTC Ltd.

12) The tenderers must upload all the documents required as per terms of NIT. Any other document uploaded which is not required as per the terms of the NIT shall not be considered.

13) The bid will be evaluated based on the filled-in technical & commercial formats.

14) The documents uploaded by tenderer(s) will be scrutinized. In case any of the information furnished by the tenderer is found to be false during scrutiny, EMD of defaulting tenderer(s) will be forfeited. Punitive action including suspension, banning of business and debarment can also be taken against defaulting tenderers.

E-tender cannot be accessed after the due date and time mentioned in NIT.

Bidding in e-tender:

EMD of **Rs.7.98 lakh /-** in the form of Demand Draft drawn in favour of Reserve Bank of India, of a Scheduled Bank or Bank Guarantee as per proforma annexed hereto shall be deposited in original at the office of tender inviting authority on or before the due date 06.07.2025.

EMD can also be remitted to Reserve Bank of India Account of on or before 06.07.2025. The account details for NEFT transactions are as under:

a) The account details for NEFT/RTGS transactions are as follows.

Beneficiary Name: Reserve Bank of India, Kolkata
A/c No – 186003001.
IFSC CODE – RBIS0KLPA01
Remarks: <Work Description and Company Name>
Proof of remittance with transaction number (Scanned copy) shall be attached/ uploaded.
The bidders are also advised to send the proof of remittance with transaction number (scanned copy) to **estateKolkata@rbi.org.in**

Place **Signature of bidder with seal**

Date

SECTION - I

Form of Tender

Place:
Date:

Regional Director
Reserve Bank of India
Kolkata-700001

Dear Sir,

Having read and examined the Notice Inviting e-Tender, Specifications, Drawings, designs, schedule of quantities, various schedules, General conditions of contract and clauses, Special conditions of contract, General rules and instructions to bidders and all other contents in the tender document for the work specified in the memorandum hereinafter set out and having examined the site of the works and having acquired the requisite information relating thereto as affecting the tender, I/We hereby offer to execute the works specified in the said memorandum within the time specified in the said memorandum at the rates mentioned in the attached schedule of quantities and in accordance in all respects with the specifications, designs, drawings and instructions in writing referred to in Conditions of Contract, the Articles of Agreement, Special Instructions, Schedule of Quantities and Special Conditions of Contract and with such materials as are provided for, by and in all other respects in accordance with such conditions so far as they may be applicable.

Memorandum

(a)	Description of work	Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)
(b)	Estimated cost (₹)	As specified in Schedule 'E' of the Tender
(c)	Earnest Money (₹)	As specified in Schedule 'E' of the Tender
(d)	Performance Guarantee	Bank Guarantee from any Scheduled Bank for an amount equal to 5% of the Contract Amount
(e)	Percentage, if any, to be deducted from each bill	5% of each RA bill & final bill
(f)	Time allowed for completion of the work	As specified in Schedule 'E' of the Tender

2. We agree to keep the tender open for the validity period specified in Schedule 'E' of the tender and not to make any modification in its terms and conditions during the validity period or any other extended period as agreed mutually.

3. A sum of **₹7.98 lakh** only is hereby forwarded/uploaded in the form as specified in Schedule 'E' of the tender document as Earnest Money. If I/We, fail to furnish the prescribed performance guarantee within the prescribed period, I/We agree that the Reserve Bank of India or its successors, in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I/We fail to commence work as specified, I/ We agree that Reserve Bank of India or its successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said performance guarantee absolutely. The said Performance Guarantee shall be a guarantee to execute all the works referred to in the tender document upon the terms and conditions contained therein. In case of non-submission of EMD till submission date, the bid will be considered as non-bonafide and hence, the price bid of that particular bid will not be opened.

4. Further, I/We agree that in case of forfeiture of Earnest Money or Performance Guarantee as aforesaid, I/We shall be debarred from participation in the re-tendering process of the work.

5. I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Reserve Bank of India, then I/We shall be debarred from tendering in Reserve Bank of India in future. Also, if such a violation comes to the notice of Reserve Bank of India before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee.

6. I/We hereby declare that I/We shall treat the tender documents, drawings and other records connected with the work as secret/confidential documents and shall not communicate information/derived therefrom to any person other than a person to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the Reserve Bank of India.

7. Should this tender be accepted, I/We hereby agree to abide by and fulfill the terms and provisions of the said Conditions of Contract annexed hereto so far as they may be applicable or in default thereof to forfeit and pay to the Reserve Bank of India the amount mentioned in the said conditions.

8. Our bankers are (Name and full address)

(i)	
(ii)	

The names of partners, if applicable, of our firm are:

(i)	
(ii)	

Name of the partner of the firm authorized to sign	
OR	
Name of person having power of Attorney to sign the Contract (certified true copy of the Power of Attorney should be attached)	

Yours faithfully,

Signature of Contractor with seal
Signatures and addresses of witnesses

Sr. No.	Signature	Address
(i) (ii)		

Section II

1. SCOPE OF WORK

1.1 Description of Work:

Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC).

The scope of proposed work includes Civil, Sanitary & Plumbing, Interior Furnishing including Acoustical works & partition, Electrical works, Electro-Mechanical, AC ducting, sprinkler Firefighting, etc. as per the approved layout plans, working detailed drawings, design details, Schedule of quantities and Specifications given in this tender document. Some of the major items of works covered are listed below (in brief):

A) CIVIL WORKS

i. Dismantling of brick wall, flooring, old plaster, skirting/wall dado, removal of existing doors, m.s. windows, wooden partition, wall paneling, etc.
ii. Toilet Renovation- compact solid laminate partition, acrylic sheet solid surface basin top on kodappa slab, ceramic/vitrified tiles for floor/dado,
iii. Replace existing old MS window with aluminium factory made system window
iv. Vitrified tiles/wooden flooring
v. Masonry works for walls, plastering works,
vi. Finishing works like wall putty, painting, etc.
vii. Sanitary and plumbing works, etc.

B) INTERIOR WORKS

i. Low/ full height laminated plywood partition,
ii. MS framing for seating gallery in Class rooms and Stages
iii. Acoustical Partition for Classrooms upto ceiling level
iv. False ceiling work
v. Laminated flooring work for classrooms
vi. Wall/column paneling
vii. Acoustical Doors, etc.

C) ELECTRICAL, AC ducting & sprinkler firefighting works

i. Internal Electrical Installation
ii. Cabling
iii. AC Ducting works- Main Ducting cleaning, New Branch Ducting, Dampers, Grill, Glass wool insulation, Air filters.
iv. Internal lighting
v. TV and telephone system
vi. Earthing and lightening protection,
viii. Sprinkler Fire Fighting system
    a. Laying of pipe lines including its connection to main riser pipe
    b. Water sprinklers, etc.

1.3 It is not the intent to specify completely herein all details of work covered under this enquiry. Scope of work may also include such other related works as indicated in the drawings and /or schedule of quantities although they may not be specifically mentioned in the above paragraphs and all such incidental items of works not specified but reasonably implied and necessary for completion of the job as a whole, as directed by the Engineer-in-Charge. All works shall confirm in all respects to high standards of engineering, design and workmanship and shall, fulfil the anticipated performance during the CONTRACTOR's Defect Liability Period / warranty period in a manner acceptable to the Engineer-in-Charge who shall have the power to reject any works or materials which in his judgement are not in full accordance with the specification requirements.

1.4 Various works covered in this specification shall include design of components and systems, furnishing of all materials, labour, tools, plants and equipment, transportation, fabrication, fixing, installation, supervision and execution as per schedule of quantities, technical specifications, drawings/plans, etc. as provided herein and as directed by the Engineer-in-Charge

I/We hereby declare that I/we have read and understood the above information.

Signature of Tenderer with seal

Place

Date

Section III: General Rules and Instructions to the Bidders

1. The Bidder who fulfil the following minimum **pre-qualification criteria** shall be eligible to participate in tendering process.

PRE-QUALIFICATION CRITERIA

A	Composition of the firm/ organization	Details of Registration of the firm/organization - whether Sole Proprietorship/ Partnership firm /Private Limited/ Limited or Cooperative Body etc. - Name of Registering Authority, Date, and Registration number, etc.	Bidder should fill up information in **Format 1 and Format 1A** annexed hereto and submit along with the following supporting documents. (i) Copy of registration certificate. (ii)Copy of the Articles of Association/ Power of Attorney/other relevant document (iii)copy of Goods and Service Tax registration certificate (iv) Details of registration of labour along with EPF and ESI documents, if any.
		The Bidder should have valid Goods and Service Tax registration	

B	Duration of past Experience	The bidder should have minimum 5 years of experience of executing similar work/s*. Bidder shall submit the documentary evidence in support of minimum experience of 5 years (i.e. the bidder should have undertaken similar work/s* prior To …….(last day of month previous to the one which applications are invited) and work has since been completed.	i) Bidder should fill up the information in **Format 2** annexed hereto indicating client-wise names of similar work(s), awarded and actual cost(s), completion date stipulated in contract and actual dated of completion date, etc. and should submit along with the documentary evidence as proof of minimum 5 years of experience of completed similar work/s * viz. copies of detailed **work order/s** for qualifying works indicating date of award, contract amount, time given for completing the work, etc. and the corresponding **completion certificate(s)** indicating actual date of completion and actual value of executed similar work/s issued by the client(s) for works executed for government /public sector companies and copies of work order, work completion certificate along with **Tax Deducted at Source (TDS) certificate(s)** issued by the client(s) for works executed for private companies. ii) Bidder should also fill up the information about similar work/s* **on hand** in the **Format 2A** annexed hereto and should submit along with supporting documents viz. copies of work order/s with details of items of work, issued by the client(s) for the work/s in progress. iii) The details along with documentary evidence of previous experience, if any, of carrying out works for the Reserve Bank of India at any centre, should also be given.

C	Minimum value of each completed similar work/s (qualifying) during specified period	The bidder should have experience of successfully completed similar work/s ***** during last 5 years ending on ……should be either of the following: i) Three completed similar works * each costing not less than the amount equal to ₹1.6crore i.e. 40% of estimated cost of the work. **or** ii)Two completed similar works * each costing not less than the amount equal to ₹2.0crore i.e. 50% of estimated cost of the work **or** iii) One completed similar work * each costing not less than the amount equal to **₹3.2crore** i.e. 80% of estimated cost of the work.	Bidder should fill up the information in **Format 3** annexed hereto and submit along with the following documents as proof of having successfully completed similar work/s *. (i)Copies of detailed **work order/s** for qualifying works indicating date of award, contract amount, time given for completing the work, etc. and the corresponding **completion certificate(s)** indicating actual date of completion and actual value of executed similar work/s issued by the client(s) for works executed for government /public sector companies and copies of work order, work completion certificate along with **Tax Deducted at Source (TDS) certificate(s)** issued by the client(s) for works executed for private companies. (ii)**Client certificate/s** for **each of the qualifying** work as per the **Format 3A** annexed hereto.
D	Annual financial turnover	The tenderer shall possess Annual Financial Turnover of ₹3.99crore i.e. 100% of the estimated cost or more during the last three consecutive financial years ending 31st March. Income Tax Assessment Orders along with the latest final accounts of the business of the contractor duly certified by a Chartered Accountant should be enclosed in proof of their creditworthiness and turnover	Bidder should fill up the information in **Format 4** annexed hereto and submit along with the following documents (i) Copies Audited financial statements/ accounts of the business of the bidder duly **certified by a Chartered Accountant** indicating the turnover for financial years referred in the **format 4**. (ii) Copies of the **Income Tax Clearance Certificates / Income Tax Assessment orders** duly certified by a Chartered Accountant as a proof creditworthiness

E	Solvency	The tenderers should have a Solvency of value not less than 100% of estimated cost of the work i.e. ₹3.99crore.	(i) Bidder should submit solvency certificate issued by their Banker. (ii) Bidder should also submit Banker's certificate as per **Format 5** annexed hereto from their Banker. (iii) Names and addresses of Bankers along with full details, like names, postal addresses, e-mail IDs, telephone (landline and mobile) nos., fax nos., etc. of the contact executives (i.e. the persons who can be contacted at the office of their bankers by the Bank, in case it is so needed) should be furnished.
F	Registration for GST payment	The bidder should have valid Goods and Service Tax (GST) registration	Copy of GST registration certificate shall be submitted
G	Electrical license	The bidder should have valid electrical license duly issued by state Authority.	A photocopy of the same certificate shall be uploaded along with tender documents.
H	EPF & ESI registration	The bidder should have EPF & ESI registered.	A photocopy of the same EPF & ESI registration certificate shall be uploaded along with tender documents.

Note:

(i) ***Similar work** shall mean 'interior building renovation works of office/s interiors, technology driven training room with electrical works under one contract.

(ii) Components of work executed other than those included in definition of similar work shall be deducted while calculating cost of similar work. Bidder shall submit abstract of cost of work in support of this.

(iii) In respect similar work completion certificate(s), client certificate(s) issued by the private companies shall also accompany copy of Tax Deducted at Source (TDS) certificates. Bids received without the specified certificates shall be rejected and the Bank shall have the right to verify/ cause verification of authenticity of the said documents whenever felt necessary.

(iv) Regarding client's certificate for qualifying similar completed works carried out for Government/public sector companies, the certificate should be

signed by the concerned Executive Engineer or an officer in an equivalent or higher rank. For qualifying similar completed works carried out for private companies, shall accompany Tax Deducted at Source (TDS) certificates has to be submitted for proving the credentials/contract amount.

(v) Bank reserve its right to obtain the performance reports from the clients for the qualifying work/s, Banker/s report of the Bidders directly, if so desired. The Bank on its own may also conduct inspection of their work eligible/qualifying works referred by the Bidder in their bid.

(vi) It is clarified that the work executed by the applicant for their in-house or capital use will not be considered for the purpose of work experience of completion of similar works.

(vii) **All information called for in the annexed formats should be furnished against the relevant columns** in the formats. If for any reason, information is furnished on a separate sheet, this fact should be mentioned against the relevant column. Even, if no information is to be provided in a column, a '**nil'** or **'no such case'** entry should be made in that column. If any particular/query is not applicable in case of the bidder, it should be stated as **'Not applicable'** Tender document shall contain all the enclosures mentioned and copies shall be self-attested.

(viii) The bid submitted by a bidder who is found to be not satisfying the above prequalification criteria will be disqualified. Bids containing false and /or incomplete information are liable for rejection.

2)	**Bids in Two bid system**
	The tender in two parts (Part I comprising of duly filled tender part I, EMD Receipt/ Screenshot, technical bid/details, literature etc. and Part II comprising of duly filled-in tender part II) should be submitted online as e-Tender using digital signature not later than the date and time of submission of tender/bid on line (as specified in schedule 'E'). Tender inviting authority and Name of work, office are specified in schedule 'E'. No tender will be accepted after the specified date and time for submission of tender under any circumstances whatsoever. Bids shall be submitted online only and those received in physical form, by telegram or telex and those received late will not be entertained
3)	The eligible bidders are advised to follow **the important instructions of e-Tender specified in Schedule 'H'** and must have valid class III / applicable digital signature to submit the bid.
4)	**Documents Comprising Tender/ Bid**

	Part I: (Techno-Commercial Bid)		
	a)	Form of Tender/Bid	
	b)	e-tender transaction fee shall be paid as specified in schedule 'E'	
	c)	Earnest Money Deposit (EMD)/Bid Security in approved format as specified in Schedule C.	
	d)	Power of Attorney (as per Proforma annexed hereto) in favour of person signing the Bid	
	e)	Duly filled-in and digitally signed tender document consisting of:	
		i)	Entire Tender Document Section I to Section IX
		ii)	EMD Receipt
	Part II: (Price Bid)		
	Schedule of Quantities, duly filled-in online through MSTC portal only		
5)	**Clarifications and pre-bid meeting**		
	If the bidder shall have any doubt as to the meaning of any portion general rules and instructions to bidders, general conditions, or the special conditions or the scope of the work or the specifications and drawings or any other matter concerning the work, he shall in good time, before the scheduled date of Pre-bid meeting, put forth the particulars thereof and submit them to the RBI, in writing, addressed to the Tender Inviting Authority, specified in Schedule 'E' in order that such doubts may be clarified authoritatively during Pre-bid meeting and shall be conveyed to all the bidders in due course. Once a tender is submitted, the matter will be decided according to tender conditions in the absence of such authentic pre-clarification.		
	In order to explain the scope of work, other details and to clarify any issues/ queries raised by the bidders, a Pre-bid meeting shall be arranged on the date, time and venue specified in Schedule 'E'. The bidders are advised to peruse the tender and visit the site and submit any matter requiring clarification to the RBI latest by 5:00 PM on the previous working day of Pre Bid meeting. In case the bidder wishes to include any condition while tendering for the work, he will have to submit the same before the pre-bid meeting to enable the RBI to examine/ consider the same. RBI's decision in the matter shall be conveyed to all the bidders after pre-bid meeting but before the scheduled date of submission of the tenders. All the bidders are advised to attend the Pre-bid meeting mandatorily. Any tender received with any deviation/ Condition is liable for rejection.		
6)	**Amendment to Tender document**		
	a)	At any time prior to the deadline for the submission of tender/bids, RBI may, for any reason, whether at its own initiative or in response to a clarification or query raised by a prospective Bidder, modify any part of the tender document by an amendment and will be uploaded on website. No separate press advertisement shall be issued for any corrigendum/addendum.	

	b)	The said amendment in the form of the addendum/ corrigendum will be made available on website of RBI to all the prospective bidders to whom the tender documents issued online and this communication will be in writing and same shall be binding on the bidders. The prospective bidders should promptly acknowledge receipt of the addendum/corrigendum by fax/courier/e-mail to RBI. The addendum (s), if any, issued will form part of the contract document.
	c)	In order to afford prospective Bidders reasonable time for preparing their Bids after taking into account such amendments, the RBI may, at its discretion, extend the deadline for submission of Bids.
7.	**Item Rate Tender**	
	The Bidder should note that unless otherwise stated, the tender is strictly on item rates basis and his attention is drawn to the fact that rates for each and every item should be correct, workable and self-supporting. The quantities in the Schedule of Quantities approximately indicate the total extent of work, but may vary to any extent and may even be omitted thus altering the aggregate value of the Contract. Rates quoted shall remain firm for a variation of plus (+)25% of the specified quantities of each item in the Schedule of Quantity (except AHR items, for which it is upto tender quantity).	
8.	**Site Visit**	
	The tenderer is advised to visit the site of work, at his own cost, and examine it and its surroundings to himself collect all information that he considers necessary for proper assessment of the prospective assignment.	
9.	**Manpower resources**	
	The tenderer should have minimum strength of qualified / skilled persons required for successful implementation of the project and shall furnish the details in Format 6.	
10.	**Debarment**	
	A bidder is liable for debarment/disqualification from bidding on the following grounds:	
	1	If it is determined that the bidder has committed the following acts or omissions in contravention of the code of integrity: (i) a. making offer, solicitation or acceptance of bribe, reward or gift or any material benefit, either directly or indirectly, in exchange for an unfair advantage in the procurement process or to otherwise influence the procurement process. b. any omission or misrepresentation that may mislead or attempt to mislead so that financial or other benefit may be obtained or an obligation avoided.

		c. any collusion, bid rigging or anticompetitive behavior that may impair the transparency, fairness and the progress of the procurement process. d. improper use of information provided by the procuring entity to the bidder with an intent to gain unfair advantage in the procurement process or for personal gain. e. any financial or business transactions between the bidder and any official of the procuring entity related to tender or execution process of contract: which can affect the decision of the procuring entity directly or indirectly. f. any coercion or any threat to impair or harm, directly or indirectly, any party or its property to influence the procurement process. g. obstruction of any investigation or auditing of a procurement process. h. making false declaration or providing false information for participation in a tender process or to secure a contract; (ii) failed to disclose conflict of interest. (iii) failed to disclose any previous transgressions made in respect of the provisions of sub-clause (i) with any public institution / entity in India or any other country during the last three years or of being debarred by any public procuring institution / entity.
	2	For any actions or omissions by the bidder other than violation of code of integrity, which in the opinion of the Bank warrants debarment, for the reasons like supply of sub-standard material, non-supply of material, abandonment of works, sub-standard quality of works, failure to abide terms of the tender etc.
	3	If the bidder has been convicted of an offence— (a) under the Prevention of Corruption Act, 1988; or (b) the Indian Penal Code or any other law for the time being in force, for causing any loss of life or property or causing a threat to public health as part of execution of a public procurement contract.
	The tenderer has to submit an undertaking in **Format at Annex 9** of Schedule XIV	
11.	**Preparation of bid and Cost of bidding**	
	a)	The bidder must obtain for himself on his own responsibility and at his own expenses all the information which may be necessary for the purpose of making a tender and for entering into a contract and must examine the drawings and must inspect the site of the work and acquaint himself with all local conditions, means of access to the work, nature of the work and all matters pertaining thereto.

	b)	The Contractor shall be deemed to have carefully examined the work and site conditions including labour, the general and special conditions, the specifications, schedules and drawings and shall be deemed to have visited the site of work, to have fully informed himself regarding the local conditions and carried out his own investigations to arrive at the rates quoted in the tender. In this regard, he will be given necessary information available with the RBI but without any guarantee about its sufficiency and accuracy.
12.	**Format to be used**	
	The bidder must fill up and submit only the tender forms/formats issued (online) by the RBI, stating at what rate he is willing to undertake each item of the work. Tenders, which propose any alteration in the work specified in the said form of invitation to tender, or in the time allowed for carrying out the work, or which contain any other conditions of any sort, including conditional rebates, will be liable for rejection.	
13	**Filling of Rates**	
	a)	Rates should be quoted for each item of work both in figures and words in columns specified in the Schedule of Quantity. Care shall be taken to avoid discrepancy in the rate given in figures and words. The amount for each item should be worked out and requisite totals should be given in the specified column.
	b)	In the event, no rate has been quoted for any item(s), leaving space both in figure(s), word(s) and amount blank, the tender shall be considered incomplete and shall not be considered.
	c)	No advice of any change in rate or conditions after the opening of the tender will be entertained.
14.	**Earnest Money Deposit (EMD)/ Bid security**	
	a)	The bidders are required to submit Earnest Money Deposit (EMD)/ Bid Security for an amount and in the manner as specified in Schedule 'E'.
	b)	A tender, which is not accompanied by EMD, will not be considered. It will be considered non bonofied. The Earnest Money will be refunded to the bidder if his tender is not accepted but without any interest.
	c)	The Earnest Money Deposit paid by the successful bidder will be released after award of work on submission of Performance Bank Guarantee. No interest shall be paid on the said deposit.
15.	**Signing of Bid, Power of Attorney**	
	a)	Each of the tender documents should be digitally signed as per instruction of e-tender specified in Schedule 'H' hereto by the person or persons submitting the tender in token of his/their acquainted himself/themselves with the General Rules and Instructions to bidders including prequalification criteria, General Conditions of Contract,

		Specifications, Special Conditions and other terms and conditions etc. as laid down.
	b)	The tender submitted online on behalf of a firm must be digitally signed as per instructions of e-tender specified in Schedule 'H', it must be digitally signed on his behalf by a person holding a power-of attorney authorizing him to do so, such power of attorney to be uploaded along with the tender, or it must be digitally signed by a partner who has the necessary authority on behalf of the firm to enter into the proposed contract and it must disclose that the firm is duly registered under the Indian Partnership Act, 1952. Otherwise the tender may be rejected by RBI. In case of company, a copy of resolution passed in the meeting authorizing POA.
	c)	Bidders shall submit online along with Part-I of the tender, a power of attorney, on a stamp paper of appropriate value and duly notarized, in favour of the person digitally signing the Bid documents authorizing him to sign the Bid documents, make corrections/ modifications thereto and interacting with Reserve Bank of India and act as the contact person. The proforma of the power of attorney shall be as annexed hereto.
16.	**Modification / substitution / Withdrawal of Bids**	
	a)	No modification or substitution of the submitted Bid shall be allowed after the due date and time of submission of the tender.
	b)	A Bidder may withdraw its submitted Bid, provided that written notice of the withdrawal is received by RBI before the last date for submission of Bids. In case a Bidder wants to resubmit his Bid, he shall submit within the due date a fresh Bid following all the applicable conditions.
	c)	Only a single copy of the withdrawal notice shall be prepared and each page of the notice shall be signed and stamped by the authorized signatory. The notice shall be duly marked "WITHDRAWAL"
17.	**Bid Due Date**	
	Bids should be submitted online as specified in instructions to e-Tender on or before the stipulated time and date as specified in Schedule 'E'. Reserve Bank of India may, in exceptional circumstances, and at its sole discretion, extend the Bid due date.	
18.	**Late bids**	
	No bid will be received after the due date/last date and time specified for submission of bids in schedule 'E' or after the extended Bid due date. If any.	

19.	**Opening of Bids**	
	Duly filled tender Part I, accompanied by EMD, technical details, if any, literature etc., called Part I of the tender, will be opened on e-Tender mode on the time and date, as specified in Schedule 'E', at his office, by the tender inviting authority, as specified in Schedule 'E' or his authorized representative in the presence of authorized representatives of the bidders who choose to be present. Duly filled-in tender- Part II will be opened on the time and date, as specified in Schedule 'E', at his office, by the tender inviting authority, as specified in Schedule 'E' in presence of the authorized representatives of the qualified bidders.	
20.	**Bid Validity**	
	Tenders shall remain open to acceptance by the RBI for a period as specified in Schedule 'E' from the date of opening of the Part-I of the tender which period may be extended by mutual agreement and the bidder shall not cancel or withdraw the tender during this period.	
21.	**Clarification & Evaluation of Bids**	
	RBI would subsequently examine and evaluate bids as below:	
	a)	After verification of the correctness/legality and adequacy of the information and supporting documents furnished, Price Bids of only those Bidders who are technically qualified as per part I of tender shall be opened.
	b)	Rates quoted for each item shall be considered during verification/ scrutiny.
	c)	If the rates written in figures and in words do not tally, then the rates quoted by the contractor in words shall be taken as correct.
	d)	Where the rates quoted by the contractor in figures and in words tally, but the amount is not worked out correctly, the rates quoted by the contractor will be taken as correct and the amount will be worked out accordingly.
	e)	To assist in the examination, evaluation and comparison of the bid, RBI may ask Bidders individually for clarifications. The request for clarification and the response shall be in writing. No change in the price or substance of the Bid shall be sought, offered or permitted except as required to during the evaluation of Bids in accordance with tender clauses.
	f)	In the case of any tender where unit rate of any item/items appears unrealistic, such tender will be considered as unbalanced and in case the tenderer is unable to provide satisfactory explanation, such a tender is liable to be disqualified and rejected.

	g)	In case the lowest tendered amount (worked out on the basis of quoted rate of Individual items) of two or more bidders is same, then such lowest bidders may be asked to submit a revised offer quoting percentage discount on their already quoted tendered amount which shall be applicable on all tender items except buy-back amount. The lowest tender shall be decided on the basis of revised offer. Further, if any such lowest bidder does not revise his bid on lower side, his original bid shall remain valid for further processing.
	h)	If the revised tendered amount (worked out on the basis of quoted rate of individual items) of two or more bidders received in revised offer is again found to be equal, then the RBI shall decide future course of action which shall be final and binding on all the bidders.
22.	**Acceptance of Tender and Award of Work**	
	On receipt of intimation from the RBI of the acceptance of his/their tender, the successful bidder shall be bound to implement the contract and within fourteen days from the date of issue of work order thereof, the successful bidder shall sign an agreement in accordance with the draft articles of agreement. Further, the written acceptance by the Reserve Bank of India of a tender will constitute a binding contract between the Reserve Bank of India and the person so tendering, whether such formal agreement is or is not executed subsequently.	
23.	**Performance Bank Guarantee**	
	The Contractor whose tender is accepted will be required to furnish performance Bank Guarantee equal to 5% of the contract amount within the period specified in Schedule 'F'. In case of delays in submission of unavoidable circumstances, charge for delay in submission of Performance Bank Guarantee shall be recovered from the bills of the contractor at Bank rate. This guarantee shall be from any Scheduled Bank as per the approved proforma annexed hereto and its validity upto completion of defect liability period (DLP).	
24.	**Retention Money/ Security Deposit**	
	a)	In addition to the Performance Bank Guarantee under para xix above, as further security for the due fulfillment of the contract by the Contractor, 5% of the value of the work done will be deducted by the RBI from each payment to be made to the Contractor towards Retention Money. This total amount (Performance Bank Guarantee + Retention Money) will be termed as Security Deposit. Earnest Money Deposit (EMD) will be released after award of work and on submission of Performance Bank Guarantee (PBG). RBI will release the Performance Bank Guarantee after completion of the Defect liability period i.e. One Year from the virtual completion of the work and the remaining Security Deposit after rectification of the defects pointed out during the Defects Liability Period. The amounts retained by the RBI shall not bear any interest.

	b)	All compensation or other sums of money payable by the Contractor to the Employer under the terms of this Contract may be deducted from the security deposit if the amount so permits and the Contractor shall, unless such deposit has become otherwise payable, within ten days after such deduction make good in cash the amount so deducted.
	c)	The security deposit of the successful bidder will be forfeited if he fails to comply with any of the conditions of the Contract.
25.	**Taxes/ Duties/ Levies**	
	a)	Goods and service tax (GST), purchase tax, turnover tax, Excise duty or any other tax applicable in respect of this contract shall be payable by the Contractor and RBI will not entertain any claim whatsoever in respect of the same.
26.	**Time for Completion of Work**	
	Time allowed for carrying out the work as mentioned in the Schedule 'E' shall be strictly observed by the Contractor and it shall be reckoned from the 14th day from the date of the written work order.	
27.	**Work Programme**	
	The work shall throughout the stipulated period of the contract be proceeded with all due diligence and if the Contractor fails to complete the work within the specified period, he shall be liable to pay compensation as defined in the relevant clause of the General Conditions of Contract. The bidder shall, before commencing work, prepare a detailed work programme, as specified in the General Conditions of Contract, which shall be approved by the Engineer-In-Charge.	
28.	**RBI/Employer's right to accept or reject any or all the bids**	
	Notwithstanding anything mentioned above, RBI reserves the right to accept or reject any Bid at any time prior to award of contract without thereby incurring any liability to the affected Bidder or Bidders. The RBI/Employer shall not assign any reason for rejection of any or all Bids.	
29.	**Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central (Amendment) Rules, 2017**	
	Applicable Labour Cess as per the above Act shall be paid by the Bank to the concerned authorities after deducting from amount due to the contractor. The bidders shall include the said cess in their quote.	
xxvi)	**Compliance to Office Memorandum issued by Department of Expenditure, Ministry of Finance, Government of India – Rule 144(xi), General Financial Rules (GFR), 2017**	

	i) Compliance with the Rule 144(xi) of GFR 2017 inserted vide Office Memorandum (OM) F. No. 6/18/2019-PPD dated July 23, 2020 issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, Government of India, the Public Procurement Orders issued in furtherance thereto, and their subsequent revisions shall be mandatory. ii) In this regard, Bidder shall submit a copy of Undertaking / Declaration / Certificate on their letter head duly sealed and signed by the authorized signatory in the format given at Annex 10 / Section XIII iii) If the Undertaking / Declaration / Certificate submitted by the bidder is found to be false, his/her/its tender / work order will be immediately terminated, and legal action in accordance with law including forfeiting of Earnest Money Deposit / Performance Bank Guarantee / Security Deposit may be initiated and the Bank may also debar the bidder from participating in the tenders invited by the Bank in future

I/We hereby declare that I/we have read and understood the above instructions.

Place **Signature of bidder**
Date

Terms of Payment

The payment for the works to be executed under this contract shall be made as follows and no variation in the mode of payment will be acceptable to the Reserve Bank of India.

Payment will be made based on the submission of RA Bills as per milestone decided by the Bank. Milestone shall be followed in the following manner:

	Milestone Period	Amount	Cumulative amount
1st	90 Days from award of the work excluding 14 days Period granted for execution of Agreement, submission of BG & Insurance and other documents.	Rs.50lakh	Rs.50lakh
2nd	90 days from the date of First milestone	Rs.1.0crore	Rs.1.50crore
3rd	90 days from the date of Second milestone	Rs.2.49crore	Rs.3.99crore

Note: In case of non-achievement of milestones as mentioned in the above chart, amount corresponding to the unfinished work will be withheld with the Bank. However, if the contractor succeeds in achieving the subsequent milestone as per prescribed timeline, then the withhold amount will be released along with payable of that milestone.

Section IV General Conditions of the Contract

Definitions	1.	The Contract means all the documents forming the tender and acceptance thereof together with any correspondence leading thereto and the formal agreement executed between the competent authority on behalf of the Employer and the Contractor, together with the documents referred to therein including the General Conditions, Special Conditions, General rules and instructions to bidders, the Technical specifications, designs, drawings, correspondences exchanged and instructions issued from time to time by the Engineer in-Charge. All these documents taken together, shall be deemed to form one contract and shall be complementary to one another.	
	2.	In the contract, the following expressions shall, unless the context otherwise requires, have the meanings, hereby respectively assigned to them:-	
		i)	The expression works or work or Project shall, unless there be something either in the subject or context repugnant to such renovation /construction be construed and taken to mean the works by or by virtue of the contract contracted to be executed whether temporary or permanent, and whether original, altered, substituted or additional, as defined in Schedule 'F'
		ii)	The Site shall mean the land/or other places on, into or through which work is to be executed under the contract including any building and erections thereon or any adjacent land, path or street through which work is to be executed under the contract or any adjacent land, path or street which may be allotted or used for the purpose of carrying out the contract, as defined in Schedule 'F'.
		iii)	Employer shall mean The Reserve Bank of India (as mentioned in schedule 'F') and shall include its assignees and successors
		iv)	RBI shall mean Reserve Bank of India, having its Regional Office at Kolkata.
		v)	Tender document shall mean document named as such issued/ uploaded by the Employer to the bidders for inviting Bids for the Project / work.
		vi)	Day shall mean Calendar day
		viii)	Month shall mean the calendar month.
		ix)	Year shall mean Calendar Year

		x)	Bidder (s) shall mean all parties participating in the bidding process pursuant to and in accordance with the terms of the Tender document.
		xi)	The Contractor shall mean the individual, firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representative of such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assignees of such individual, firm or company.
		xii)	Sub-Contractor means the person or persons, firm or company engaged by the Contractor for executing any part or to whom any part thereof has been sub-let with the consent in writing of the Employer
		xiii)	The Engineer-in-charge means the Engineer Officer employed and paid by the Employer and acting under the orders of the Employer who shall supervise and be in-charge of the work.
		xiv)	The Authorized representatives of Engineer-in-charge (AGM(Tech)/Manager(Tech)/AM(Tech)) means the Engineer officers employed and paid by the Employer and acting under the orders of the Employer who shall supervise day to day execution of work under the direction and guidance of Engineer-in-Charge.
		xv)	Contract Price or Contract Amount shall mean the total amount as calculated from quoted unit rates by the successful bidder and quantities mentioned in the Schedule of quantities (Price Bid) and as accepted by the Employer and indicated in the letter of award of work.
		xvi)	Contract Period shall mean the period specified in the tender document for execution of the contract/ completion of the work, including any authorized extended period by the Employer
		xvii)	Contract Agreement shall mean the agreement signed between the Contractor and the Employer for the execution of the Project.
		xviii)	Notice in writing or written notice shall mean a notice in written, typed or printed characters sent (unless delivered personally or otherwise proved to have been received) by registered post to the last known private or business address or registered office of the addressee and shall be deemed to have been received when in the ordinary course of post, it would have been delivered and/or sent. The communication delivered by any accepted electronic means shall also be deemed to be a written notice.

		xix)	Act of Insolvency shall mean any act of insolvency as defined by the Presidency Towns Insolvency Act, or the Provincial Insolvency Act or any Act amending such original.
		xx)	Manufacturer refers to a person or firm who is the producer and furnisher of the material or designer and fabricator of equipment
		xxi)	Contractor's Works or Manufacturer's Works shall mean and include the land and other places which are used by the CONTRACTOR/ FABRICATOR or SUB-CONTRACTOR/ SUB-FABRICATOR for the manufacture of "Equipment" or performing the "Works".
		xxii)	Market Rate shall be the rate as decided by the Engineer-in Charge on the basis of the cost of materials and labour at the site where the work is to be executed plus the percentage mentioned in Schedule 'F' to cover all overheads and profits.
		xxiii)	Net Rate/Price - If in arriving at the contract amount the Contractor shall have added to or deducted from the total of the items in the Tender any sum, either as a percentage or otherwise, then the net price of any item in tender shall be the sum arrived at by adding or deducting from the actual figure appearing in the Tender as the price of that item a similar percentage or determining the percentage or proportion of the sum so added or deducted by the contractor the total amount of any Prime Cost items and provisional sums of money shall be deducted from the total amount of the tender. The expression "net rates" or "net prices" when used with reference to the contract or accounts shall be held to mean rates or prices so arrived at.
Scope and Performance	3.	Where the context so requires, words imparting the singular only also include the plural and vice versa. Any reference to masculine gender shall whenever required include feminine gender and vice versa.	
	4.	Headings and Marginal notes to these General Conditions of Contract shall not be deemed to form part thereof or be taken into consideration in the interpretation or construction thereof or of the contract.	
	5.	The contractor shall be furnished, free of cost one certified copy of the contract documents except Indian standard specifications and such other printed and published documents, together with all drawings as may be forming part of the tender papers. None	

		of these documents shall be used for any purpose other than that of this contract.
Works to be carried out	6.	The work to be carried out under the Contract shall, except as otherwise provided in these conditions, include all labour, materials, tools, plants, equipment and transport which may be required in preparation of and for and in the full and entire execution and completion of the works. The Contractor shall provide at his cost everything necessary for the proper execution of the works according to the intent and meaning of the drawings, Schedule of Quantities and Specification taken together, whether the same may or may not be particularly shown or described therein provided that the same can reasonably be inferred there from and if the Contractor finds any discrepancy in the drawings or amongst the drawings, Schedule of Quantities and Specifications, he shall immediately and in writing refer same to the Engineer-in-Charge who shall decide which is to be followed. The descriptions given in the Schedule of Quantities shall, unless otherwise stated, be held to include wastage on materials, carriage and cartage, carrying and return of empties, hoisting, setting, fitting and fixing in position and all other labour necessary in and for the full and entire execution and completion of the work as aforesaid in accordance with good practice and recognized principles. The Contractor shall carry out and complete the said work in every respect in accordance with this Contract and with the directions of and to the satisfaction of the Engineer-in-Charge. The Engineer-in-Charge may in his absolute discretion and from time to time issue further drawings and/or written instructions, detailed directions and explanations which are hereafter collectively referred to as “Employer’s Instructions” in regard to : a) The variation or modification of the design, quality or quantity of works or the addition or omission or substitution of any work. b) Any discrepancy in the drawings or amongst the Schedule of Quantities and/or drawings and/or specification. c) The removal from the site of any material brought thereon by the Contractor not fulfilling the tender specifications and the substitution of any other material therefor. d) The removal and/or re-execution of any material/works executed by the Contractor but not fulfilling the tender specifications.

		e) The dismissal from the works of any persons employed by the contractor thereupon. f) The opening up for inspection of any work covered up. g) The amending and making good of any defects noticed and reported during Defect Liability Period. The Contractor shall forthwith comply with and duly execute any work comprised in such Employer's instructions provided always that verbal instructions, directions and explanations given to the Contractor or his representatives upon the works by the Engineer-in-Charge shall, if involving a variation, be confirmed in writing by the Contractor within seven days, and if the same is not approved/ disapproved by the Engineer-in-charge in writing within a further period of seven days, such shall be deemed to be Employer's Instructions within the scope of the Contract.	
Sufficiency of Tender	7.	The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and prices quoted in the Schedule of Quantities, which rates and prices shall, except as otherwise provided, cover all his obligations under the Contract and all matters and things necessary for the proper completion and maintenance of the works.	
Discrepancies and Adjustment of Errors (order of preference)	8.	The several documents forming the Contract are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to small scale drawing and figured dimensions in preference to scale and special conditions in preference to General Conditions.	
	8.1	In the case of discrepancy between the schedule of Quantities, the Specifications and/ or the Drawings, the following order of preference shall be observed:-	
		i)	Description/Nomenclature as per Schedule of Quantities.
		ii)	General / Particular Specification and Special Condition, if any.
		iii)	CPWD Specifications with up to date correction slip
		iv)	Architectural / structural Drawings.
		v)	Indian Standard Specifications of BIS
		vi)	National Building Code – 2016
		vii)	Manufacturer's specifications
		viii)	Sound Engineering Practices
		ix)	Decision of Engineer-in-Charge
		A reference made to any Indian Standard Specifications in this documents, shall imply to the latest version of that standard, including such revisions / amendments as issued by the Bureau of Indian Standards up to the last date of receipt of tenders. The	

		contractor shall keep at his own cost all such publications of relevant Indian Standard applicable to the work at site.	
	8.2	If there are varying or conflicting provisions made in any one document forming part of the contract, the Competent Authority as defined in the schedule 'F' shall be the deciding authority with regard to the intention of the document and his decision shall be final and binding on the Contractor	
	8.3	If there is a discrepancy between actual scaled drawing and written dimension (or description) on a drawing, the latter shall be followed.	
	8.4	The Schedule of Quantities, unless otherwise stated shall be deemed to have been prepared in accordance with standard method of measurement. Any error in description or in quantity in Schedule of Quantities or any omission of items therefrom shall not vitiate the Contract but shall be rectified and the value thereof, as ascertained under clause 12 hereof shall be added to, or deducted from the Contract amount (as the case may be) provided that no rectification or errors, if any, shall be allowed in the contractor's Schedule of rates. The above discrepancies in Schedule of Quantities shall not release the Contractor from the execution of the whole or any part of the works comprised therein according to drawings and specifications or from any of his obligations under the contract.	
Signing of Contract	9.	The successful tenderer/contractor, on acceptance of his tender by the Employer, shall, within 14 days from the stipulated date of start of the work, sign the contract consisting of:-	
		i)	Articles of agreement on non-judicial stamp paper/s of appropriate values (The cost of the stamp paper/s shall be borne by the contractor. One Certified copy of the agreement will be handed over to the contractor by the Employer)
		ii)	The notice inviting tender, all the documents including drawings, if any, forming the tender as issued at the time of invitation of tender and acceptance thereof together with any correspondence leading thereto.
		No payment for the work done will be made unless contract is signed by the contractor. Thus, the first RA Bill shall not be accepted for making payment before signing off the Agreement in Bilingual Format.	

CLAUSES OF CONTRACT

	CLAUSE 1		
Performance Guarantee	i)	The contractor shall submit an irrevocable Performance Guarantee of 5% (Five percent) of the Contract amount in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement, (not withstanding and/or without prejudice to any other provisions in the contract) within period specified in Schedule 'F' from the date of issue of letter of award. This period can be further extended by the Engineer-in-Charge up to a maximum period as specified in schedule 'F' on written request of the contractor stating the reason for delays in procuring the Performance Guarantee, to the satisfaction of the Engineer-in-Charge. This guarantee shall be issued by any Scheduled Bank in the approved proforma annexed hereto.	
	ii)	The Performance Guarantee shall be initially valid up to the stipulated date of completion plus 12 months (DLP). In case the time for completion of work gets enlarged, the contractor shall get the validity of Performance Guarantee extended to cover such extended time for completion of work. After recording of the completion certificate for the work by the Engineer-in-charge, the performance guarantee shall be returned to the contractor, without any interest.	
	iii)	The Engineer-in-Charge shall not make a claim under the performance guarantee except for amounts to which the Employer is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:	
		a)	Failure by the contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer-in-Charge may claim the full amount of the Performance Guarantee.
		b)	Failure by the contractor to pay the Employer any amount due, either as agreed by the contractor or determined under any of the Clauses/Conditions of the agreement, within 30 days of the service of notice to this effect by Engineer-in-Charge.
	iv)	In the event of the contract being determined or rescinded under provision of any of the Clause/Condition of the agreement, the performance guarantee shall stand forfeited in full and shall be absolutely at the disposal of the Employer.	

	CLAUSE 1 A	
Recovery of Security Deposit	i)	The Contractor shall permit Employer at the time of making any payment to him for work done under the contract to deduct a sum at the rate of 5% of the gross amount of each running account and final bill till the sum deducted will amount to security deposit of 5% of the Contract price of the work. Such deductions will be made and held by the Employer by way of Security Deposit till the successful completion of Defect Liability Period (DLP).
	ii)	All compensations or the other sums of money payable by the contractor under the terms of this contract may be deducted from his security deposit or from any sums which may be due to or may become due to the contractor by Employer on any account whatsoever and in the event of his Security Deposit being reduced by reason of any such deductions, the contractor shall within 10 days make good in cash any sum or sums which may have been deducted from his security deposit or any part thereof. The security deposit shall be collected from the running bills and the final bill of the contractor at the rates mentioned above.
	CLAUSE 2	
Compensation for Delay		If the contractor fails to maintain the required progress in terms of clause 5 or to complete the work and clear the site on or before the contract or extended date of completion, he shall, without prejudice to any other right or remedy available under the law to the Employer on account of such breach, pay as agreed compensation the amount calculated at the rates stipulated in schedule 'F' and as per the authority specified in schedule 'F' (whose decision in writing shall be final and binding) may decide on the amount of contract price of the work for every completed day (as applicable) that the progress remains below that specified in Clause 5 or that the work remains incomplete. This will also apply to items or group of items for which a separate period of completion has been specified
	i)	Compensation at the rate as specified in schedule 'F' per week of delay for delay of work to be computed on per day basis, provided, always, that the total amount of compensation for delay to be paid under this Condition shall not exceed 10% of the Contract Price of work or of the Contract price of the item or group of items of work for which a separate period of completion is originally given.

	ii)	The amount of compensation may be adjusted or set-off against any sum payable to the Contractor under this or any other contract with the Employer. In case, the contractor does not achieve a particular milestone mentioned in Schedule 'F', or the re-scheduled milestone(s) in terms of Clause 5.4, the amount shown against that milestone shall be withheld, to be adjusted against the compensation levied at the final grant of Extension of Time. With-holding of this amount on failure to achieve a milestone, shall be automatic without any notice to the contractor. However, if the contractor catches up with the progress of work on the subsequent milestone(s), the withheld amount shall be released. In case the contractor fails to make up for the delay in subsequent milestone(s), amount mentioned against each milestone missed subsequently also shall be withheld. However, no interest, whatsoever, shall be payable on such withheld amount.
	CLAUSE 3	
When Contract can be Determined		Subject to other provisions contained in this clause, the Engineer-in-Charge may, without prejudice to his any other rights or remedy against the contractor in respect of any delay, inferior workmanship, any claims for damages and/or any other provisions of this contract or otherwise, and whether the date of completion has or has not elapsed, by notice in writing absolutely determine the contract in any of the following cases:
	i)	If the contractor has abandoned the contract
	ii)	If the contractor having been given by the Engineer-in-Charge a notice in writing to rectify, pull down, reconstruct or replace any defective work or that the work is being performed in an inefficient or otherwise improper or un-workman like manner shall omit to comply with the requirement of such notice for a period of seven days thereafter or has failed to remove the materials from the site within seven days of the written instructions of the Engineer-in-charge that the same were condemned and rejected by him under these conditions .
	iii)	If the contractor has failed to commence the work or, without any lawful excuse under these conditions suspended the progress of the work for fourteen days after receiving notice from the Engineer-in-charge to proceed or has failed to proceed with the work with due diligence so that in the opinion of the Engineer-in-Charge (which shall be final and binding) he will be unable to secure completion of the work

		by the date for completion and continues to do so after a notice in writing of seven days from the Engineer-in-Charge.
	iv)	If the contractor fails to complete the work within the stipulated date or items of work with individual date of completion, if any stipulated, on or before such date(s) of completion and does not complete them within the period specified in a notice given in writing in that behalf by the Engineer-in-Charge.
	v)	If the contractor persistently neglects or fails to carry out his obligations under the contract and/ or commits default in complying with all or any of the terms and conditions of the contract and does not remedy it or take effective steps to remedy it within 7 days after a notice in writing is given to him in that behalf by the Engineer-in-Charge.
	vi)	If the contractor shall offer or give or agree to give to any person in Employer's service or to any other person on his behalf any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other contract for Employer.
	vii)	If the contractor shall enter into a contract with Employer in connection with which commission has been paid or agreed to be paid by him or to his knowledge, unless the particulars of any such commission and the terms of payment thereof have been previously disclosed in writing to the Engineer-in-Charge.
	viii)	If the contractor had secured the contract with Employer as a result of wrong tendering or other non-bonafide methods of competitive tendering or commits breach of Integrity Agreement.

	ix)	If the contractor being an individual, or if a firm, any partner thereof commits an “Act of Insolvency” or shall at any time be adjudged insolvent or have a receiving order or order for administration of his estate made against him or shall suffer execution or other process of court attaching property to be issued against the contractor or shall take any proceedings for liquidation or composition (other than a voluntary liquidation for the purpose of amalgamation or reconstruction) under any Insolvency Act for the time being in force or make any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors or purport so to do, or if any application be made under any Insolvency Act for the time being in force for the sequestration of his estate or if a trust deed be executed by him for benefit of his creditors and shall be unable within seven days after notice to him requiring him to do so, to show to the reasonable satisfaction to the Engineer-in-charge that he is able to carry out and fulfill the contract and to give security therefor, if so required by the Engineer-in-charge.
	x)	If the contractor being a company shall pass an effective resolution for winding up voluntarily or shall have an order for compulsory winding up made against it or shall subject to the supervision of court and the official Assignee or the liquidator in such acts of insolvency or winding up, as the case may be, or if a receiver or a manager on behalf of a creditor shall be appointed or if circumstances shall arise which entitle the court or the creditor to appoint a receiver or a manager or which entitle the court to make a winding up order.
	xi)	If the contractor shall suffer any payment under this contract to be attached by or on behalf of any of the creditors or the contractor or shall charge or encumber this contract or any payments due or which may become due to the contractor hereunder
	xii)	If the contractor shall suffer an execution being levied on his goods and allow it to be continued for a period of 21 days.

	xiii)	If the contractor assigns, transfers, sublets (engagement of labour on a piece-work basis or of labour with materials not to be incorporated in the work, shall not be deemed to be subletting) or otherwise parts with or attempts to assign, transfer, sublet or otherwise parts with the entire works or any portion thereof without the prior written approval of the Engineer -in-Charge. When the contractor has made himself liable for action under any of the cases aforesaid, the Engineer-in-Charge on behalf of the Employer shall have powers:	
		a)	To determine the contract, notwithstanding any previous waiver, after giving seven days' notice in writing to the Contractor, as aforesaid (of which termination notice in writing to the contractor under the hand of the Engineer-in-Charge shall be conclusive evidence). Upon such determination, the Security Deposit already recovered and Performance Guarantee under the contract shall be liable to be forfeited and shall be absolutely at the disposal of the Employer.
		b)	After giving notice to the contractor measure up the work of the contractor and to take such whole, or the balance or part thereof, as shall be un-executed out of his hands. The action will be without thereby affecting the powers of the Engineer-in-charge or the obligations and liabilities of the Contractor, the whole of which shall continue in force as fully as if the Contract had not been so determined, and as if the work subsequently executed had been executed by or on behalf of the Contractor. And further, the Employer by his agents or servants may enter upon and take possession of the works and all plants, tools, scaffoldings, sheds, machinery steam and other power utensils and materials lying upon the premises or the adjoining lands or roads, and use the same as his own property or may employ the same by means of his own servants and workmen in carrying on and completing the works or by employing any other Contractor or other person or persons to complete the works, and the Contractor shall not in any way interrupt or do any act, matter or thing to prevent or hinder such other Contractor or other person or persons employed for completing and finishing or

			using the materials and plant for the works. When the works shall be completed or as soon thereafter as convenient the Engineer-in- charge shall give a notice in writing to the Contractor to remove his surplus materials and plant, and should the Contractor fail to do so within a period of fourteen days after receipt thereof by him, the Employer may sell the same by public auction, and give credit to the Contractor for the net amount realized. The Employer shall thereafter ascertain and certify in writing under his hand what (if anything) shall be due or payable to or by the Employer and expense or loss which the Employer shall have been put to in procuring the works to be completed and the amount, if any, owing to the Contractor and the amount which shall be so certified shall thereupon be paid by the Employer to the Contractor or by the Contractor to the Employer, as the case may be, and the Certificate of the Engineer-in-charge shall be final and conclusive between the parties. The contractor, whose contract is determined as above, shall not be allowed to participate in the tendering process for the balance work, if resorted to by the Employer.
		In the event of above courses being adopted by the Engineer-in-Charge, the contractor shall have no claim to compensation for any loss sustained by him by reasons of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of the contract. And in case action is taken under any of the provision aforesaid, the contractor shall not be entitled to recover or be paid any sum for any work thereof or actually performed under this contract unless and until the Engineer-in-Charge has certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.	
	CLAUSE 3A		
	a)	In case, the work cannot be started due to reasons not within the control of the contractor within 1/8th of the stipulated time for completion of work or one month whichever is higher, either party may close the contract.	

	b)	If the payment of the amount payable by the Employer under Certificate of the Engineer-in-charge shall be in arrears and unpaid for thirty days after notice in writing requiring payment of the amount as aforesaid shall have been given by the Contractor to the Employer, or if the Employer interferes with or obstructs the issue of any such Certificate, or if the Employer shall repudiate the Contract, or if the works be stopped for three months under the order of the Engineer-in-charge or the Employer or by any injunction or other order of any court of Law, then and in any of the cases the Contractor shall be at liberty to determine the Contract by notice in writing to the Employer, through the Engineer-in-charge and he shall be entitled to recover from the Employer, payment for all works executed and for any loss he may sustain upon any plant or materials supplied or purchased or prepared for the purpose of the Contract. In arriving at the amount of such payment, the net rates contained in the Contractor's original tender shall be followed or where the same may not apply, valuation shall be made in accordance with Clause hereof.
	c)	In case contractor wants to close the contract, he shall give notice to the Employer stating the failure on the part of Employer. In such eventuality, the Performance Guarantee of the contractor shall be refunded within following time limits:
	i)	If the Contract price of work is up to Rs.50 lakhs: 15 days.
	ii)	If the Contract price of work exceeds Rs.50 lakhs: 30 days.
	d)	If Performance Guarantee is not released within prescribed time limit, then a simple interest @ 0.25% per month shall be payable on Performance Guarantee amount to the contractor from the date of expiry of prescribed time limit. A compensation for such eventuality, on account of damages etc. shall be payable @ 0.25% of Contract price subject to maximum limit of Rs.10 lakhs.
	CLAUSE 3B	
Termination of Contract in case of death of Contractor	Without prejudice to any of the rights or remedies under this contract, if the contractor, being an individual, dies, the Employer shall have the option of terminating the contract without any liability for such termination and compensation to the contractor.	
	CLAUSE 4	

Contractor liable to pay Compensation even if action not taken under Clause 3		In any case in which any of the powers conferred upon the Engineer-in-Charge by Clause-3 thereof, shall have become exercisable and the same are not exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any future case of default by the contractor and the liability of the contractor for compensation shall remain unaffected. In the event of the Engineer-in-Charge putting in force all or any of the powers vested in him under the preceding clause he may, if he so desires after giving a notice in writing to the contractor, take possession of (at the sole discretion of the Engineer-in-Charge which shall be final and binding on the contractor) or use as on hire (the amount of the hire money being also in the final determination of the Engineer-in-Charge) all or any tools, plant, materials and stores, in or upon the works, or the site thereof belonging to the contractor, or procured by the contractor and intended to be used for the execution of the work/or any part thereof, paying or allowing for the same in account at the contract rates, or, in the case of these not being applicable, at current market rates to be certified by the Engineer-in-Charge, whose certificate thereof shall be final, and binding on the contractor, clerk of the works, foreman or other authorized agent to remove such tools, plant, materials, or stores from the premises (within a time to be specified in such notice) in the event of the contractor failing to comply with any such requisition, the Engineer-in-Charge may remove them at the contractor's expense or sell them by auction or private sale on account of the contractor and his risk in all respects and the certificate of the Engineer-in-Charge as to the expenses of any such removal and the amount of the proceeds and expenses of any such sale shall be final and conclusive against the contractor.
	CLAUSE 5	
Time and Extension for Delay		The time allowed for execution of the Works as specified in the Schedule 'F' or the extended time in accordance with these conditions shall be the essence of the Contract. The execution of the works shall commence from such time period as mentioned in schedule 'F' or from the date of handing over of the site whichever is later. If the Contractor commits default in commencing the execution of the work as aforesaid, Employer shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the performance guarantee absolutely.

	5.1		As soon as possible after the award of work but in any case, before 14 days from the date of award of work, the Contractor shall submit a Time and Progress Chart for each milestone and get it approved by the Engineer-in-charge. The Chart shall be prepared in direct relation to the time stated in the Contract documents for completion of items of the works. It shall indicate the forecast of the dates of commencement and completion of various trades of sections of the work and may be amended as necessary by agreement between the Engineer-in-Charge and the Contractor within the limitations of time imposed in the Contract documents, and further to ensure good progress during the execution of the work, the contractor shall in all cases in which the time allowed for any work, exceeds one month (same for special jobs for which a separate programme has been agreed upon) complete the work as per mile stones given in Schedule 'F'.
			PROGRAMME CHART
	i)		The Contractor shall prepare a detailed work programme for the execution of work, clearly showing all activities from the start of work to completion, with details of manpower, equipment and machinery required for the fulfillment of the programme within the stipulated period or earlier and submit the same for approval to the Engineer-in-Charge within fourteen days of award of the contract. A recovery of Rs.500/- shall be made on per day basis in case of delay in submission of the above programme subject to a maximum of 0.5% of the contract amount.
	ii)		The programme should include the following:
		a)	Descriptive note explaining sequence of the various activities.
		b)	Network (PERT / CPM / BAR CHART).
		c)	Programme for procurement of materials by the contractor.
		d)	Programme for deployment of man power by the contractor.
	iii)		If at any time, it appears to the Engineer-in-Charge that the actual progress of work does not conform to the approved programme referred above or after rescheduling of milestones, on his instructions , the contractor shall produce a revised programme within 7 (seven) days, showing the modifications to the approved programme to ensure timely completion of the work.
	5.2)		If the work(s) be delayed by:-

	i)	force majeure, or
	ii)	abnormally bad weather, or
	iii)	serious loss or damage by fire, or
	iv)	civil commotion, local commotion of workmen, strike or lockout, affecting any of the trades employed on the work, or
	v)	delay on the part of other contractors or tradesmen engaged by Engineer-in- Charge in executing work not forming part of the Contract, or
	vi)	non-availability of stores, which are the responsibility of Employer to supply or
	vii)	non-availability or break down of tools and Plant to be supplied or supplied by Employer or
	viii)	any other cause which, in the absolute discretion of the Engineer-in Charge is beyond the Contractor's control.
		then upon the happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the authority as indicated in Schedule 'F' but shall nevertheless use constantly his best endeavours to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-Charge to proceed with the works.
	5.3)	Request for rescheduling of Milestones and extension of time, to be eligible for consideration with reasons, shall be made by the Contractor in writing within fourteen days of the happening of the event causing delay to the authority as indicated in Schedule 'F'. The Contractor may also, if practicable, indicate in such a request the period for which extension is desired.
	5.4)	In such case the authority as indicated in Schedule 'F' may give a fair and reasonable extension of time and reschedule the milestones for completion of work. Such extension or rescheduling of the milestones shall be communicated to the Contractor by the authority as indicated in Schedule 'F' in writing within 4 weeks from the date of receipt of such request. The contractor should make any such request for extension of time or rescheduling of milestones at least in one month advance from schedule date of achievement of milestone/work. Non submission of application by the contractor for extension of time/ rescheduling of the milestones shall not be a bar for giving a fair and reasonable extension of time by the authority as indicated in Schedule 'F'

		and this shall be binding on the contractor. After giving a fair and reasonable extension of time, the authority shall advise the contractor to reschedule the milestones and submit for approval.
	CLAUSE 6	
Measurements of Work Done	i)	Engineer-in-Charge shall, except as otherwise provided, ascertain and determine by measurement, the value in accordance with the contract of work done.
	ii)	All measurement of all items having financial value shall be entered in Measurement Book and/or level field book so that a complete record is obtained of all works performed under the contract.
	iii)	All measurements and levels shall be taken jointly by the Engineer-in-Charge or his authorized representative and by the contractor or his authorized representative from time to time during the progress of the work and such measurements shall be signed and dated by the Engineer-in-Charge and the contractor or their representatives in token of their acceptance. If the contractor objects to any of the measurements recorded, a note shall be made to that effect with reason and signed by both the parties.
	iv)	If for any reason, the contractor or his authorized representative is not available and the work of recording measurements is suspended by the Engineer-in-Charge or his representative, the Engineer-in-Charge and the Employer shall not entertain any claim from contractor for any loss or damages on this account. If the contractor or his authorized representative does not remain present at the time of such measurements after the contractor or his authorized representative has been given a notice in writing three (3) days in advance or fails to countersign or to record objection within a week from the date of the measurement, then such measurements recorded in his absence by the Engineer-in-Charge or his representative shall be deemed to be accepted by the Contractor.
	v)	The contractor shall, without extra charge, provide all assistance with every appliance, labour and other things necessary for measurements and recording levels.

	vi)	Except where any general or detailed description of the work expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the specifications notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom. In the case of items which are not covered by specifications, measurements shall be taken in accordance with the relevant standard method of measurement issued by the Bureau of Indian Standards (IS 1200) or any other relevant code of practice and if for any item no such standard is available, then a mutually agreed method shall be followed.
	vii)	The contractor shall give, not less than seven days' notice to the Engineer-in-Charge or his authorized representative in charge of the work, before covering up or otherwise placing beyond the reach of measurement any work in order that the same may be measured and correct dimensions thereof be taken before the same is covered up or placed beyond the reach of measurement and shall not cover up and place beyond reach of measurement any work without consent in writing of the Engineer-in-Charge or his authorized representative in charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of measurements without such notice having been given or the Engineer-in-Charge's consent being obtained in writing, the same shall be uncovered at the Contractor's expense, or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.
	viii)	Engineer-in-Charge or his authorized representative may cause either themselves or through another officer of the department to check the measurements recorded jointly or otherwise as aforesaid and all provisions stipulated herein above shall be applicable to such checking of measurements or levels.
	ix)	It is also a term of this contract that recording of measurements of any item of work in the measurement book and/or its payment in the interim, on account or final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.

	CLAUSE 6A	
Computerized Measurement Book	i)	Engineer-in-Charge shall, except as otherwise provided, ascertain and determine by measurement the value of work done in accordance with the contract.
	ii)	All measurements of all items having financial value shall be entered by the contractor and compiled in the shape of the Computerized Measurement Book having pages of A-4 size as per the proforma of Measurement Book annexed hereto, so that a complete record is obtained of all the items of works performed under the contract.
	iii)	All such measurements and levels recorded by the contractor or his authorized representative from time to time, during the progress of the work, shall be got checked by the contractor from the Engineer-in-Charge or his authorized representative as per interval or program fixed in consultation with Engineer-in-Charge or his authorized representative. After the necessary corrections made by the Engineer-in-Charge or his authorized representative the measurement sheets shall be returned to the contractor for incorporating the corrections and for resubmission to the Engineer-in-Charge for the dated signatures by the Engineer- in- Charge and/or his authorized representative and the contractor or their representatives in token of their acceptance.

	iv)	Whenever bill is due for payment, the contractor would initially submit draft computerized measurement sheets and these measurements would be got checked/test checked from the Engineer-in-Charge and/or his authorized representative. The contractor will, thereafter, incorporate such changes as may be done during these checks/test checks in his draft computerized measurements, and submit to the Employer a computerized measurement book, duly bound, and with its pages machine numbered. The Engineer-in- Charge and/or his authorized representative would thereafter check this MB, and record the necessary certificates for their checks/test checks.

	v)	The final, fair, computerized measurement book given by the contractor, duly bound, with its pages machine numbered, should be 100% correct, and no cutting or over-writing in the measurements would thereafter be allowed. If at all any error is noticed, the contractor shall have to submit a fresh computerized MB with its pages duly machine numbered and bound, after getting the earlier MB cancelled by the Employer. Thereafter, the MB shall be taken in the Office records, and allotted a number as per the Register of Computerized MBs. This should be done before the corresponding bill is submitted to the Office for payment. The contractor shall submit two spare copies of such computerized MB's for the purpose of reference and record by the concerned officers of the Employer.
	vi)	The contractor shall also submit to the Employer separately his computerized Abstract of Cost as per format annexed hereto and the bill based on these measurements, duly bound, and its pages machine numbered along with two spare copies of the bill. Thereafter, this bill will be processed by the Employer and allotted a number as per the computerized record in the same way as done for the measurement book meant for measurements.
	vii)	The contractor shall, without extra charge, provide all assistance with every appliance, labour and other things necessary for checking of measurements/levels by the Engineer-in- Charge or his representative.
	viii)	Except where any general or detailed description of the work expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the specifications notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom. In the case of items which are not covered by specifications, measurements shall be taken in accordance with the relevant standard method of measurement issued by the Bureau of Indian Standards or any other relevant code of practice and if for any item no such standard is available then a mutually agreed method shall be followed.
	ix)	The contractor shall give not less than seven days' notice to the Engineer-in-Charge or his authorized representative in charge of the work before covering up or otherwise placing beyond the reach of checking and/or test checking the measurement of any work in order

		that the same may be checked and/or test checked and correct dimensions thereof be taken before the same is covered up or placed beyond the reach of checking and/or test checking measurement and shall not cover up and place beyond reach of measurement any work without consent in writing of the Engineer-in-Charge or his authorized representative in charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of checking and/or test checking measurements without such notice having been given or the Engineer-in-Charge's consent being obtained in writing the same shall be uncovered at the Contractor's expense, or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.
	x)	Engineer-in-Charge or his authorized representative may cause either themselves or through another officer of the department to check the measurements recorded by contractor and all provisions stipulated herein above shall be applicable to such checking of measurements or levels.
	xi)	It is also a term of this contract that checking and/or test checking the measurements of any item of work in the measurement book and/or its payment in the interim, on account of final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.
	CLAUSE 7	
Payment on Interim Certificate to be Regarded as Advances	i)	No payment shall be made for work, estimated to cost Rs.50 lakh or less till after the whole of the work shall have been completed and certificate of completion given. For works estimated to cost over Rs.Fifty Lakh, the interim or running account bills shall be submitted by the contractor for the work executed on the basis of such recorded measurements on the format of the Employer as provided in the proforma annexed hereto. The contractor shall not be entitled to be paid any such interim payment if the gross work done together with net payment/ adjustment of advances for material collected, if any, since the last such payment is less than the amount specified in Schedule 'F', in which case the interim bill shall be prepared only after the requisite progress is achieved. Engineer-in-Charge shall arrange to have the bill verified by taking or causing to be taken, where necessary, the requisite

		measurements of the work. In the event of the failure of the contractor to submit the bills, Engineer-in-Charge shall prepare or cause to be prepared such bills in which event no claims whatsoever due to delays on payment including that of interest shall be payable to the contractor. Payment on account of amount admissible shall be made by the Engineer-in- Charge certifying the sum to which the contractor is considered entitled by way of interim payment at such rates as decided by the Engineer-in-Charge. The Contractor shall be paid by the Employer from time to time, by installments under Interim Certificates to be issued by the Engineer-in-Charge to the Contractor on account of the works executed as aforesaid in accordance with this contract, subject, however, to a retention of the percentage of such value named in the schedule 'F' as "Retention percentage for Interim Certificates" until the total amount retained shall reach the sum named in the schedule 'F' as "Total Retention Money". The Engineer-in-charge may in his discretion include in the Interim Certificate such amount as he may consider proper on account of materials delivered upon the site by the Contractor for use in the works. And when the works have been virtually completed and the Engineer-in-charge shall have certified in writing that they have been completed, the Contractor shall be paid by the Employer in accordance with the Certificate, the sum of money named in the schedule as "Installment after Virtual Completion" being a part of the said Total Retention Money. The Contractor shall be entitled to the payment of the Final Balance in accordance with the final certificate to be issued in writing by the Engineer-in-Charge at the expiry of the period referred to as "the Defects Liability Period" in clause 17 or as soon as after the expiration of such period as the works shall have been finally completed and all defects made good according to the true intent and meaning hereof whichever shall last happen, provided always that the issue by the Engineer-in-Charge of any Certificate during the progress of the works or at or after their completion shall not relieve the Contractor from his liability under this contract nor relieve the Contractor of his liability in case of fraud, dishonesty or fraudulent concealment relating to the works or materials or to any matter dealt with in the certificate, and in case of all defect and insufficiencies in the works or materials which a reasonable examination would not have disclosed. No certificate of the Engineer-in-charge shall of itself be conclusive evidence that any works or materials to which it

		relates are in accordance with the Contract neither will the Contractor have a claim for any amounts which the Engineer-in-charge might have certified in any interim bill and paid by the Employer and which might subsequently be discovered as not payable and in this respect the Employer's decision shall be final and binding.
	a)	75% of the amount payable to the Contractor on the RA bills will be released as ad-hoc payment within 10 working days from the date of certification by the Engineer-in-charge, pending test checking of work and verification of detailed arithmetical accuracy by Employer.
	b)	The Employer shall have power to withhold any certificate if the works or any parts thereof are not being carried out to his satisfaction.
	c)	No payment shall be made to the Contractor if the Contractor fails to insure the works and keep them insured till the issue of the Completion Certificate.
	d)	The amount admissible shall be paid within the specified period of honouring certificates in the schedule 'F' after the day of presentation of the bill by the Contractor to the Engineer-in-Charge together with the account of the dismantled materials, if any and all required details/ documents. In case of delay in payment of Running Account bills after 45 days of submission of bill by the contractor, provided the bill submitted by the contractor found to be in order, a simple interest @ 3% per annum shall be paid to the contractor from the date of expiry of prescribed time limit.
	e)	In case there is significant discrepancies observed in the bill submitted and certified value, the next time the release of 75% payment within 10 working days shall not be considered.

	ii)	All such interim payments shall be regarded as payment by way of advances against final payment only and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be rejected, removed, taken away and reconstructed or re-erected. Any certificate given by the Engineer-in-Charge relating to the work done or materials delivered forming part of such payment, may be modified or corrected by any subsequent such certificate(s) or by the final certificate and shall not by itself be conclusive evidence that any work or materials to which it relates is/are in accordance with the contract and specifications. Any such interim payment, or any part thereof shall not in any respect conclude, determine or affect in any way powers of the Engineer-in-Charge under the contract or any of such payments be treated as final settlement and adjustment of accounts or in any way vary or affect the contract.
	iii)	Pending consideration of extension of date of completion, interim payments shall continue to be made as herein provided without prejudice to the right of the Employer to take action under the terms of this contract for delay in the completion of work, if the extension of date of completion is not granted by the competent authority.
	CLAUSE 7A	
Unfixed materials when taken into account to be the property of the Employer	Where in any Certificate (of which the Contractor has received payment), the Engineer-in-Charge has included the value of any unfixed materials intended for and/or placed on or adjacent to the works such materials shall become the property of the Employer and they shall not be removed except for use upon the works, without the written authority of the Engineer-in-Charge. The Contractor shall be liable for any loss of, or damage to, such materials	
	CLAUSE 7B	
	No Running Account Bill shall be paid for the work till the applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board, whatever applicable are submitted by the contractor to the Engineer-in-Charge.	

	CLAUSE 8	
Completion Certificate and Completion Plans	i)	Within ten days of the completion of the work, the contractor shall give notice of such completion to the Engineer-in-Charge and within thirty days of the receipt of such notice, the Engineer-in-Charge shall inspect the work if the work is found incomplete, the contractor shall be advised suitably .Further, in the completed work, if there is no defect , the Engineer-In-Charge shall furnish the contractor with a final certificate of completion, otherwise a provisional certificate of physical completion indicating defects (a) to be rectified by the contractor and/or (b) for which payment will be made at reduced rates, shall be issued. But no final certificate of completion shall be issued, nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the work shall be executed all scaffolding, surplus materials, rubbish and all huts and sanitary arrangements required for his/their work people on the site in connection with the execution of the works as shall have been erected or constructed by the contractor(s) and cleaned off the dirt from all wood work, doors, windows, walls, floor or other parts of the building, in, upon, or about which the work is to be executed or of which he may have had possession for the purpose of the execution; thereof, and not until the work shall have been measured by the Engineer-in-Charge. If the contractor shall fail to comply with the requirements of this Clause as to removal of scaffolding, surplus materials and rubbish and all huts and sanitary arrangements as aforesaid and cleaning off dirt on or before the date fixed for the completion of work, the Engineer-in-Charge may at the expense of the contractor remove such scaffolding, surplus materials and rubbish etc., and dispose of the same as he thinks fit and clean off such dirt as aforesaid, and the contractor shall have no claim in respect of scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof.
	ii)	The works shall not be considered as completed until the Engineer-incharge has certified in writing that they have been completed. The Defects Liability Period shall commence from the date of such certificate.
	CLAUSE 8A	
Contractor to keep Site		The splashes and droppings from white washing, colour washing, painting etc., on walls, floor, windows, etc shall be

Clean		removed and the surface cleaned simultaneously with the completion of these items of work in the individual rooms, quarters or premises etc. where the work is done. The cleaning shall be carried out as soon as possible without waiting for the actual completion of all the other items of work in the contract. In case the contractor fails to comply with the requirements of this clause, the Engineer-in-Charge shall have the right to get this work done at the cost of the contractor through any other agency. Before taking such action, the Engineer-in-Charge shall give ten days' notice in writing to the contractor.
	CLAUSE 8B	
Completion Plans to be Submitted by the Contractor	i)	The contractor shall submit completion plan (as built drawing in AUTOCAD or any such approved software and one hard copy) as applicable to related drawings depending upon the scope of work within thirty days of the completion of the work.
	ii)	The contractor shall submit all the data and details as regards the work to enable the Employer to prepare the 'As built drawings' for layouts etc.
	iii)	The contractor shall also submit the operation and maintenance manuals and other technical literature/ warranty certificates provided by OEMs in respect of all the electrical/ electro-mechanical and electronic equipment/ systems etc.
	iv)	In case, the contractor fails to submit the completion plan as aforesaid, the Employer will not process its bills for payment till such time the completion plan is submitted.
	CLAUSE 9	
Payment of Final Bill		The final bill shall be submitted by the contractor in the same manner as specified in interim bills within three months of physical completion of the work or within one month of the date of the final certificate of completion furnished by the Engineer-in-Charge whichever is earlier. No further claims shall be made by the contractor after submission of the final bill and these shall be deemed to have been waived and extinguished. Payments of those items of the bill in respect of which there is no dispute and of items in dispute, for quantities and rates as approved by Engineer-in-Charge, will, as far as possible be made within

		the period specified hereunder, the period being reckoned from the date of receipt of the bill by the Engineer-in-Charge complete with account of materials wherever applicable.
	ii)	Time Period : 3 months
		In case of delay in payment of final bills after prescribed time limit, a simple interest @ 3% per annum shall be paid to the contractor from the date of expiry of prescribed time limit, provided the final bill submitted by the contractor found to be in order.
	CLAUSE 9A	
Payment of Contractor's Bills through electronic means	i)	Payments due to the contractor shall be made to his bank through NEFT. For this purpose, the contractor shall furnish to the Engineer-in-Charge (1) an authorization in the form of a legally valid document such as a power of attorney conferring authority on the bank; to receive payments and all other required particulars in the approved format (2) his own acceptance of the correctness of the amount made out as being due to him by Employer or his signature on the bill or other claim preferred against Employer before settlement by the Engineer-in-Charge of the account or claim by payment to the bank. While the NEFT transaction slip shall constitute a full and sufficient
		discharge for the payment, the contractor shall whenever possible, present his bills duly receipted and discharged through his bank.
	ii)	Nothing herein contained shall operate to create in favour of the bank any rights or equities vis-a- vis the Employer.
	CLAUSE 10	
Materials to be provided by the Contractor	i)	The contractor shall, at his own expense, provide all materials, required for the works.
	ii)	The contractor shall, at his own expense and without delay, supply to the Engineer-in- Charge samples of materials to be used on the work and shall get these approved in advance. All such materials to be provided by the Contractor shall be in conformity with the specifications laid down or referred to in the contract. The materials shall be selected from the make/brand specified in the list of approved makes of materials. The contractor shall, if requested by the Engineer-in- Charge furnish proof along with Material Test Certificates (MTC) of manufacturer, to the satisfaction of the Engineer-in-Charge that the

		materials so comply (Schedule B). The Engineer-in-Charge shall within thirty days of supply of samples or within such further period as he may require intimate to the Contractor in writing whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the Engineer-in-Charge for his approval, fresh samples complying with the specifications and make/brand in the list of approved make / materials laid down in the contract. In case of non availability of make/brand specified in the list of approved makes of and the Contractor submit the documentary evidence for the same to the satisfaction of Engineer-in-Charge, proposed materials shall be tested in accordance with specifications following the Indian Standard Codes of Bureau of Indian Standard and / or applicable code of material testing and specifications, and approval of the Engineer-in-Charge in such case shall be issued after receipt of satisfactory test results of materials satisfying the specifications and standards.
	iii)	The Contractor shall at his risk and cost submit the samples of materials to be tested or analyzed and shall not make use of or incorporate in the work any materials represented by the samples until the required tests or analysis have been made and materials finally accepted by the Engineer-in-Charge. The Contractor shall not be eligible for any claim or compensation either arising out of any delay in the work or due to any corrective measures required to be taken on account of and as a result of testing of materials.
	iv)	The contractor shall, at his risk and cost, make all arrangements and shall provide all facilities as the Engineer-in-Charge may require for collecting, and preparing the required number of samples for such tests at such time and to such place or places as may be directed by the Engineering-Charge and bear all charges and cost of testing unless specifically provided for otherwise elsewhere in the contract or specifications. The Engineer-in- Charge or his authorized representative shall at all times have access to the works and to all workshops, factories or/ and other places where work is being prepared or from where materials, manufactured articles or machinery are being obtained for the works and the contractor shall afford every facility and every assistance in obtaining the right to such access for inspections and examination and test of the materials and workmanship. No person not authorized by the employer except the

		representatives of public authorities shall be allowed on the works at any time.
	v)	The Engineer-in-Charge shall have full powers to require the removal from the premises of all materials which in his opinion are not in accordance with the specifications and in case of default, the Engineer-in-Charge shall be at liberty to employ at the expense of the contractor, other persons to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials. The Engineer-in-Charge shall also have full powers to require other proper materials to be substituted thereof and in case of default, the Engineer-in-Charge may cause the same to be supplied and all costs which may attend such removal and substitution shall be borne by the Contractor.
	vi)	Basic price adjustment shall be done on the measured quantities for the finished items of work with specified "Basic Prices / Rates". In addition to the difference in the Basic Price / Rate and the actual purchase Price / Rate, Contractor's overhead and profit @ 15% on the difference shall be considered for the Basic price / Rate adjustment. While carrying out price adjustments, NO other components such as wastage, transportation, handling, insurance, labour, etc. shall be taken in to account.
Work to be Executed in Accordance with Specifications, Drawings, Orders etc.	CLAUSE 11	
	i)	The contractor shall execute the whole and every part of the work in the most substantial and workmanlike manner both as regards materials and otherwise in every respect in strict accordance with the specifications. The contractor shall also conform exactly, fully and faithfully to the design, drawings and instructions in writing in respect of the work signed by the Engineer-in-Charge and the contractor shall be furnished free of charge one copy of the contract documents together with specifications, designs, drawings and instructions as are not included in any Bureau of Indian Standard or any other, published standard or code or, Schedule of Rates or any other printed publication referred to elsewhere in the contract.

	ii)	In the case of any class of work for which there is no such specifications as referred above, such work shall be carried out in accordance with the Bureau of Indian Standards Specifications. In case there are no such specifications in Bureau of Indian Standards, the work shall be carried out as per manufacturers' specifications. In case there are no such specifications as required above, the work shall be carried out in all respects in accordance with the instructions and requirements of the Engineer-in-Charge.
	iii)	The contractor shall comply with the provisions of the contract and with the care and diligence execute and maintain the works and provide all labour and materials, tools and plants including for measurements and supervision of all works, structural plans and other things of temporary or permanent nature required for such execution and maintenance in so far as the necessity for providing these, is specified or is reasonably inferred from the contract. The Contractor shall take full responsibility for adequacy, suitability and safety of all the works and methods of construction.
Action in case Work not done as per Specifications	CLAUSE 11 A	
	i)	All works under or in course of execution or executed in pursuance of the contract, shall at all times be open and accessible to the inspection and supervision of the Engineer-in-charge, his authorized subordinates in charge of the work and all the superior officers of the Employer or any organization engaged by the Employer for Quality Assurance and of the Chief Technical Examiner's Office, and the contractor shall, at all times, during the usual working hours and at all other times at which reasonable notice of the visit of such officers has been given to the contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing, present for that purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the contractor himself.

	ii)	If it shall appear to the Engineer-in-charge or his authorized representatives or to the Superior Officers of the employer or the officers of the organization engaged by the Employer for Quality Assurance or to the Chief Technical Examiner or his subordinate officers, that any work has been executed with unsound, imperfect, or unskillful workmanship, or with materials or articles provided by him for the execution of the work which are unsound or of a quality inferior to that contracted or otherwise not in accordance with the contract, the contractor shall, on demand in writing which shall be made within Defects Liability Period stated in schedule 'F' or, if none stated, then within twelve months (six months in the case of work costing Rs Five Lakh and below) after completion of the work, from the Engineer-in-Charge specifying the work, materials or articles complained of notwithstanding that the same may have been passed, certified and paid for forthwith rectify, or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost. In the event of him failing to do so within a period specified by the Engineer-in-Charge in his demand aforesaid, then the contractor shall be liable to pay compensation at the same rate as under clause 2 of the contract (for non-completion of the work in time) for this default.
	iii)	In such case the Engineer-in-Charge may not accept the item of work at the rates applicable under the contract but may accept such items at reduced rates as the authority specified in Schedule 'F' may consider reasonable during the preparation of on account bills or final bill if the item is so acceptable without detriment to the safety and utility of the item and the structure or he may reject the work outright without any payment and/or get it and other connected and incidental items rectified, or removed and re-executed at the risk and cost of the contractor. Decision of the Engineer-in-Charge to be conveyed in writing in respect of the same will be final and binding on the contractor.
Deviations/ Variations Extent and Pricing	CLAUSE 12	
		The Engineer-in-Charge shall have power (i) to make alteration in, omissions from, additions to, or substitutions for the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work, and (ii) to omit a part of the works in case of non-availability of a portion of the site or for any other

		reasons and the contractor shall be bound to carry out the works in accordance with any instructions given to him in writing signed by the Engineer-in-Charge and such alterations, omissions, additions or substitutions shall form part of the contract as if originally provided therein and any altered, additional or substituted work which the contractor may be directed to do in the manner specified above as part of the works, shall be carried out by the contractor on the same conditions in all respects including price on which he agreed to do the main work except as hereafter provided. The Engineer-in-Charge shall be the final authority to decide whether any item of work is extra/ deviation/ substitution item.	
	12.1	The time for completion of the works shall, in the event of any deviations resulting in additional cost over the Contract price sum being ordered, be extended, if requested by the contractor, as follows	
		i)	In the proportion in which the additional cost of the altered, additional or substituted work (The difference of Final completed cost of work(including the financial impact of all extra, substituted and deviated items but excluding the financial impact due to operation of price adjustment clause) and the Contract price), bears to the original Contract price plus
		ii)	25% of the time calculated in (i) above or such further additional time as may be considered reasonable by the Engineer-in-Charge.
Deviation - Extra Items and Pricing	12.2	A)	Items that are completely new, and are in addition to the items contained in the contract
			Where the extra works are not of similar character and/or executed under similar conditions as aforesaid or where the omissions vary the conditions under which any remaining items of works are carried out or if the amount of any omissions or additions relative to the amount of the whole of the contract works or to any part thereof shall be such that in the opinion of the Engineer-in-charge the net rate or price contained in the Priced Schedule of Quantities or tender or for any item of the works involves loss or expense beyond that reasonably contemplated by the Contractor or is by reason of such omission or addition rendered unreasonable or inapplicable, the Engineer-in-charge shall fix such other rate or price as in the circumstances he shall think reasonable and proper, with the prior approval in writing of the Employer.

				Where extra work cannot be properly measured or valued, the Contractor shall be allowed day work prices as the net rates stated in the tender of the Priced Schedule of Quantities or, if not so stated, then in accordance with the local day work rates and wages for the district, provided that in either case vouchers specifying the daily time (and if required by the Engineer-in-charge, the workman's name) and materials employed be delivered for verification to the Engineer-in-charge or his representative at or before the end of the week following that in which the work has been executed.
				In the case of extra item(s) (items that are completely new, and are in addition to the items contained in the contract), the contractor may within fifteen days of receipt of order or occurrence of the item(s) claim rates, supported by proper rate analysis (CPWD method shall be followed as far as possible) worked on the "actual cost basis" plus 15% towards establishment charges, contractor's overhead and profit and the Engineer-in-charge shall within prescribed time limit of the receipt of the claims supported by analysis, after giving consideration to the analysis of the rates submitted by the contractor, determine the rates on the basis of the market rates and the contractor shall be paid in accordance with the rates so determined.
Deviation - Substituted Items and Pricing		B)		Items that are taken up with partial substitution or in lieu of items of work in the contract
				In the case of substituted items (items that are taken up with partial substitution or in lieu of items of work in the contract), the rate for the agreement item (to be substituted) and substituted item shall, wherever possible, be derived out of the rates given in priced schedule of quantities in the manner as mentioned in the following para.
			a)	The net rates or prices in the original tender shall determine the valuation of the extra work where such extra work is of similar character and executed under similar conditions as the work priced therein.

			b)	The net prices of the original tender shall determine the value of the items omitted provided if omissions vary the conditions under which any remaining items of works are carried out the prices for the same shall be valued under sub-clause (A) thereof.
			c)	If the market rate for the substituted item so determined is more than the market rate of the agreement item (to be substituted), the rate payable to the contractor for the substituted item shall be the rate for the agreement item (to be substituted) so increased to the extent of the difference between the market rates of substituted item and the agreement item (to be substituted).
			d)	If the market rate for the substituted item so determined is less than the market rate of the agreement item (to be substituted), the rate payable to the contractor for the substituted item shall be the rate for the agreement item (to be substituted) so decreased to the extent of the difference between the market rates of substituted item and the agreement item (to be substituted).
Deviation - Deviated Quantities and Pricing		C)	In the case of contract items, substituted items, contract cum substituted items which exceed the pre-specified limits over the tender quantity	
			In the case of contract items, substituted items, contract cum substituted items, which exceed the pre-specified limits laid down in Schedule 'F', the contractor may within fifteen days of receipt of order or occurrence of the excess, claim revision of the rates, supported by proper rate analysis (CPWD method shall be followed as far as possible) worked on the "actual cost basis" plus 15% towards establishment charges, contractor's overhead and profit for the work in excess of the above mentioned limits, provided that if the rates so claimed are in excess of the rates specified in the schedule of quantities, the Engineer-in-Charge shall within prescribed time limit of receipt of the claims supported by analysis, after giving consideration to the analysis of the rates submitted by the contractor, determine the rates on the basis of the market rates and the contractor shall be paid in accordance with the rates so determined.	

			The provisions of the preceding paragraph shall also apply to the decrease in the rates of items for the work in excess of the limits laid down in Schedule D, and the Engineer-in-Charge shall after giving notice to the contractor within one month of occurrence of the excess and after taking into consideration any reply received from him within fifteen days of the receipt of the notice, revise the rates for the work in question within one month of the expiry of the said period of fifteen days having regard to the market rates.
	12.3		The prescribed time limit for finalising rates for Extra Item(s), Substitute Item(s) and Deviated Quantities of contract items is fourty five (45) Calendar days.
	12.4	The contractor shall send to the Engineer-in-Charge once every three months, an up to date account giving complete details of all claims for additional payments to which the contractor may consider himself entitled and of all additional work ordered by the Engineer-in-Charge which he has executed during the preceding quarter failing which the contractor shall be deemed to have waived his right. However, the Employer may authorize consideration of such claims on merits.	
	12.5	Any operation incidental to or necessarily has to be in contemplation of tenderer while filing tender, or necessary for proper execution of the item included in the Schedule of quantities or in the schedule of rates mentioned above, whether or not, specifically indicated in the description of the item and the relevant specifications, shall be deemed to be included in the rates quoted by the tenderer or the rate given in the said schedule of rates, as the case may be. Nothing extra shall be admissible for such operations.	
	CLAUSE 13		

Foreclosure of contract due to Abandonment or Reduction in Scope of Work	If at any time after acceptance of the tender, Employer shall decide to abandon or reduce the scope of the works for any reason whatsoever and hence not require the whole or any part of the works to be carried out, the Engineer-in-Charge shall give notice in writing to that effect to the contractor and the contractor shall act accordingly in the matter. The contractor shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the works in full but which he did not derive in consequence of the foreclosure of the whole or part of the works.	
	The contractor shall be paid at contract rates, full amount for works executed at site and, in addition, a reasonable amount as certified by the Engineer-in-Charge for the items hereunder mentioned which could not be utilized on the work to the full extent in view of the foreclosure;	
	i)	Employer shall have the option to take over contractor's materials or any part thereof either brought to site or of which the contractor is legally bound to accept delivery from suppliers (for incorporation in or incidental to the work) provided, however Employer shall be bound to take over the materials or such portions thereof as the contractor does not desire to retain. For materials taken over or to be taken over by Employer, cost of such materials as detailed by Engineer-in- Charge shall be paid. The cost shall, however, take into account purchase price, cost of transportation and deterioration or damage which may have been caused to materials whilst in the custody of the contractor.
	The contractor shall, if required by the Engineer- in-Charge, furnish to him, books of account, wage books, time sheets and other relevant documents and evidence as may be necessary to enable him to certify the reasonable amount payable under this condition.	
Carrying out part work at risk & cost of contractor	CLAUSE 14	
	If contractor:	
	i)	At any time makes default during currency of work or does not execute any part of the work with due diligence and continues to do so even after a notice in writing of 7 days in this respect from the Engineer-in-Charge; or
	ii)	Commits default in complying with any of the terms and conditions of the contract and does not remedy it or takes effective steps to remedy it within 7 days even after a notice in writing is given in that behalf by the Engineer-in-Charge; or

	iii)	Fails to complete the work(s) or items of work with individual dates of completion, on or before the date(s) so determined, and does not complete them within the period specified in the notice given in writing in that behalf by the Engineer-in-Charge.
	The Engineer- in-Charge without invoking action under clause 3 may, without prejudice to any other right or remedy against the contractor which have either accrued or accrue thereafter to E m p l o y e r , by a notice in writing to take the part work / part incomplete work of any item(s) out of his hands and shall have powers to:	
	a)	Take possession of the site and any materials, constructional plant, implements, stores, etc., thereon; and/or
	b)	Carry out the part work / part incomplete work of any item(s) by any means at the risk and cost of the contractor.
	The Engineer-in-Charge shall determine the amount, if any, is recoverable from the contractor for completion of the part work/ part incomplete work of any item(s) taken out of his hands and execute at the risk and cost of the contractor. The liability of contractor on account of loss or damage suffered by Employer because of action under this clause shall not exceed 10% of the Contract price of the work.	
	In determining the amount, credit shall be given to the contractor with the value of work done in all respect in the same manner and at the same rate as if it had been carried out by the original contractor under the terms of his contract, the value of contractor's materials taken over and incorporated in the work and use of plant and machinery belonging to the contractor. The certificate of the Engineer-in-Charge as to the value of work done shall be final and conclusive against the contractor provided always that action under this clause shall only be taken after giving notice in writing to the contractor. Provided also that if the expenses incurred by the Employer are less than the amount payable to the contractor at his agreement rates, the difference shall not be payable to the contractor.	
	Any excess expenditure incurred or to be incurred by Employer in completing the part work/ part incomplete work of any item(s) or the excess loss of damages suffered or may be suffered by Employer as aforesaid after allowing such credit shall without prejudice to any other right or remedy available to Employer in law or as per agreement be recovered from any money due to the contractor on any account, and if such money is insufficient, the contractor shall be called upon in writing and shall be liable to pay the same within 30 days.	

	If the contractor fails to pay the required sum within the aforesaid period of 30 days, the Engineer-in-Charge shall have the right to sell any or all of the contractors' unused materials kept at site etc. and adjust the proceeds of sale thereof towards the dues recoverable from the contractor under the contract and if thereafter there remains any balance outstanding, it shall be recovered in accordance with the provisions of the contract.		
	In the event of above course being adopted by the Engineer-in-Charge, the		
	contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any engagements or made any advance on any account or with a view to the execution of the work or the performance of the contract.		
Suspension of Work	CLAUSE 15		
	i)	The contractor shall, on receipt of the order in writing of the Engineer-in-Charge, (whose decision shall be final and binding on the contractor) suspend the progress of the works or any part thereof for such time and in such manner as the Engineer-in-Charge may consider necessary so as not to cause any damage or injury to the work already done or endanger the safety thereof for any of the following reasons:	
		a)	on account of any default on the part of the contractor or;
		b)	for proper execution of the works or part thereof for reasons other than the default of the contractor; or
		c)	for safety of the works or part thereof. The contractor shall, during such suspension, properly protect and secure the works to the extent necessary and carry out the instructions given in that behalf by the Engineer-in- Charge.
	ii)	If the suspension is ordered for reasons (b) and (c) in sub-para (i) above:	
		a)	the contractor shall be entitled to an extension of time equal to the period of every such suspension PLUS 25%, for completion of the item or group of items of work for which a separate period of completion is specified in the contract and of which the suspended work forms a part, and;

		b)	If the total period of all such suspensions in respect of an item or group of items or work for which a separate period of completion is specified in the contract exceeds thirty days, the contractor shall, in addition, be entitled to such compensation as the Engineer-in-Charge may consider reasonable in respect of salaries and/or wages paid by the contractor to his employees and labour at site, remaining idle during the period of suspension, adding thereto 2% to cover indirect expenses of the contractor provided the contractor submits his claim supported by details to the Engineer-in- Charge within fifteen days of the expiry of the period of 30 days.
	iii)	If the works or part thereof is suspended on the orders of the Engineer-in-Charge for more than three months at a time, except when suspension is ordered for reason (a) in sub- para (i) above, the contractor may after receipt of such order serve a written notice on the Engineer-in-Charge requiring permission within fifteen days from receipt by the Engineer- in-Charge of the said notice, to proceed with the work or part thereof in regard to which progress has been suspended and if such permission is not granted within that time, the contractor, if he intends to treat the suspension, where it affects only a part of the works as an omission of such part by Employer or where it affects whole of the works, as an abandonment of the works by Employer, shall within ten days of expiry of such period of 15 days give notice in writing of his intention to the Engineer-in-Charge. In the event of the contractor treating the suspension as an abandonment of the contract by Employer, he shall have no claim to payment of any compensation on account of any profit or advantage which he might have derived from the execution of the work in full but which he could not derive in consequence of the abandonment. He shall, however, be entitled to such compensation, as the Engineer-in-Charge may consider reasonable, in respect of salaries and/or wages paid by him to his employees and labour at site, remaining idle in consequence adding to the total thereof 2% to cover indirect expenses of the contractor provided the contractor submits his claim supported by details to the Engineer-in-Charge within 30 days of the expiry of the period of 3 months.	
	CLAUSE 16		

Dismantled Material Employer's Property	The contractor shall treat all materials obtained during dismantling work at site (except material mentioned in Bill of quantity under rebate item and debris) etc. as Employer's property and such materials shall be disposed off as per the specific instructions in this regard or in absence of the same to the best advantage of Employer according to the instructions in writing issued by the Engineer-in-Charge.	
Contractor Liable for Damages, defects during defect liability period	CLAUSE 17	
	i)	If the contractor or his working people shall break, deface, injure or destroy any part of building in which they may be working, or any building, road, road kerb, fence, enclosure, water pipe, cables, drains, electric or telephone post or wires, trees, grass or grassland, or cultivated ground contiguous to the premises on which the work or any part is being executed, or if any damage shall happen to the work while in progress, from any cause whatever or if any defect, shrinkage, settlement or other faults appear in the work within Defects Liability Period stated in schedule 'F' or, if none stated, then within twelve months after a certificate final or otherwise of its completion shall have been given by the Engineer- in-Charge as aforesaid arising out of defect or improper materials or workmanship, the contractor shall upon receipt of a notice in writing on that behalf and within such reasonable times as shall be specified therein, make the same good at his own expense or in case of default the Engineer-in-Charge may employ and pay other persons to amend and make good such defects, shrinkage, settlements or other faults and all damages, loss and expenses consequent thereon or incidental thereto shall be made good and borne by the Contractor and such damage, loss, expenses shall be recoverable from him by the Employer or may be deducted by the Employer, upon the Engineer-in-Charge's Certificate in writing, from any money due or may become due to the Contractor, or the Employer may in lieu of such amending and making good by the Contractor deduct from any money due to the Contractor, a sum, to be determined by the Engineer-in-Charge equivalent to the cost of amending such work and in the event of the amount retained as Security Deposit being insufficient, recover the balance from the Contractor, together with any expenses the Employer may have incurred in connection therewith. Should any defective work have been done or material supplied by any sub-contractor employed on the works

		who has been nominated or approved by the Employer, the Contractor shall be liable to make good in the same manner as if such work or material had been done or supplied by the Contractor and been subject to the provisions of this Clause. The Contractor shall remain liable under the provisions of this Clause notwithstanding the signing of any certificate or the passing of any accounts, by the Employer. . The security deposit of the contractor shall not be refunded before the expiry of the Defect Liability Period after the issue of the certificate final or otherwise, as provided elsewhere.
Setting out of works	Clause 18	
	The Contractor shall set out the works and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions and alignment of all parts thereof. If at any time, any error in this respect shall appear during the progress of the works or within the Defect Liability Period after completion of the works, the Contractor shall, if so required, at his own expense rectify such error to the satisfaction of the Engineer-in-Charge. The checking of any setting-out or of any line or level by the Engineer-incharge or his representative shall not in any way relieve the Contractor of his responsibility for the correctness thereof and the Contractor shall carefully protect and preserve all bench-marks, sight rails, pegs and other things used in setting out the works.	
All relevant Statutory Laws to be complied by the Contractor	CLAUSE 19	
	i)	The contractor shall obtain a valid licence under the Contract Labour (R&A) Act, 1970, and the Contract Labour (Regulation and Abolition) Central Rules, 1971, before the commencement of the work, and continue to have a valid license until the completion of the work. The contractor shall also abide by the provisions of the Child Labour (Prohibition and Regulation) Act, 1986, Minimum Wages (Central) Rules, 1950 and POSH Act 2013.
	ii)	The contractor shall also comply with the provisions of the building and other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996 and the building and other Construction Workers Welfare Cess Act, 1996.

		iii)	The contractor shall comply with the provisions of the Payment of Wages Act, 1936, Minimum Wages Act, 1948, Employees Liability Act, 1938, Workmen's Compensation Act, 1923, Industrial Disputes Act, 1947, Maternity Benefits Act, 1961, or the modifications thereof or any other relevant laws and the rules made thereunder from time to time.
		iv)	The contractor shall comply with provisions of any other relevant law in connection with the work, as may be applicable.
		v)	Any failure to fulfill these requirements shall attract the penal provisions of the concerned Act and Contractor shall be liable to face the consequences thereof in addition to any other penal provisions of this contract. The contractor shall indemnify the Employer for any loss caused due to non-compliance with any of the provisions of laws applicable.
Payment of wages:		CLAUSE 19 A	
		i)	The contractor shall pay to labour employed by him either directly or through subcontractors, wages not less than fair wages as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970 and the contract Labour (Regulation and Abolition) Central Rules, 1971, wherever applicable.
		ii)	The contractor shall, notwithstanding the provisions of any contract to the contrary, cause to be paid fair wage to labour indirectly engaged on the work, including any labour engaged by his sub-contractors in connection with the said work, as if the labour had been immediately employed by him.
		iii)	In respect of all labour directly or indirectly employed in the works for performance of the contractor's part of this contract, the contractor shall comply with or cause to be complied with the Labour Regulations made by Government from time to time in regard to payment of wages, wage period, deductions from wages, recovery of wages not paid and deductions unauthorizedly made, maintenance of wage books or wage slips, publication of scale of wages and other terms of employment, inspection and submission of periodical returns and all other matters of the like nature or as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970, and the Contract Labour (Regulation and Abolition) Central Rules, 1971, wherever applicable.

		iv)	a)	The Engineer-in-Charge concerned shall have the right to deduct from the moneys due to the contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfilment of the conditions of the contract for the benefit of the workers, non-payment of wages or of deductions made from his or their wages which are not justified by their terms of the contract or non-observance of the Regulations.
			b)	Under the provision of Minimum Wages (Central) Rules, 1950, the contractor is bound to allow to the labours directly or indirectly employed in the works one day rest for 6 days continuous work and pay wages at the same rate as for duty. In the event of default, the Engineer-in-Charge shall have the right to deduct the sum or sums not paid on account of wages for weekly holidays to any labours and pay the same to the persons entitled thereto from any money due to the contractor.
		v)	The contractor shall indemnify as per the approved format and keep indemnified the Employer against payments to be made under and for the observance of the laws aforesaid without prejudice to his right to claim indemnity from his sub-contractors.	
		vi)	The laws aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a breach of this contract.	
		vii)	The contractor shall ensure that no amount by way of commission or otherwise is deducted or recovered from the wage of workmen.	
		CLAUSE 19 B		
		In respect of all labour directly or indirectly employed in the work for the performance of the contractor's part of this contract, the contractor shall at his own expense arrange for the safety provisions as per the Safety Code annexed and shall also at his own expense provide for all facilities in connection therewith.		
		CLAUSE 19 C		
		The contractor shall submit by the 4th and 19th of every month, to the Engineer-in-Charge, a true statement showing in respect of the second half of the preceding month and the first half of the current month respectively:-		

	1. the number of labourers employed by him on the work,	
	2. their working hours,	
	3. the wages paid to them,	
	4. the accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them, and	
	The decision of the Employer shall be final in deducting from any bill due to the contractor, the amount levied as fine if any by relevant statutory authorities and be binding on the contractor.	
	CLAUSE 19 D	
	In respect of all labour directly or indirectly employed in the works for the performance of the contractor's part of this contract, the contractor shall comply with or cause to be complied with all the rules framed by Government from time to time for the protection of health and sanitary arrangements for workers employed by him/her.	
	CLAUSE 19 E	
	The Engineer-in-Charge may require the contractor to dismiss or remove from the site of the work any person or persons in the contractor's employment upon the work who may be incompetent or misconduct himself and the contractor shall forthwith comply with such requirements. In respect of maintenance/repair or renovation works etc. where the labour have an easy access to the individual houses, the contractor shall issue identity cards to the labourers, whether temporary or permanent and he shall be responsible for any untoward action on the part of such labour.	
	CLAUSE 19 F	
	i)	It shall be the responsibility of the contractor to see that the site under renovation is not occupied by anybody unauthorizedly during renovation, and is handed over to the Engineer-in-Charge with vacant possession of the site. If such site though completed is occupied illegally, then the Engineer-in-Charge shall have the option to refuse to accept the said site in that position. Any delay in acceptance on this account will be treated as the delay in completion and for such delay, the provisions of clause 2 shall be applied by the Employer whose decision shall be final both with regard to the justification and quantum and be binding on the contractor.

	ii)	However, the Employer, through a notice, may require the contractor to remove the illegal occupation any time on or before renovation and handing over.
Contribution of EPF and ESI	CLAUSE 19 G	
	The ESI and EPF contributions on the part of employer in respect of this contract shall be paid by the contractor. The quoted rate shall be inclusive of these amounts. The contractor shall submit the details of registration of labour for EPF and ESI and documents evidencing these payments shall be submitted every month.	
Ensuring Payment and Amenities to Workers if Contractor fails	CLAUSE 19 H	
	In every case in which by virtue of the provisions of the Contract Labour (Regulation and Abolition) Act, 1970, and of the Contract Labour (Regulation and Abolition) Central Rules, 1971, Employer is obliged to pay any amounts of wages to a workman employed by the contractor in execution of the works, or to incur any expenditure in providing welfare and health amenities required to be provided under the above said Act and under the rules framed by Government from time to time for the protection of health and sanitary arrangements for workers employed by Contractors. Employer will recover from the contractor, the amount of wages so paid or the amount of expenditure so incurred; and without prejudice to the rights of the Employer under subsection(2) of Section 20, and sub-section (4) of Section 21, of the Contract Labour (Regulation and Abolition) Act, 1970, Employer 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 Employer to the contractor whether under this contract or otherwise Employer shall not be bound to contest any claim made against it under sub-section (1) of Section 20, sub-section (4) of Section 21, of the said Act, except on the written request of the contractor and upon his giving to the Employer full security for all costs for which Employer might become liable in contesting such claim.	
Authorities and Notices	CLAUSE 20	
	(i)	The Contractor shall conform to the provisions of any Act of the Legislature relating to the work, and to the regulations and bye-laws of any authority, and of any water, electric supply and other companies and/or authorities with whose systems the structure is proposed to be connected and shall before making any variations from the Drawing or Specifications that may be necessitated by so conforming give to the Employer written notice, specifying the variation

		proposed to be made and the reason for making it and apply for instructions thereon. In case the Contractor shall not within ten days receive such instructions he shall proceed with the work conforming to the provisions, regulations or bye-laws in question, and any variation so necessitated shall be dealt with under Clause 12 thereof.
	(ii)	The Contractor shall bring to the attention of the Employer all notices required by the said Acts, regulations or bye-laws to be given to any authority and pay to such authority, or to any public office all fees that may be properly chargeable in respect of the works, and lodge the receipts with the Employer.
Work not to be sublet. Action in case of insolvency	CLAUSE 21	
	The whole of the works included in the contract shall be executed by the Contractor and the Contract or any part/share thereof or any interest therein shall not be assigned or sublet without the prior written consent of the Employer, and no undertaking shall relieve the Contractor from the full and entire responsibility of the Contract or from active superintendence of the works during their progress. And if the contractor shall assign or sublet his contract, or attempt to do so, or become insolvent or commence any insolvency proceedings or make any composition with his creditors or attempt to do so, or if any bribe, gratuity, gift, loan, perquisite, reward or advantage pecuniary or otherwise, shall either directly or indirectly, be given, promised or offered by the contractor, or any of his servants or agent to any public officer or person in the employment of the Employer in any way relating to his office or employment, or if any such officer or person shall become in any way directly or indirectly interested in the contract, the Engineer-in-Charge on behalf of the Employer shall have power to adopt the course specified in Clause 3 hereof in the interest of Employer and in the event of such course being adopted, the consequences specified in the said Clause 3 shall ensue.	
	CLAUSE 22	

Recovery of Compensation paid to Workmen	In every case in which by virtue of the provisions of the Workmen's Compensation Act, 1923, or any statutory modification or re-enactment thereof, Employer is obliged to pay compensation to a workman employed by the contractor, in execution of the works, Employer shall be entitled to recover from the contractor, the amount of the compensation so paid; and, without prejudice to the rights of the Employer under the provisions of the said Act, Employer 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 Employer to the contractor whether under this contract or otherwise. Employer shall not be bound to contest any claim made against it under the provisions of the said Act, except on the written request of the contractor and upon his giving to Employer full security for all costs for which Employer might become liable in consequence of contesting such claim.
Changes in firm's Constitution to be intimated	CLAUSE 23
	Where the contractor is a partnership firm, the previous approval in writing of the Engineer-in-Charge shall be obtained before any change is made in the constitution of the firm. Where the contractor is an individual or a Hindu undivided family business concern, such approval as aforesaid shall likewise be obtained before the contractor enters into any partnership agreement where under the partnership firm would have the right to carry out the works hereby undertaken by the contractor. If previous approval as aforesaid is not obtained, the contract shall be deemed to have been assigned in contravention of Clause 21 hereof and the same action may be taken, and the same consequences shall ensue as provided in the said Clause 21.
Contractor to	CLAUSE 24

Supply Material, Machinery, Equipment, Tools & Plants etc.	The contractor shall arrange at his own expense all materials (including consumables such as welding rods etc.), all tools, plant, machinery and equipment (hereinafter referred to as T&P) required for execution of the work. In addition to this, appliances, implements, other plants, ladders, cordage, tackle, steel scaffolding and temporary works required for the proper execution of the work, whether original, altered or substituted and whether included in the specifications or other documents forming part of the contract or referred to in these conditions or not, or which may be necessary for the purpose of satisfying or complying with the requirements of the Engineer-in-Charge as to any matter as to which under these conditions he is entitled to be satisfied, or which he is entitled to require together with carriage therefor to and from the work. The contractor shall also supply without charge the requisite number of persons with the means and materials, necessary for the purpose of setting out works, and counting, weighing and assisting the measurement for examination at any time and from time to time of the work or materials.		
	CLAUSE 25		
Settlement of Disputes & Arbitration	Except where otherwise provided in the contract, all questions and disputes relating to the meaning of the specifications, design, drawings and instructions here-in before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the works or the execution or failure to execute the same whether arising during the progress of the work or after the cancellation, termination, completion or abandonment thereof shall be dealt with as mentioned hereinafter:		
		i)	The decision, opinion, direction, certificate of payment issued by the The committee member decided by the Bank in respect of all or any of the excepted matters as provided in the contract shall be final, conclusive and binding on the parties hereto and shall be without appeal. Such decision may be in the form of a final certificate or otherwise.

	ii)	All other disputes and differences of any kind whatsoever arising out of or in connection with the contract or the carrying out of the works (whether during the progress of the works or after their completion and whether before or after the determination abandonment or breach of the contract) shall be referred to and settled by a committee comprising of two (02) higher officials of the Bank and one Independent External Monitor. The designated authority shall state its decision in writing within 28 days from the date of receipt of reference from the contractor.
	iii)	But If the committee fails to give his decision within the aforesaid period or if either party be dissatisfied on any matter it may, within 28 days after receiving notice of such decision, give a written notice to the other party requiring that the matters in dispute be arbitrated upon. Such written notice shall specify the matters, which are in dispute or difference of which such written notice has been given. If both the parties agree, a single arbitrator would be appointed for the purpose. In case there is no agreement on the appointment of arbitrator, the employer shall prepare a panel of three person's names and forward to the contractor to select one among them as arbitrator. The arbitrator so appointed/selected shall confine himself only to the dispute/difference referred to him while adjudicating and pronouncing his decision. The arbitrator shall make his or their award within one year (or such further extended time as may be decided by him or them as the case may be with the consent of the parties) from the date of entering on the reference. In case during the arbitration proceedings the parties mutually settle or compromise their dispute or difference, on the parties filing their joint memorandum of the settlement or compromise, the arbitrator or the arbitrators as the case may be, shall make an award in terms of such settlement or compromise. Upon any such reference, the decision on the cost incidental to the reference and award respectively shall be in the discretion of the arbitrator as the case may be, who may determine the amount thereof

			or direct the same to be taxed as between the party and party, and shall direct by whom and to whom and in what manner the same shall be borne and paid. This submission shall be deemed to be a submission to arbitration within the meaning of the Indian Arbitration and Conciliation Act, 1996 or any statutory modification thereof. The award of the arbitrator shall be final and binding on the parties. It is agreed that the Contractor shall not delay the carrying out of the works by reason of any such matter, question or dispute being referred to arbitration, but shall proceed with the works with all due diligence and shall until the decision of the arbitrator is given, abide by the decision of the Employer. No award of the arbitrator shall relieve the Contractor of his obligations to adhere strictly to the Employer's instructions with regard to the actual carrying out of the works. The Employer and the Contractor hereby also agree that arbitration under this clause shall be a condition precedent to any right of action under the contract. The place of Arbitration shall be as specified in Schedule 'F'.
Nominated Sub-Contractors	CLAUSE 26		
	(i)		All Specialists, Merchants, Tradesman and other executing any work of supplying and fixing any goods for which prime cost prices or provisional sums are included in the Schedule of Quantities and/or Specifications who may be nominated or selected by the Engineer-in-charge are hereby declared to be Sub-Contractors employed by the Contractor and are herein referred to as nominated Sub-Contractors. The AC ducting & sprinkler firefighting works shall to be carried out through approved licensed vendors only.
	(ii)		No nominated Sub-Contractor shall be employed on or in connection with the works against whom the Contractor shall make reasonable objection or (save where the Employer and Contractor shall otherwise agree) who will not enter into a Contract provided :
		a)	That the nominated Sub-Contractor shall indemnify the Contractor against the same obligation in respect of the Sub-Contract as the Contractor is under in respect of this contract.

		b)	That the nominated Sub-Contractor shall indemnify the Contractor against claims in respect of any negligence by the Sub-Contractor, his servants or agents or any misuse by him or them of any scaffolding or other plant, the property of the Contractor or under any Workmen's Compensation Act in force.
		c)	Payment shall be made to the nominated Sub-Contractor within fourteen days of his receipt of the Engineer-in-charge's Certificate provided that before any certificate is issued, the Contractor shall, upon request, furnish to the Engineer-in-charge proof that all nominated Sub-Contractor's accounts included in previous Certificates have been duly discharged, on the default whereof, the Employer may pay the same upon a Certificate of the Engineer-in-charge and deduct the amount thereof from any sum due to the Contractor. The exercise of this power shall not create brevity of contract as between Employer and Subcontractor.
	CLAUSE 27		

Withholding and lien in respect of sum due from contractor	i)	Whenever any claim or claims for payment of a sum of money arises out of or under the contract or against the contractor, the Employer shall be entitled to withhold and also have a lien to retain such sum or sums in whole or in part from the security, if any deposited by the contractor and for the purpose aforesaid, the Employer shall be entitled to withhold the security deposit, if any, furnished as the case may be and also have a lien over the same pending finalization or adjudication of any such claim. In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the contractor, the Employer shall be entitled to withhold and have a lien to retain to the extent of such claimed amount or amounts referred to above, from any sum or sums found payable or which may at any time thereafter become payable to the contractor under the same contract or any other contract elsewhere with the R E S E R V E B A N K O F I N D I A, pending finalization of adjudication of any such claim. It is an agreed term of the contract that the sum of money or moneys so withheld or retained under the lien referred to above by Employer will be kept withheld or retained as such by the Employer till the claim arising out of or under the contract is determined by the arbitrator(if the contract is governed by the arbitration clause) or by the competent court, as the case may be and that the contractor will have no claim for interest or damages whatsoever on any account in respect of such withholding or retention under the lien referred to above and duly notified as such to the contractor. For the purpose of this clause, where the contractor is a partnership firm or a limited company, the Employer shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/limited company as the case may be, whether in his individual capacity or otherwise.

	ii)	Employer shall have the right to cause an audit and technical examination of the works and the final bills of the contractor including all supporting vouchers, abstract, etc., to be made after payment of the final bill and if as a result of such audit and technical examination any sum is found to have been overpaid in respect of any work done by the contractor under the contract or any work claimed to have been done by him under the contract and found not to have been executed, the contractor shall be liable to refund the amount of over-payment and it shall be lawful for Employer to recover the same from him in the manner prescribed in sub-clause (i) of this clause or in any other manner legally permissible; and if it is found that the contractor was paid less than what was due to him under the contract in respect of any work executed by him under it, the amount of such under payment shall be duly paid by Employer to the contractor, without any interest thereon whatsoever.
Lien in respect of claims in other Contracts	CLAUSE 27A	
	Any sum of money due and payable to the contractor (including the security deposit returnable to him) under the contract may be withheld or retained by way of lien by the Employer against any claim of the Employer in respect of payment of a sum of money arising out of or under any other contract made by the contractor with the Employer or RESERVE BANK OF INDIA elsewhere. It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the Employer will be kept withheld or retained as such by the Employer or till his claim arising out of the same contract or any other contract is either mutually settled or determined by the arbitration clause or by the competent court, as the case may be and that the contractor shall have no claim for interest or damages whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the contractor.	
	CLAUSE 28	

Return of Surplus materials	Notwithstanding anything contained to the contrary in this contract, where any materials for the execution of the contract are procured with the assistance of Employer by purchases made under orders or permits or licenses issued by Government, the contractor shall hold the said materials economically and solely for the purpose of the contract and not dispose them off without the written permission of the Employer and return it to Employer, if required by the Employer, all surplus materials that may be left with him after the completion of the contract or at its termination for any reason whatsoever on being paid or credited such price as the Engineer-in-Charge shall determine having due regard to the condition of the materials. The price allowed to the contractor however shall not exceed the purchase price thereof inclusive of sales tax, octroi and other such levies paid by Contractor in respect thereof. The decision of the Engineer-in-Charge shall be final and conclusive. In the event of breach of the aforesaid condition, the contractor shall in addition to throwing himself open to action for contravention of the terms of the license or permit and/or for criminal breach of trust, be liable to Employer for all moneys, advantages or profits resulting or which in the usual course would have resulted to him by reason of such breach.	
Water and Electric power supply for work	CLAUSE 29	
	It will available water and electricity power supply required at one point free of charge. Contractor shall make their own arrangement for further extension of connection if any with safety fixtures and nothing extra will be paid for the same.	
	i)	The Employer do not guarantee to maintain uninterrupted supply of water and it will be incumbent on the contractor(s) to make alternative arrangements for water at his/ their own cost in the event of any temporary break down in the water mains so that the progress of his/their work is not held up for want of water. No claim of damage or refund of water charges will be entertained on account of such break down.
Insurance in respect of damages to Persons and Property	CLAUSE 30	
		The Contractor shall be responsible for all injury or damage to persons, animals or things, and for all damage to property which may arise from any factor omission on the part of the Contractor or any Sub-Contractor or any nominated Sub-Contractor or any of their employees. The liability under this clause shall cover also inter-alia any damage to structures, whether immediately adjacent to the works or otherwise, any damage to roads, streets, footpaths, bridges as well as damage caused to the building and other structures and

		works forming the subject matter of this contract. The contractor shall also be responsible for any damage caused to the buildings and other structures and works forming the subject matter of this contract due to rain, wind, frost or other inclemency of weather. The Contractor shall indemnify and keep indemnified the Employer and hold him harmless in respect of all and any loss and expenses arising from any such injury or damage to persons or property as aforesaid and also against any claim made in respect of injury or damage, whether under any statute or otherwise and also in respect of any award or compensation or damage consequent upon such claims. The Contractor shall, at his own expense, effect and maintain till issue of the virtual completion certificate under this contract, with an insurance company approved by the Employer, an All Risks Policy for Insurance for the full amount of the contract including earth quake risk in the joint names of the Employer and the Contractor (the name of the former being placed first in the policy) against all risks as per the standard all risk policy for Contractors and deposit such policy or policies with the Employer before commencing the works. The Contractor shall reinstate all damage of every sort mentioned in this clause so as to do delivery of the whole of the works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to property or third parties. The Contractor shall also indemnity and keep indemnified the Employer against all claims which may be made against the Employer by any person in respect of anything which may arise in respect of the works or in consequence thereof and shall at his own expense, effect and maintain until the virtual completion of the contract, with an Insurance Company approved by the Employer a policy of Insurance in the joint names of the Employer and the Contractor (name of the former being placed first in the policy) against such risks and deposit such policy or policies before commencement of the works. The minimum limit of the coverage under the policy shall be Rs.2 lakhs per person for any one accident or occurrence and Rs.5 lakhs in respect of damage to property for any one accident or occurrence. The Contractor shall also indemnify

		the Employer against all claims which may be made upon the Employer, whether under the Workmen's Compensation Act or any other statute in force, during the currency of this contract or at Common Law in respect of any employee of the Contractor or Sub-Contractor and shall at his own expense effect and maintain until the Virtual Completion of the Contract with an Insurance Company approved by the Employer a policy of Insurance against such risks and deposit such policy or policies with the Employer from time to time during the currency of this contract. In default of the Contractor insuring as provided above, the Employer may so insure and may deduct the premiums paid from any money due or which may become due to the Contractor.
		The Contractor shall be responsible for any liability which may not be covered by the insurance policies referred to above and also for all other damages to any person, animal or defective carrying out of this contract, whatever, may be the reasons due to which the damage shall have been caused.
	The Contractor shall also indemnify and keep indemnified the Employer against all and any costs, charges or expenses arising out of any claim or proceedings relating to the works and also in respect of any award of damage or compensation arising therefrom. Without prejudice to the other rights of the Employer against Contractors in respect of such default, the Employer shall be entitled to deduct from any sums payable to the Contractor the amount of any damages, compensation costs, charges and other expenses paid by the Employer and which are payable by the Contractor under this clause.	

	The Contractor shall upon settlement by the insurer of any claim made against the insurer pursuant to a policy taken under this clause, proceed with due diligence to rebuild or repair the works destroyed or damaged. In this event all the money received from the insurer in respect of such damage shall be paid to the Contractor and the Contractor shall not be entitled to any further payment in respect of the expenditure incurred for rebuilding or repairing of the materials or goods destroyed or damaged. The Contractor, in case of re-building or reinstatement after damage shall be entitled to such extension of time for completion as the Engineer-in-charge may deem fit, but shall, however, not be entitled to reimbursement by the Employer of any shortfall or deficiency in the amount finally paid by the insurer in settlement of any claim arising as set out herein. Without prejudice to his liability under this clause, the Contractor shall also cause all nominated sub-Contractors to effect, for their respective portions of the works similar policies of insurance in accordance with the provisions of this clause and shall produce or cause to produce to the Employer such policies. The Contractor shall not permit a nominated Sub-Contractor to commence work at the site unless said insurance policies are submitted. In the event of failure, of the Sub-Contractor to take out such policy or policies of insurance before commencing the works at the site, the Contractor shall be responsible for any claim or damage attributable to the said Sub-Contractor.		
Employment of Technical Staff and employees	CLAUSE 31		
	Contractor's Superintendence, Supervision, Technical Staff & Employees		
	i)	The contractor shall provide all necessary superintendence during execution of the work and all along thereafter as may be necessary for proper fulfillment of the obligations under the contract until the expiry of the "Defects Liability Period" stated in schedule 'F'. The contractor shall immediately after receiving letter of award of work and before commencement of the work, intimate in writing to the Engineer-in-Charge, the name(s), qualifications, experience, age, address(s) and other particulars along with certificates, of the Project Manager, to be in charge of the work, Principal technical representative and other technical representative(s) who	

		will be supervising the work. Minimum requirement of such Project Manager and technical representative(s) and their qualifications and experience shall not be lower than specified in Schedule 'F'. The Engineer-in-Charge shall within 3 days of receipt of such communication intimate in writing his approval or otherwise of such a representative(s) to the contractor. Any such approval may at any time be withdrawn and in case of such withdrawal, the contractor shall appoint another such representative(s) according to the provisions of this clause. Decision of the Employer shall be final and binding on the contractor in this respect. Such a Project Manager, Principal technical representative and other technical representative(s) shall be appointed by the contractor soon after receipt of the approval from Engineer-in-charge and shall be available at site before start of work. All the provisions applicable to the principal technical representative under the Clause will also be applicable to other technical representative(s). The principal technical representative and other technical representative(s) shall be present at the site of work for supervision at all times when any renovation work is in progress and also present himself/themselves, as required, to the Engineer-in-Charge and/or his designated representative to take instructions. Instructions given to the principal technical representative or other technical representative(s) shall be deemed to have the same force as if these have been given to the contractor. The principal technical representative and other technical representative(s) shall be actually available at site fully during all stages of execution of work, during recording/checking/test checking of measurements of works and whenever so required by the Engineer-in-Charge and shall also note down instructions conveyed by the Engineer-in-Charge or his designated representative(s) in the site order book and shall affix his/their signature in token of noting down the instructions and in token of acceptance of measurements/ checked measurements/ test checked measurements. Necessary site Registers viz. site instruction register /Hindrance Register/Labour Register/water ponding register etc. shall be strictly

		maintained by him on daily basis and got duly authenticated from Engineer-in-charge or his designated representative. The representative(s) shall not look after any other work. Substitutes, duly approved by Engineer-in-Charge of the work in similar manner as aforesaid shall be provided in event of absence of any of the representative(s) by more than two consecutive days. If the Engineer-in-Charge, whose decision in this respect is final and binding on the contractor, is convinced that no such technical representative(s) is/are effectively appointed or is/are effectively attending or fulfilling the provision of this clause, a recovery (non-refundable) shall be effected from the contractor as specified in Schedule 'F' and the decision of the Engineer-In-Charge as recorded in the site order book and measurement recorded checked/test checked in Measurement Books shall be final and binding on the contractor. Further if the contractor fails to appoint suitable Project Manager, Principal technical representative and/or other technical representative(s) and if such appointed persons are not effectively present or are absent by more than two continuous days without duly approved substitute or do not discharge their responsibilities satisfactorily, the Engineer-in-Charge shall have full powers to suspend the execution of the work until such date as suitable other technical representative(s) is/are appointed and the contractor shall be held responsible for the delay so caused to the work. The contractor shall submit a certificate of employment of the technical representative(s) (in the form of copy of Form-16 or CPF deduction issued to the Technical staff and employees employed by him) along with every on account bill and final bill and shall produce evidence if at any time so required by the Engineer-in-Charge.
	ii)	The contractor shall provide and employ on the site only such technical assistants as are skilled and experienced in their respective fields and such foremen and supervisory staff as are competent to give proper supervision to the work. The contractor shall provide and employ skilled, semiskilled and unskilled labour as is necessary for proper and timely execution of the work.

	iii)	The Engineer-in-Charge shall be at liberty to object to and require the contractor to remove from the works any person who in his opinion misconducts himself, or is incompetent or negligent in the performance of his duties or whose employment is otherwise considered by the Engineer-in-Charge to be undesirable. Such person shall not be employed again at works site without the written permission of the Engineer- in-Charge and the persons so removed shall be replaced as soon as possible by competent substitutes. iv) **The contractor shall arrange for police verification of the staff and labours before commencement of the work at his own cost.**
Levy/Taxes payable by Contractor	CLAUSE 32	
	i)	Goods and service tax (GST) , Building and other Construction Workers Welfare Cess or any other tax or Cess in respect of this contract shall be payable by the contractor a nd Employer shall not entertain any claim whatsoever in this respect.
	ii)	The contractor shall deposit royalty and obtain necessary permit for supply of the red bajri, sand, stone, kankar, etc. from local authorities.
	If pursuant to or under any law, notification or order any royalty, cess or the like becomes payable by the Employer and does not any time become payable by the contractor to the State Government/ Local authorities in respect of any material used by the contractor in the works, then in such a case, it shall be lawful to the Employer and it will have the right and be entitled to recover the amount paid in the circumstances as aforesaid from dues of the contractor.	
Conditions for reimbursement of levy/taxes if levied after receipt of tenders	CLAUSE 33	
	i)	All tendered rates shall be inclusive of all taxes and levies () payable under respective statutes. However, if any further tax or levy or cess is imposed by Statute, after the last stipulated date for the receipt of tender including extensions, if any, and the contractor thereupon necessarily and properly pays such taxes/levies/cess, the contractor shall be reimbursed the amount so paid, provided such payments, if any, is not, in the opinion of the Employer (whose decision shall be final and binding on the contractor) attributable to delay in execution of work within the control of the contractor.

	ii)	The contractor shall keep necessary books of accounts and other documents for the purpose of this condition as may be necessary and shall allow inspection of the same by a duly authorized representative of the Employer and/or the Engineer-in-Charge and shall also furnish such other information/document as the Engineer-in-Charge may require from time to time.
	iii)	The contractor shall, within a period of 30 days of the
		imposition of any such further tax or levy or cess, give a written notice thereof to the Engineer-in-charge that the same is given pursuant to this condition, together with all necessary information relating thereto.
Other Persons employed by Employer	CLAUSE 34	
	The Employer reserves the right to use premises and any portions of the site for the execution of any work not included in this Contract which it may desire to have carried out by other persons and the Contractor shall allow all reasonable facilities for the execution of such work but shall not be required to provide any plant or material for the execution of such work except by special arrangement with the Employer. Such work shall be carried out in such manner as not to impede the progress of the works included in the Contract and the Contractor shall not be responsible for any damage or delay which may happen to or occasioned by such work.	
If relative working with the Employer then the contractor not allowed to tender	CLAUSE 35	
	The contractor shall not be permitted to tender for works in the office of the Employer responsible for award and execution of contracts in which his near relative is posted as an officer (in any grade) or assistant (including Junior Engineer). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any Officer of the Employer. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of the Employer. If, however, the contractor is registered in any other organization, he shall be debarred from tendering by the Employer for any breach of this condition. NOTE: By the term “near relatives” is meant wife, husband, parents and grandparents, children and grandchildren, brothers and sisters, uncles, aunts and cousins and their corresponding in-laws.	

No Employee of the Employer to work as Contractor within one year of retirement	CLAUSE 36 No Technical or other officer or assistant (including Junior Engineer) employed with the Employer shall work as a contractor or employee of a contractor for a period of one year after his retirement from the service without the previous permission of Employer in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found at any time to be such a person who had not obtained the permission of the Employer as aforesaid, before submission of the tender or engagement in the contractor's service, as the case may be.
Compensation during warlike situations	CLAUSE 37 The work (whether fully constructed or not) and all materials, machines, tools and plants, scaffolding, temporary buildings and other things connected therewith shall be at the risk of the contractor until the work has been delivered to the Engineer-in-Charge and a certificate from him to that effect obtained. In the event of the work or any materials properly brought to the site for incorporation in the work being damaged or destroyed in consequence of hostilities or warlike operation, the contractor shall when ordered (in writing) by the Engineer-in-Charge to remove any debris from the site, collect and properly stack or remove in store all serviceable materials salvaged from the damaged work and shall be paid at the contract rates in accordance with the provision of this agreement for the work of clearing the site of debris, stacking or removal of serviceable material and for reconstruction of all works ordered by the Engineer-in-Charge, such payments being in addition to compensation up to the value of the work originally executed before being damaged or destroyed and not paid for. In case of works damaged or destroyed but not already measured and paid for, the compensation shall be assessed by the Engineer-in-Charge. The contractor shall be paid for the damages/destruction suffered and for restoring the material at the rate based on analysis of rates tendered for in accordance with the provision of the contract. The certificate of the Engineer in-Charge regarding the quality and quantity of materials and the purpose for which they were collected shall be final and binding on all parties to this contract.

	Provided always that no compensation shall be payable for any loss in consequence of hostilities or warlike operations (a) unless the contractor had taken all such precautions against air raid as are deemed necessary by the Engineer-in-Charge (b) for any material etc. not on the site of the work or for any tools, plant, machinery, scaffolding, temporary building and other things not intended for the work. In the event of the contractor having to carry out reconstruction as aforesaid, he shall be allowed such extension of time for its completion as is considered reasonable by the Engineer-in-Charge.
	CLAUSE 38
Direction and approval of Engineer-in charge	All works to be executed under the contract shall be executed under the direction and subject to the approval in all respects of the Engineer-in-Charge who shall be entitled to direct at what point or points and in what manner they are to be commenced, and from time to time carried on.
	CLAUSE 39
	All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of Employer without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.
Release of Security deposit after labour clearance	CLAUSE 40
	Security Deposit of the work shall not be refunded till the contractor produces a clearance deposit after labour certificate from the Labour Officer. As soon as the work is virtually complete the contractor shall apply for the clearance certificate to the Labour Officer under intimation to the Engineer-in-Charge. The Engineer-in-Charge, on receipt of the said communication, shall write to the Labour Officer to intimate if any complaint is pending against the contractor in respect of the work. If no complaint is pending, on record till after 3 months after completion of the work and/or no communication is received from the Labour Officer to this effect till six months after the date of completion, it will be deemed to have received the clearance certificate and the Security Deposit will be released, if otherwise due.
Non- Disclosure Pact	CLAUSE 41
	The contractor shall not disclose directly or indirectly any information, materials and of the Employer's infrastructure/ system/equipment etc. which may come to the possession or knowledge of the contractor during the course of discharging its

	contractual obligations in connection with the agreement, to any third party and shall at all times hold the same in strictest confidence. The contractor shall treat the details of the contract as private and confidential, except to the extent necessary to carry out the obligations under it or to comply with applicable laws. The contractor shall not publish, permit to be published, or disclose any particulars of the works in any trade or technical paper or elsewhere without the previous written consent of the Employer. The contractor shall indemnify the Employer for any loss suffered by the Employer as a result of disclosure of any confidential information. Failure to observe the above shall be treated as breach of contract on the part of the contractor and the Employer shall be entitled to claim damages and pursue legal remedies. The contractor shall take all appropriate actions with respect to its employees to ensure that the obligations of non-disclosure of confidential information under this agreement are fully satisfied. The contractor's obligations with respect to non-disclosure and confidentiality will survive the expiry or termination of this agreement for whatever reason.
Contractor to indemnify Employer against Patent Rights	The contractor shall fully indemnify (Annex 8) and keep indemnified the Employer against any action, claim or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall himself pay any royalties, license fees etc. which may be payable in respect of any article or part thereof included in the contract or damages cost and charges of all and every sort that may be legally incurred in respect thereof. In the event of any claims made under or action brought against Employer in respect of any such matters as aforesaid, the contractor shall be immediately notified thereof and the contractor shall be at liberty, at his own expense, to settle any dispute or to conduct any litigation that may arise therefrom, provided that the contractor shall not be liable to indemnify the Employer if the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the Engineer-in-Charge in this behalf.
Sexual Harassment Of Women At Work Place	(i) The Contractor /Agency shall be solely responsible for full compliance with the provisions of the ''Sexual Harassment of the women at work place (Prevention, Prohibition and Redressal) Act, 2013". In case of any sexual harassment against its employee within the premises of the Bank, the complaint will be filed before the internal complaints committee constituted by the contractor / Agency and the Contractor /

	Agency shall ensure appropriate action under the said Act in respect to the complaint. (ii) Any complaint of sexual harassment from any aggrieved employee of the contractor against any employee of the Bank shall be taken cognizance of the Regional Complains Committee constituted by the Bank (iii) The contactor shall be responsible for any monetary compensation that may need to be paid in case the incident involves the employees of the contractor, for instance any monetary relief to Bank's employee, if sexual violence by the employee of the contractor is proved. (iv) The contractor shall be responsible for educating its employees about prevention of sexual harassment at work place and related issues

Place:

Date: Signature of contractor

Section V

SPECIAL CONDITIONS OF CONTRACT

General	CLAUSE SC 1	
	i)	Special conditions of Contract shall be read in conjunction with the General Conditions of Contract, specifications of work, drawings and any other documents forming part of this contract, wherever the context so requires.
	ii)	Notwithstanding the sub-divisions of the document into separate sections, schedules, annexures etc., every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the contract so far as it may be practicable to do so.
	iii)	Where any portion of the Special Conditions of Contract is repugnant to or at variance with any provisions of the General Conditions of Contract then unless a different intention appears, the provision(s) of the Special Conditions shall be deemed to override the provision(s) of the General conditions of Contract only of the extent that such repugnance or variations cannot and shall be to the extent that such repugnance or variance cannot be reconciled with the General Conditions of Contract.
	iv)	Wherever it is stated anywhere in this tender document that such and such supply is to be effected or such and such work is to be carried out, it shall be understood that the same shall be effected / carried out by the Contractor at his own cost, unless a different intention is specifically stated.
	v)	The items given in Schedule of Quantities shall be read in conjunction with materials and job specifications and relevant drawings.
Responsibilities of contractor	CLAUSE SC 2	
	i)	The CONTRACTOR shall be entirely responsible for executing the work covered under this Tender document in a safe, efficient and expeditious manner as per the time schedule, specifications, drawings and Renovation work aids equipment such as transportation equipment, tools and tackles as well as teasing appliances such as air compressors etc. and the necessary supervisory personnel, skilled, semi-skilled and unskilled labour shall be provided by the CONTRACTOR to achieve the monthly/weekly targets and the overall time schedule.

	ii)		The CONTRACTOR shall ensure that local labour, unskilled as well as skilled, to the extent possible and available from local resources are preferably employed on the work.
	iii)		All expenses towards mobilization at site and demobilization including bringing in equipment, work force, materials, dismantling the equipment, clearing the site, etc. shall be deemed to be included in the prices quoted and no separate payments on account of such expenses shall be entertained.
	iv)		It shall be entirely the CONTRACTOR's responsibility to provide, operate and maintain all necessary equipment, scaffoldings and safety gadgets, lifting tackles, tools and appliances to perform the work in a safe and efficient manner and complete all the jobs as per time schedules.
	v)		Preparing approaches and working area for the movement materials shall also be the responsibility of the CONTRACTOR. The CONTRACTOR shall acquaint himself with access availability etc. to provide suitable allowances in his quotation.
	vi)		The procurement and supply in sequence and at the appropriate time of all materials and consumables shall be entirely the CONTRACTOR's responsibility and his/her rates for execution of work will be inclusive of supply of all these items.
	vii)		Responsibility for obtaining all statutory approvals (if required) related to the work lies with the CONTRACTOR.
	viii)		The CONTRACTOR shall provide drinking water and other amenities at site for the contract workmen as per the statutory requirements at his own cost.
	ix)		CONTRACTOR shall take all steps to see that normal functioning of Working Office/Public life/ Public traffic is not affected/obstructed while executing the work. Stacking of materials, equipment, tools and vehicles involved in movement of equipment or materials should not make any hindrance for the movement of other vehicles and people.
	x)		CONTRACTOR shall be responsible for implementing the requirements of Local controlling State Pollution Control Board/ statutory authorities (if any).
	xi)		The works to be undertaken by the Contractor shall inter-alia include the following:
		a)	Preparation of detailed SHOP drawings and AS BUILT drawings wherever applicable.

		b)	Pre-commissioning tests as per relevant standard specifications, code of practice, Acts and Rules wherever required.
		c)	Contractor shall provide all the shop drawings or layout drawings for all the coordinated services before starting any work or placing any order of any of the services etc. These shop drawings/layout drawings shall be got approved from Engineer-in-charge before implementation and this shall be binding on the Contractor. The Contractor shall submit material submittals along with material sample for approval of Engineer-in-Charge prior to delivery of material at site.
	xii)	Wherever the 'basic rate' for the material is specified, the contractor shall furnish all the paid bills for Employer's verification. The purchase rate shall be got approved from the Engineer-in-charge before purchasing. The adjustment in price shall be made only on measured quantity. No overhead and profit shall be considered on the cost difference. The basic prices are ex-godown and are inclusive of excise duty, sales tax, octroi and all other duties levied by Local authority / Government. The rate quoted shall include transportation to site, storing and handling etc.	
	xiii)	The contractor shall arrange visits of authorized official of the manufacturer whose materials (costing more than Rs 1 lakh) have been selected / approved by the Employer for the work to inspect the materials supplied/ available at site and whether the materials are being used as per the Manufacturer's Specifications and specified consumption standards and shall be required to submit a report on the manufacturer's letterhead addressed to Employer, under official seal, indicating the genuineness or otherwise of the material and its usage methodology. No additional payment on this account shall be considered.	
Role of employer	CLAUSE SC 3		
	The Employer (Reserve Bank of India, Kolkata) shall administer and directly arrange for supervision of works, to test and examine any materials to be used or workmanship employed in connection with the works, monitoring of progress, inspection, certification of bills, making payments and implementation of various terms, conditions and stipulations of the contract.		

Bank's Project Architect	CLAUSE SC 4	
	Architect engaged by the Bank will provide the design and drawings pertaining to architectural, structural, MEP, HVAC, Firefighting, etc. Also, the work has to be executed as per the said details and the contractor is bound to accept and execute the works suggested during their supervision at site.	
Green Building requirements	CLAUSE SC 5	
	The Contractor shall adopt the construction practices and materials in line with the requirements specified in schedule 'G'. The Contractor shall strictly follow the instructions of Engineer-in-charge in this regard.	
	CLAUSE SC 6	
Inspection of Site	The intending Tenderer shall be deemed to have visited the site and examined the Site and its surroundings and familiarized themselves thoroughly with the site conditions as to the nature of the ground and subsoil and the form and nature of the Site before submitting the tender. Non familiarity with the site conditions will not be considered as reason either for extra claims or for not carrying out the work in strict conformity with the drawings and specifications. For site visit, the intending tenderer may contact the Employer.	
Services	CLAUSE SC 7	
	The Contractor shall take due and proper care during execution of telecommunication and fire alarm system work to protect Existing water/electric services from damage. In case, during the execution of work, the Contractor notices some services which require re-routing, the same shall be brought to the notice of the Engineer-in-charge. As per the instructions of Engineer-in-charge, further action for rerouting shall be undertaken. If the Contractor is advised by the Engineer-in-charge to carry out the required re-routing, the work shall be treated as Extra item of work and shall be dealt as per the relevant clause of GCC.	
Handing over of site	CLAUSE SC 8	
	i)	The Contractor shall be required to complete the following documentation with regard to the work within fourteen days from the date of award of work:

		a)	Signing of the agreement on adequate value of Non Judicial stamp paper as per the approved format
		b)	Obtaining and submitting all the required Insurance Policies as specified in the relevant clause of General Conditions of Contract and of specified value mentioned in schedule 'F'
		c)	Submission of the specified Bank Guarantees mentioned in Schedule 'F' or submission of documentary evidence of having instructed his Banker to prepare the specified Bank Guarantee
		d)	Obtaining and submitting the original Labour License or submitting the documentary evidence of having applied to the statutory authority in the prescribed form for Obtaining the Labour License if applicable.
		e)	Submitting the details/ documents of the Contractor's site team as specified in relevant clause of General Conditions of Contract and schedule 'F' for obtaining approval of Engineer-in-charge.
		f)	Submitting the detailed work programme as specified in the relevant clause of General Conditions of Contract for approval of the Engineer-in-charge
	ii)	After complying to the above documentation and other statutory requirements required to be complied by the Contractor before start of work, the Contractor shall be handed over the possession of the site. The scheduled date of commencement of work shall be reckoned from the fourteenth day of the date of award of work or the date of handing over the possession of site (if delay is due to any reasons beyond the contractor's control), whichever is later. However, any delay in handing over the possession of site to the Contractor on account of non-submission of the above documents/ details shall not be considered for extension of time.	
Drawings	CLAUSE SC 9		
	The CONTRACTOR shall keep one copy of all drawings on the works and Employer or his representative shall at all reasonable time have access to the same. Before the issue of the final certificate to the CONTRACTOR he shall forthwith return to the EMPLOYER all drawings and specifications.		

	Drawings accompanying the tender documents are indicative of the scope or work and issued for tendering purpose only.	
Further drawings and Instructions	CLAUSE SC 10	
	The Engineer-in-Charge shall have full power and authority to amend the drawings to the Contractor from time to time during the progress of the Works such further drawings for adequate execution and maintenance of the Works and the Contractor shall carry out and be bound by the same.	
Contractor's Barricades	CLAUSE SC 11	
	i)	Contractor shall erect and maintain at his own cost barricades required in connection with his operation to guard or protect the entire working area including storage, etc.
	ii)	Barricades and hazardous areas adjacent to but not located in normal routes of travel shall be marked with suitable red markers at night without any extra cost.
	iii)	The Contractor shall also comply with the provisions of Environment Protection Act with regard to air, water & noise pollution.
	iv)	The Contractor shall provide suitable construction safety nets to prevent damage to man / material at site without any extra cost
Site Facilities	CLAUSE SC 12	
	CONTRACTOR shall arrange for storage space for keeping own tools/tackles and other materials for performance of work under this contract. Whereas space will be provided by the R B I free of cost, the safety and security including safety of materials for erection purpose as well as subsequent removal of the same on completion of 'Work' under this contract are sole responsibility of the CONTRACTOR.	
	Lighting The CONTRACTOR shall ensure that the entire site is provided with adequate lighting at all times when the renovation work is in progress. He shall also make additional arrangements for lighting for carrying out work at night, whenever required. All costs in this connection shall be borne by him.	

	Compressed Air The Contractor shall make his own arrangement for Portable compressors, pumps, temporary piping for compressed air, if required, for the work including all necessary accessories, fittings etc. at his own cost for cleaning, testing, flushing etc.	
Renovation work Equipment	CLAUSE SC 13	
	The CONTRACTOR shall without prejudice to his overall responsibility to execute and complete the work as per specifications and time schedule, progressively deploy adequate and appropriate equipment and tools and tackles and augment the same as decided by the Engineer-in-Charge depending on the requirements of the work so as to suit the work schedule. No equipment shall be supplied by the Employer. Contractor shall assess the actual requirement based on the quantum and nature of work and arrange to provide the same to achieve the progress as per the approved work programme.	
Plant etc. to be exclusively for use on the works	CLAUSE SC 14	
	i)	All plants, tools and equipment and materials provided by the Contractor shall when brought on to the Site be deemed to be exclusively intended for the renovation work and completion of the Works and the Contractor shall not remove the same or any part thereof (save for the purpose of moving it from one part of the Site to another or moving it outside the site for repairs) without the previous consent in writing of the Engineer-in-Charge which shall not be unreasonably withheld.
	ii)	Clearance of Site on Completion: On completion of the Works the Contractor shall remove from the Site all the said Constructional Plant, tolls and equipment remaining thereon and any unused materials.
Care of works /plant/equipment	CLAUSE SC 15	
	From the commencement to the completion of the Works/Plant/Equipment, the Contractor shall take full responsibility for the care thereof and in case any damage loss or injury shall happen to the Works/Plant/Equipment or to any part thereof from any cause whatsoever shall at his own cost repair and make good the same so that at completion the Works/Plant/Equipment shall be in good order and condition and in conformity in every respect with the requirements of the contract. Finished Flooring shall be protected by suitable means while carrying out any civil/electrical work either internally or externally and no extra cost. Mixing mortar / concrete shall not be permitted on bare slab / waterproofing IPS / tiles and the same shall be done on steel	

	plates / mixing tubs / G.I. Trays. Any damage done to the flooring / IPS shall be rectified by the Contractor at his own cost and which shall be in the form of replacing the total flooring. Temporary used materials (e.g. Cable, pipe, valve etc) shall not be used for permanent work. All the bought-out items supplied by the Contractor and billed to Employer shall be considered as Employer's Property and due care shall be taken for safety of these by the contractor till handing over of work.	
Works to be carried out by licensed technicians under supervision of licensed Supervisors	CLAUSE SC 16	
	a)	All electrical works shall be carried out through a licensed Electrician under the supervision of licensed supervisor. The electrical connections carried out by the CONTRACTOR shall meet the statutory requirements. Changes, if any, as incorporated in the statutory rules and regulations from time to time shall be applicable to the electrical works done by the CONTRACTOR.
Quality Assurance and Quality Control	CLAUSE SC 17	
	i)	The reports of the test shall be submitted to the Engineer-in-charge as and when the tests/ quality assurance & control checks are carried out as per the contract. The Engineer-in-charge, after evaluation of the results of tests may decide to either reject or accept the respective materials/ works etc. In case of rejection, the Contractor shall have to replace the defective material/ work at the earliest without any additional cost.
	ii)	In case the CONTRACTOR fails to follow the instructions of Engineer-in-charge in this regard, the Engineer-in-charge may suspend the work till such time the quality of the work is ensured. No compensation for delays on account of such suspension of work shall be considered.
Materials at Basic Prices/ Basic rates	CLAUSE SC 18	
	i)	For carrying out certain items of work, the tender provides for procurement of certain materials at "Basic Prices/ Basic Rates" as specified in the tender document.
	ii)	While quoting the rates, the tenderer should base their item rates at "the Basic Prices" wherever specified. The said prices are ex-Godown and are inclusive of excise duty, sales tax, octroi and all other taxes and duties levied by Government or any other statutory body. (ex-Godown referred here will be dealer's Godown or Rail

		head within the Municipal or city limits or the city where the work is being done).
	iii)	The contractor shall obtain written approval from the Engineer-in-charge before procuring any material for which “Basic Price/ Basic Rate” is specified in the tender Document.
	iv)	Basic Price adjustment shall be done on the measured quantities for the finished items of work with specified “Basic Prices/Rates”. In addition to the difference in the Basic Price/ Rate and the actual purchase Rate/ Price, contractor’s overhead and profit @ 15% on the difference shall be considered for the Basic price/ Rate adjustment. While carrying out price adjustments, NO other components such as wastage, transportation, handling, insurance, labour, etc. shall be taken in to account.
	v)	The contractor shall submit copies of all tax paid vouchers (original tax paid vouchers shall be shown to the Engineer-in-charge for verification as and when required by him) for full quantity for all items to the Engineer-in-charge in support of their claim for adjustment in Basic Rates/Prices. In absence of these documents, his claim for adjustment in Basic rates/Prices shall not be considered.
Documents to be maintained at site	CLAUSE SC 19	
	a)	The Registers/ Documents specified at Schedule ‘D’ shall be maintained at site by the Contractor at his own cost and updated regularly.
	b)	These documents shall be available for inspection by Employer's representative or Engineer-in-charge or his representative during his site visit at all reasonable times.
	c)	After completion of work, the Contractor shall submit the duly completed registers/ documents along with all the drawings issued to him for construction purpose to the Engineer-in-charge before submission of the Final bill.
Progress Monitoring by the Engineer-in-charge	CLAUSE SC 20	
	i)	The contractor shall submit his programme for approval of Engineer-in-charge within 14 days from the date of

			award of work as specified in the relevant clause of the General Conditions of Contract.
	ii)		On the basis of the approved programme, the Engineer-in-charge shall monitor/ review the progress through site meetings on monthly interval or earlier, as and when required. The meeting should be attended by the contractor himself (in case of proprietorship firm) or authorized partner/ senior official in case of partnership firm/ limited company along with contractor's site in-charge.
	iii)		For this purpose, the contractor shall prepare and submit a progress report indicating following:
		A	Progress for the previous month (duration under review) and the planning for the next month and materials received during the month (duration under review) and expected to be received during next month.
		B	The reasons for major deviations in planned schedule and the actual progress achieved along with any hindrances/ decisions required from the Employer/ Engineer-in-charge.
		C	Statement of deployment of resources (men and machine) and variations, if any, from the planned schedule
		D	List of Variations / extra items if any carried out during the previous month(period under review)
Measurement, Billing and Terms of payment	CLAUSE SC 21		
	i)		The work shall be measured from time to time as provided in the General Conditions of Contract. The units of measurements shall be as defined in the specific item description in the Schedule of quantities. If for any item or part thereof, physical measurement is not practicable, measurements given in the execution drawings shall be adopted. (ii) As and when the Contractor feels that the gross value of work done after adjustment of the value of work already received in any previous bill and adjustment of advances, if any, has crossed the threshold value specified in the Schedule 'F' for Running Account Bill, he may raise a bill and submit to the Engineer-in-charge for payment. The bill shall invariably be accompanied with following documents:

		a)	The signed measurements, as specified in the General Conditions of Contract.
		b)	The progress reports of the concerned period.
		c)	Test certificates/ reports of any material considered for the first time in the Contractor's bill
		d)	Checklist indicating validity of the labour license, all the Insurance Policies, PBGs
		e)	Documents evidencing the price of materials (eg Tax paid
			vouchers etc.) considered in the bill where Basic Rates are mentioned, as applicable.
		f)	Delivery challans of the materials.
	ii)	The Engineer-in-charge reserves the right to refuse to accept the Running Account bill, if any of the document as above is not submitted along with the bill.	
	iii)	Once the bill is received along with all the required documents, the Engineer-in-charge shall arrange to process the bill and the payments due to the Contractor shall be released through NEFT within the specified period for honouring the certificates.	
	iv)	After completion of work and completing all the contractual responsibility, the measurement sheets shall be signed jointly by the Contractor or his authorized representative and Engineer-incharge or his authorized representatives. The Contractor shall then submit the Final bill to the Engineer-in-charge. The Final Bill shall necessarily be submitted along with the following documents:	
		a)	The signed measurements, as specified in the General Conditions of Contract.
		b)	The copy of last progress report, evidencing the completion of work.
		c)	Test certificates/ reports of any material considered for the first time in the Contractor's bill
		f)	Checklist indicating validity of the labour license, all the Insurance Policies, PBGs
		g)	Documents evidencing the price of materials (eg Tax paid vouchers etc.) considered in the bill where Basic Rates are mentioned, as applicable.
		h)	Delivery challans for the materials
		j)	All the required documents of Guarantees/ warranties (eg Water proofing and electrical equipments, etc. as mentioned in the specifications of respective items)

		k)	"No claim" certificate by the Contractor except as included in the Final bill.
		l)	Completion plans/ drawings/ details as specified in the General Conditions of Contract
	v)	The Engineer-in-charge reserves the right to refuse to accept the Final bill, if any of the document, as above, is not submitted along with the bill.	
	vi)	Once the Final bill is received along with all the required documents, the Engineer-in-charge shall arrange to process the bill and the payments due to the Contractor shall be released through NEFT within the specified period for honoring the certificates. No revised Final Bill shall be considered by the Employer.	
	vii)	All statutory deductions shall be made from the payments due to the Contractor.	
	Clause SC 22		
Other conditions (to be complied with while working at site)	(i)	Contractor and / or any of their representative, labour etc. shall not encroach upon the office area adjoining the designated worksite.	
	(ii)	Labours shall not be allowed to work between 10.00 PM to 7.00 AM within the site	
	(iii)	Contractor shall clear the debris only in gunny/plastic bags on regular basis within the prescribed hours as per local controlling rules i.e. between Contractor shall not be allowed to store any debris in the common compound of office premises or lobby or on the ground floor.	
	(iv)	The materials shall be allowed to be carried in or out only between as per local controlling authority	

Place :- Signature of contractor

Date :-

Section VI : Technical specifications:

A Renovation: Civil works

1 DISMANTLING AND DEMOLITION WORKS

1.1 LIST applicable INDIAN STANDARDS CODES

i) IS 1200 (Pt – XVIII) Method of Measurements of Building and Civil Engineering Works (Part –XVIII) Demolition and Dismantling

(ii) IS 4130 Demolition of Buildings–Code of Safety

1.2 TERMINOLOGY

i) Dismantling: The term 'Dismantling' implies carefully separating the parts without damage and removing. This may consist of dismantling one or more parts of the building as specified or shown on the drawings.

ii) Demolition: The term 'Demolition' implies breaking up. This shall consist of demolishing whole or part of work including all relevant items as specified or shown on the drawings.

1.3 GENERAL:

i) All materials obtained from dismantling or demolition shall be the property of the EMPLOYER unless otherwise specified and shall be kept in safe custody until they are handed over to the Engineer-in-charge.

ii) The demolition shall always be well planned before hand and shall generally be done in reverse order of the one in which the structure was constructed. The operations shall be got approved from the Engineer-in-charge before starting the work. iii) Due care shall be taken to maintain the safety measures prescribed in IS 4130.

iv) Necessary propping, shoring and or under pinning shall be provided to ensure the safety of the adjoining work or property before dismantling and demolishing is taken up and the work shall be carried out in such a way that no damage is caused to the adjoining work or property. Wherever specified, temporary enclosures or partitions and necessary scaffolding with suitable double scaffolding and proper cloth covering shall also be provided, as directed by the Engineer-in-charge.

v) Necessary precautions shall be taken to keep noise and dust nuisance to the minimum. All work needs to be done under the direction of Engineer-in-charge. Helmets, goggle, safety belts etc. should be used whenever required and as directed by the Engineer-in-charge.

vi) The demolition work shall be proceeded with in such a way that it causes the least damage and nuisance to the adjoining building and the public.

vii) Dismantling shall be done in a systematic manner.

viii) Any serviceable material, obtained during dismantling or demolition, shall be separated out and stacked properly as directed by the Engineer-in-charge within a lead of site boundary. All unserviceable materials, rubbish etc. shall be disposed of

out of premises as directed by the Engineer-in-charge at place permitted by municipal authority.

ix) The contractor shall maintain/disconnect existing services, whether temporary or permanent, where required by the Engineer-in-charge.

x) No demolition work should be carried out at night.

xi) Screens shall be placed where necessary to prevent injuries due to falling

pieces. xii) Water may be used to reduce dust while demolishing.

xiii) Safety belts shall be used by labourers while working at higher level to prevent falling from the structure.

xiv) First-aid equipment shall be got available at all demolition works of any magnitude.

1.4 RECOMMENDATIONS FOR DEMOLITION OF CERTAIN SPECIAL TYPES AND ELEMENTS OF STRUCTURES

1.4.1 In-situ Reinforced Concrete

i) Before commencing demolition, the nature and condition of the concrete, the condition and position of reinforcement, and the possibility of lack of continuity of reinforcement should be ascertained.

ii) Attention should be paid to the principles of the structural design to determine which parts of the structure depend on each other to maintain overall stability.

iii) Demolition should be commenced by removing partitions and external non-load bearing cladding. It should be noted that in some buildings the frame may rely on the panel walls for stability.

iv) Where hard demolition methods are to be used, the following procedures should be used.

a. Reinforced Concrete Beams: For beams, a supporting rope should be attached to the beam. Then the concrete should be removed from both ends by pneumatic drill and the reinforcement exposed. The reinforcement should then be cut in such a way as to allow the beam to be lowered under control to the floor.

b. Reinforced Concrete Columns: For columns, the reinforcement should be exposed at the base after restraining wire guy ropes have been placed round

the member at the top. The reinforcement should then be cut in such a way as to allow the column to be pulled down to the floor under control.

c. Reinforced Concrete Walls: Reinforced concrete walls should be cut into strips and demolished as for columns.

d. In case of foundations/footings /plinth column/plinth beams the required area to be excavated and RCC to be demolished by mechanical means as approved by Engineer in charge.

1.5 MEASUREMENTS

(i) All work shall be measured net in the decimal system, as fixed in its place, subject to the following limits, unless otherwise stated hereinafter.

a) Dimensions shall be measured correct to a cm.
b) Areas shall be worked out in sqm correct to two places of decimal.
c) Cubical contents shall be worked out to the nearest 0.01 cum.

(ii) Elements of work required to be dismantled/demolished shall only be measured and no allowance for increase in bulk. Excavation for exposing foundations/RCC elements will not be measured and paid under this items as already included in the excavation items.

1.6 RATES

"The rate shall include the cost of all labour involved and tools, equipment used in demolishing and dismantling including shoring/strutting/ scaffolding, dewatering etc.. The rate shall also include the charges for separating out and stacking the serviceable material properly and shall be disposed off out of premises as directed by the Engineer-in-charge at place permitted by municipal authority.

"The rate shall also include for temporary shoring for the safety of portions not required to be pulled down, or of adjoining property, and providing temporary enclosures or partitions, where considered necessary."

2 CONCRETE AND ALLIED WORKS

It shall be very clearly understood that the specifications given herein are brief and do not cover minute details. However, all works shall have to be carried out in accordance with the relevant standards and codes of practices or in their absence in accordance with the best accepted current Engineering practices or as directed by ENGINEER-IN-CHARGE from time to time. The decision of ENGINEER-IN-CHARGE as regards the specification to be adopted and their interpretation and the mode of execution of work shall be final and binding on CONTRACTOR and no claim whatsoever will be entertained on this account.

2.1 APPLICABLE CODES AND SPECIFICATIONS

The following specifications, standards and codes, including all official amendments/revisions and other specifications & codes referred to therein, should be considered a part of this specification. In all cases the latest issue/edition/revision shall apply.

2.1.1 Materials

a) IS:269 Specification for 33 grade ordinary Portland cement.

b) IS:455 Specification for Portland slag cement.

c) IS:1489 Specification for Portland pozzolana cement(Parts 1 & 2)

d) IS:8112 Specification for 43 grade ordinary Portland cement.

e) IS:12330 Specification for sulphate resisting Portland Cement.

f) IS:383 Specification for coarse and fine aggregates from natural sources for concrete.

g) IS:432 Specification for mild steel and medium tensile (Parts steel bars and hard drawn steel wires for 1 & 2) concrete reinforcement.

h) IS:1786 Specification for high strength deformed steel bars and wires for concrete reinforcement.

i) IS:1566 Specification for hard drawn steel wire fabric for (Parts II) concrete reinforcement.

j) IS:9103 Specification for admixtures for concrete.

k) IS:2645 Specification for integral cement waterproofing compounds.

l) IS:4900 Specification for plywood for concrete shuttering work.

m) IS:4926 Ready mixed concrete

n) IS:12269 Specification for 53 grade ordinary Portland cement.

o) IS:8041 Specification for rapid hardening cement.

p) IS:12600 Specification for low heat cement.

q) IS:6909 Specification for super sulphated cement.

r) IS:12089 Specification for granulated ground blast furnace slag.

s) BS:6699 Specification for granulated ground blast furnace slag.

t) BS:6073 Specifications for precast concrete masonry units (Part 1) Methods for specifying precast concrete masonry (Part 2)

u) IS 13620-1993 Specification for Fusion bonded epoxy coated reinforcing bars

2.1.2 Material Testing

a) IS:4031 Methods of physical tests for hydraulic cement. (Parts 1 to 15)

b) IS:4032 Method of chemical analysis of hydraulic cement.

c) IS:650 Specification for standard sand for testing of cement.

d) IS:2430 Methods for sampling of aggregates for concrete.

e) IS:2386 Methods of test for aggregates for concrete (Parts 1 to 8)

f) IS:3025 Methods of sampling and test (physical and chemical) water used in industry.(Part 1 to 51)

g) IS:6925 Methods of test for determination of water soluble chlorides in concrete admixtures.

2.1.3 Material Storage

a)"IS:4082" Recommendations on stacking and storing of construction materials at site

2.1.4 Concrete Mix Design

a) IS:10262 Recommended guidelines for Concrete Mix Design.

b) "SP:23 " Handbook on Concrete Mixes.

2.1.5 Concrete Testing

a) IS:1199 Method of sampling and analysis of concrete.

b) IS:516 Method of test for strength of concrete.

c) IS:9013 Method of making, curing and determining compressive strength of accelerated cured concrete test specimens.

d) IS:8142 Method of test for determining setting time of concrete by penetration resistance.

e) IS:9284 Method of test for abrasion resistance of concrete.

f) IS:2770 Methods of testing bond in reinforced concrete.

2.1.6 Equipment

a) IS:1791 Specification for batch type concrete mixers.

b) IS:2438 Specification for roller pan mixer.

c) IS:4925 Specification for concrete batching and mixing plant.

d) "IS:5892" Specification for concrete transit mixer and agitator.

e) IS:7242 Specification for concrete spreaders.

f) IS:2505 General Requirements for concrete vibrators: Immersion type.

g) IS:2506 General Requirements for screed board concrete vibrators.

h) IS:2514 Specification for concrete vibrating tables.

i) IS:3366 Specification for pan vibrators.

j) IS:4656 Specification for form vibrators for concrete.

k) IS:11993 Code of practice for use of screed board concrete vibrators.

l) IS:7251 Specification for concrete finishers.

m) IS:2722 Specifications for portable swing weigh batcher for concrete (single and double bucket type).

n) IS:2750 Specifications for steel scaffoldings

2.1.7 Codes of Practice

a) IS:456 Code of practice for plain and reinforced concrete.

b) IS:457 Code of practice for general construction of plain and reinforced concrete for dams and other massive structures.

c) IS:3370 Code of practice for concrete structures for storage of liquids (Parts 1 to 4)

d) IS:3935 Code of practice for composite construction.

e) IS:2204 Code of practice for construction of reinforced concrete shell roof.

f) IS:2210 Criteria for the design of reinforced concrete shell structures and folded plates.

g) IS:2502 Code of practice for bending and fixing of bars for concrete reinforcement.

h) IS:5525 Recommendation for detailing of reinforcement in reinforced concrete works.

i) IS:2751 Code of practice for welding of mild steel plain and deformed bars used for reinforced concrete construction.

j) IS:9417 Specification for welding cold worked bars for reinforced concrete construction.

k) IS:3558 Code of practice for use of immersion vibrators for consolidating concrete.

l) IS:3414 Code of practice for design and installation of joints in buildings.

m) IS:4326 Code of practice for earthquake resistant design and construction of buildings.

n) IS:4014 Code of practice for steel tubular scaffolding. (Parts 1 & 2)

o) IS:2571 Code of practice for laying in situ cement concrete flooring

p) "IS:7861" Part 1 - Recommended practice for hot weather concreting

Part 2 – Recommended practice for cold weather concreting

q) "IS:3370" Code of practice for concrete structures for the storage of liquid (Part I to IV)

2.1.8 Construction Safety

a) IS:3696 Safety code for scaffolds and ladders.(Parts 1 & 2)

b) IS:7969 Safety code for handling and storage of building materials.

c) IS:8989 Safety code for erection of concrete framed structures.

2.2 GENERAL

2.2.1 ENGINEER-IN-CHARGE shall have the right at all times to inspect all operations including the sources of materials, procurement, layout and storage of materials, the concrete batching and mixing equipment, and the quality control system. Such an inspection shall be arranged, and ENGINEER-IN-CHARGE's approval obtained, prior to starting of concrete work. This shall, however, not relieve CONTRACTOR of any of his responsibilities. All materials, which do not conform to this specification, shall be rejected.

2.2.2 Materials should be selected so that they can satisfy the design requirements of strength, serviceability, safety, durability and finish with due regards to the functional requirements and the environmental conditions to which the structure will be subjected. Materials complying with codes/standards shall only be used.

2.3 MATERIALS

2.3.1 Cement

(a) Unless otherwise specified or called for by ENGINEER-IN-CHARGE, cement shall be ordinary Portland cement conforming to IS: 269, IS: 8112 or IS: 12269.

(b) If used, The Portland pozzolana cement shall conform to IS: 1489 and it shall be used as directed by ENGINEER-IN-CHARGE. Where Portland pozzolana cements are used, it shall be ensured that consistency of quality is maintained and there will be no adverse interactions between the materials and the finish specified is not marred.

(c) Only one type of cement shall be used in any one mix unless specifically approved by
ENGINEER-IN-CHARGE.

(d) Cement, which is not used within 90 days from its date of manufacture, shall be tested at a laboratory approved by ENGINEER-IN-CHARGE and until the results of such tests are found satisfactory, it shall not be used in any work.

2.3.2 Aggregates

(a) Aggregates shall consist of naturally occurring stones and gravel (crushed or uncrushed) and manufactured sand (M sand) from approved source. They shall be chemically inert, strong, hard, clean, durable against weathering, of limited porosity, free from dust/silt/organic impurities/deleterious materials and conform to IS: 383. Aggregates such as slag, crushed over burnt bricks, bloated clay ash, sintered fly ash and tiles shall not be used.

(b) Aggregates containing reactive materials shall be used only after tests conclusively prove that there will be no adverse effect on strength, durability and finish, including long term effects, on the concrete.

c) The maximum size of coarse aggregate shall not be greater than 1/4 of the minimum thickness of the member, if the concrete can be placed without difficulty to surround all reinforcement thoroughly and fill the corners of the form. For most of work 20mm downgraded aggregate is suitable.

(d) In concrete elements with thin sections, closely spaced reinforcements or small cover, consideration should be given to the use of 10mm nominal maximum size.

(e) Plums 150 mm and above of a reasonable size may be used where directed. Plums shall not constitute more than 40% by volume of concrete unless specified by ENGINEER-IN-CHARGE.

2.3.3 Water

a) Water used for both mixing and curing shall conform to IS: 456. Potable water is generally satisfactory. Water containing any excess of acid, alkali, sugar or salt shall not be used.

b) The pH value of water shall not be less than 6.

c) The proposed admixtures shall comply with requirements of Specification for admixture.

2.3.4 Reinforcement

a) Reinforcement bars shall conform to IS: 1786 and welded wire fabric to IS: 1566 as shown on the drawing.

b) All reinforcement shall be clean, free from pitting, oil, grease, paint, loose mill scales, rust, dirt, dust or any other substance that will destroy or reduce bond.

2.3.5 Form work-Shuttering & supportin

a) Ply shuttering with required supporting arrangement shall to be used for the concrete work.

2.3.6 Storing Of Materials

a) All material shall be stored in a manner to prevent its deterioration and contamination, which would preclude its use in the works. Requirements of IS: 4082 shall be complied with.

2.4 CONCRETE

2.4.1 Nominal mix concrete

Mix Design and preliminary tests are not necessary for Nominal Mix Concrete. However, works tests shall be carried out as per IS: 456. Proportions for Nominal Mix Concrete and w/c ratio may be adopted as per Table 9 of IS: 456. However, it will be CONTRACTOR"s sole responsibility to adopt appropriate nominal mix proportions to achieve the specified characteristic strength.

2.4.2 Batching & Mixing of Concrete

Based on the adopted nominal mixes, aggregates shall be measured by volume. However, cement shall be by weight only. Appropriate correction shall be made for bulking of sand after testing.

2.4.3 CLEAN-UP

Upon the completion of concrete work, all forms, equipment, construction tools, protective coverings and any debris, scraps of wood, etc. resulting from the work shall be removed and the premises left clean.

3. MASONRY, PLASTERING AND PAINTING WORKS:

This specification covers the general requirements for building works comprising Autoclaved Aerated Concrete blocks, brick and stone masonry, pointing plastering, Gypsum plastering /POP cladding, painting and such other related works forming a part of this job, which may be required to be carried out. The work under this specification shall consist of furnishing of all tools, plants, labour, materials, and everything necessary for carrying out the work

3.1 APPLICABLE IS CODES AND SPECIFICATIONS

5.1.1 The following codes, standards and specifications are a part of this specification. All standards, specifications, codes of practice referred to herein shall be as per the latest editions including all applicable official amendments and revisions.

3.1.2 In case of discrepancy between the specification and those referred to herein, these IS specification shall govern.

i. IS:110/1983 Ready mixed paint, brushing, and grey filler, for enamels for use over primers.

ii. IS:269/1989 Specification for 33 grade ordinary Portland cement.

iii. IS:280/1978 Specification for mild steel wire for general engineering purposes.

v. IS:337/1975 Varnish, finishing interior.

vi. IS:348/1968 French polish.

vii. IS:383/1970 Specification for coarse and fine aggregates from natural sources for concrete.

viii. IS:412/1975 Expanded metal steel sheets for general purposes.

ix. IS:419/1967 Specification for putty for use on window frames.

x. IS:428/1969 Distemper, oil emulsion, colour as required.

xi. IS:702/1988 Specification for industrial bitumen.

xii IS:712/1984 Specification for building limes.

xiii IS:733/1983 Wrought aluminium and aluminum alloys, bars, rods and sections for general engineering purposes.

xiv IS:1077/1992 Specification for common burnt clay building bricks.

IS:1124/1974 Method of test for determination of water absorption, apparent specific gravity and porosity of natural building stones.

xv IS:1322/1993 Bitumen felts for water- proofing and damp proofing. IS:1397/1990 Specification for Kraft paper.

Xvi IS:1477/1971 Code of practice for painting of ferrous metals in buildings (Part 1).

xvii IS:1477/1971 - do- (Part 2)

xviii IS:1542/1992 Specification for sand for plaster.

xix IS:1580/1991 Specification for bituminous compounds for waterproofing and caulking purposes.

xx IS:1597/1992 Code of practice for construction of stone masonry: Part 1 Rubble stone masonry.

xxi IS:1661/1972 Code of practice for application of cement and cementlime plaster finishes.

Xxii IS:1834/1984 Specification for hot applied sealing compound for joint in concrete.

xxiii IS:1838/1983 Specification for preformed fillers for expansion joint in concrete pavements and structures (non extruding and resilient type): Part 1 Bitumen impregnated fibre.

xxiv IS:2074/1992 Ready mixed paint, air drying, red oxide-zinc chrome, and priming.

xxv IS:2116/1980 Specification for sand for masonry mortars. xxvi.

IS:2185/1967 Specification for concrete masonry units (Parts 1, 2 & 3). xxvii

IS:2212/1991 Code of practice for brickwork.

xxviii IS:2250/1981 Code of practice for preparation and use of masonry mortars.

xxix IS:2339/1963 Aluminum paint for general purposes, in dual container.

xxx IS:2395/1994 Code of practice for painting Concrete, masonry and plaster surfaces (Part 1).

xxxi IS:2395/1994 -DO- Part 2 xxxii IS:2402/1963 Code of practice for external rendered finishes.

xxxiii IS:2572/1963 Code of practice for construction of hollow concrete block masonry.

xxxiv IS:2750/1964 Specification for steel scaffoldings.

xxxv IS:2932/1993 Specification for enamel, synthetic, exterior type (a) undercoating, (b) finishing.

xxxiv IS:3495/1992 Method of test for burnt clay building bricks: Part 1 to 4.

Xxxv IS:3536/1966 Specification for ready mixed paint, brushing, wood primer, pink.

xxxvi IS:3696/1987 Safety code of scaffolds and ladders (Part 1).

xxxvii IS:3696/1991 -DO- (Part 2).

xxxviii IS:4443/1980 Code of practice for use of resin type chemical resistant mortars.

xxxix IS:4832/1969 Specification for chemical resistant mortars (Part 2).

xxxx IS:4860/1968 Specification for acid resistant bricks.

xxxxi. IS:4948/1974 Specification for welded steel wire fabric for general use.

xxxxii IS:5410/1992 Cement paint, colour as required.

xxxxiii. IS:15489/2004 Specification for plastic emulsion paint .

xxxxiv. IS:6041/1985 Code of practice for construction of autoclaved cellular concrete block masonry.

xxxxv. IS:6042/1969 Code of practice for construction of light weight concrete block masonry

Methods of tests for autoclaved cellular concrete

Xxxxvi IS 6441(part products 1,2,4,5,6,8)

xxxxvii IS:8042/1989 Specification for white Portland cement.

xxxxvii. IS:8543 Methods of testing plastics (all Parts/ all Section)

xxxxix IS:12200/1987 Code of practice for provision of water-stops at transverse contraction joints in masonry and concrete dams.

3.1.3 GENERAL

(a) The work to be built plumb, curved, or batters as may be required by the design and to be carried out in a thoroughly workman like manner and to the entire satisfaction of the Engineer-in-charge The Contractor to provide at his own expense all moulds, templates, centering, scaffolding etc. as may be required for the proper execution of the work which shall be included in the prices of the work, as no separate change to be made for them.

(b) All stones to be thoroughly cleaned and wetted with fresh water before being put into the work and the mortar to be used stiff.

(c) The work to be kept wet (curing) while in progress to the entire satisfaction of the Engineer-in-charge till the mortar is properly set. On Sundays and other holidays also when the work is stopped, the top of all unfinished masonry to be kept flooded and labourers to be employed for this purpose. Watering& Curing to be done carefully so as not to wash the mortar out of the joints. The Engineer-in-charge shall be at liberty to employ labourers for watering curing of the works, if the contractors fail to do the same to his (the Engineer's) satisfaction.

(d) Should the mortar perish that is becomes dry, white or powdery through neglect of watering, the work shall be pulled down and rebuilt at the contractor's expense.

(e) As a rule the whole of the masonry work in any structure to be carried up at one uniform level throughout but where breaks are unavoidable the joint to be made in good long steps, so as to prevent cracks arising between the new and old work. All junctions of walls to be formed at the time the walls are being built, and cross walls to be carefully bonded into the main walls.

(f) When new work is to be added to existing structure, the old work must be prepared to receive the new and both must be carefully bonded together.

(g) During the rains, the work to be carefully covered without extra charge, so as to avoid the fresh mortar being washed away.

(h) Where the word cement is used it is to be understood Portland cement of the best description, specified under the head of the Cement.

4. AUTOCLAVED AERATED CONCRETE BLOCK MASONRY

4.1 Materials

(a) Masonry units of Autoclaved Cellular Concrete blocks shall conform to the requirements of IS: 2185 (Part 3).

(b) The height of the concrete masonry units shall not exceed either its length or six times its width.

(c) The nominal dimensions of concrete block shall be as under.

(i) Length - 600 mm.

(ii) Height- 100 or 200 mm.

(iii) Width- 100 to 300 mm in 50 mm increments

(iv) Half blocks shall be in lengths of 200, 250 or 300 mm to correspond to the full-length blocks. Actual dimensions shall be 10 mm short of the nominal dimensions.

(d) The maximum variation in the length of the units shall not be more than + /-5mm and maximum variation in height or width of the units shall not be more than +/- 3mm.

(e) Concrete blocks shall be solid blocks. Concrete blocks shall be sound, free of cracks, chipping or other defects which impair the strength or performance of the construction. Surface texture shall be as specified. The faces of the units shall be flat

and rectangular, opposite faces shall be parallel and all arises shall be square. The bedding surfaces shall be at right angles to the faces of the block.

(f) Concrete blocks shall be stored at site suitably to avoid any contact with moisture from the ground and covered to protect against wetting.

(g) Concrete blocks shall be of approved manufacture, which satisfy the limitations in the values of water absorption, drying shrinkage and moisture movement, as specified for the type of block as per relevant IS code. CONTRACTOR shall furnish the test certificates and also supply the samples, for the approval of Engineer-in-Charge.

4.2 Workmanship

(a) The type of the concrete block, thickness and grade based on the compressive strength for use in load bearing and/or non-load bearing walls shall be as specified in the respective items of work. The minimum nominal thickness of non-load bearing internal walls shall be 100 mm. The minimum nominal thickness of external panel walls in framed construction shall be 200 mm.

(b) The workmanship shall generally conform to the requirements of IS: 2572 for concrete block masonry and IS: 6041 for autoclaved cellular concrete block masonry works.

(c) From considerations of durability, generally concrete block masonry shall be used in superstructure works above the damp-proof course level.

(d) Concrete blocks shall be embedded with a mortar which is relatively weaker than the mix of the blocks in order to avoid the formation of cracks. Cement mortar of proportion 1:6 shall be used for the works unless otherwise specified in the respective items of work. Preparation of mortar shall be as specified.

(e) The thickness of both horizontal and vertical joints shall be 10 mm. The first course shall he laid with greater care, ensuring that it is properly aligned, levelled and plumb since this will facilitate in laying succeeding courses to obtain a straight and truly vertical wall. For the horizontal (bedding) joint, mortar shall be spread over the entire top surface of the block including front and rear shells as well as the webs to a uniform layer of 10 mm. For vertical joints, the mortar shall be applied on the vertical edges of the front and rear shells of the blocks. The mortar may he applied either to the unit already placed on the wall or an the edges of the succeeding unit when it is standing vertically and then placing it horizontally, well pressed against the previously laid unit to produce a compacted vertical joint. In case of two cell blocks with slight depression on the vertical sides these shall also be filled up with mortar to secure greater lateral rigidity. To assure satisfactory bond, mortar shall not be spread too far ahead of actual laying of the block as the mortar will stiffen and lose its plasticity. Mortar while hardening shrinks slightly and thus pulls away from the edges of the block. The mortar shall be pressed against the units with a jointing tool after it has stiffened to effect intimate contact between the mortar and the unit to obtain a weather tight joint. The mortar shall be raked to a depth of 10 mm as each course is laid to ensure good bond for the plaster.

(f) Dimensional stability of hollow concrete blocks greatly affected by variations of moisture content in the units. Only well dried blocks should be used for the construction. Blocks with moisture content/water absorption more than permissible limits specified in the relevant IS shall not be used. The blocks should not be wetted before or during laying in the walls. Blocks should be laid dry except slightly moistening their surface on which mortar is to be applied to obviate absorption of water from the mortar.

(g) As per the design requirements and to effectively control cracks in the masonry, RCC bond beam, joint reinforcement shall he provided at locations as per details indicated in the construction drawings. Joint reinforcement shall be fabricated either from welded wire fabric/MS steel /high strength deformed bars as per the drawings.

(h) Concrete Block for partition walls shall be stacked adjacent to the structural member to pre-deflect the structural member before the wall is taken up for execution. Further, the top most course of walls abutting against either a de-shuttered slab or beam shall be built only after any proposed masonry wall above the structural member is executed to cater for the deflection of the structural element. All Block work shall be built tightly against columns, floor slabs or other structural members

(i) For jambs of doors, windows and openings where solid concrete blocks provided the holdfasts of doors/windows should be arranged so that they occur at block course level.

(j) At intersection of walls, the courses shall be laid up at the same time with a true masonry bond between at least 50% of the concrete blocks. The treatment at the top of load bearing walls to overcome the possibility of development of cracks in the block masonry following measures shall be adopted.

(I) For resting RCC slabs, the bearing surface of masonry wall shall be finished on top with 12 mm thick cement mortar 1:3 and provided with 2 layers of Kraft paper Grade 1 as per IS:1397 or 2 layers of 50 micron thick polyethylene sheets.

(II) RCC/steel beams resting on masonry wall shall be provided with plain or reinforced concrete bed blocks of dimensions as indicated in the drawings duly finished on top with 2 layers of Kraft paper Grade 1 as per IS:1397 or 2 layers of 50 micron thick polyethylene sheets.

(k) Reinforced cement concrete transoms and mullions of dimensions as indicated in the construction drawings are generally required to be provided in 100mm concrete block partition walls. Reinforced concrete for transoms and mullions will not be measured separately.

(l) Curing of the mortar joints shall be carried out for at least 7 days. The walls should only be lightly moistened and shall not be allowed to become excessively wet.

(m) Double scaffolding shall be adopted for execution of block masonry work. Double scaffolding having two sets of vertical supports shall be provided to facilitate execution of the masonry works. The scaffolding shall be designed adequately considering all the dead, live and possible impact loads to ensure safety of the

workmen, in accordance with the requirements stipulated in IS:2750 and IS:3696 (Part 1). Scaffolding shall be properly maintained during the entire period of construction.

(n) Cutting of the units shall be restricted to a minimum. All horizontal and vertical dimensions shall be in multiples of half length and full height of units respectively, adapting modular co-ordination for walls, opening locations for doors, windows etc. During inclement weather conditions, newly built block masonry works shall be protected by tarpaulin or other suitable covering to prevent mortar being washed away by rain.

(o) CONTRACTOR shall note that the unit rates quoted for the Concrete block masonry work shall be deemed to include for the installation of miscellaneous inserts such as pipe sleeves, bolts, steel sections with anchors etc and providing pockets, leaving openings, cutting chases etc. in accordance with the construction drawings. Miscellaneous inserts shall be furnished by the CONTRACTOR. Any of the miscellaneous inserts which are required to be fabricated and supplied by the CONTRACTOR and cement concrete to be provided in the pockets for the hold fasts of door/window frames etc.

4.3 Measurement

Measurement shall be in cum correct up to two places of decimal for walls of thickness 200 mm and above. Measurement shall be in sqm correct up to two places of decimal for walls of 100mm/150mm in thickness. Measurement shall be for the quantities for actually executed duly deducting for openings as per IS1200. The rate quoted shall be for the type of masonry blocks specified in the respective items of work which shall include for the specific sequential operations as stipulated in the construction drawings.

5 CEMENT PLASTERING WORK

5.1 Materials

The proportions of the cement mortar for plastering shall be 1:4 (one part of Cement to four parts of Coarse Sand) for external work and 1:4(one part of Cement to four parts of fine Sand) for internal work, unless otherwise specified under the respective item of work. Cement and Sand (Manufactured sand) shall be mixed thoroughly in dry condition and then water added to obtain a workable consistency. The quality of water and cement shall be as per relevant IS. Cement shall be of Ordinary Portland Cement, 43 Grade of approved make. The quality and grading of Manufactured Sand for plastering shall conform to IS: 1542 & IS 383. Manufactured Sand shall be approved by Engineer-in-Charge and if so directed it shall be washed/screened to meet specification requirements. The mixing shall be done thoroughly in a mechanical mixer unless hand mixing is specifically permitted by the Engineer-in-Charge. The mortar thus mixed shall be used as soon as possible preferably within 30 minutes from the time water is added to cement. In case the mortar has stiffened due to evaporation of water this may be retempered by adding water as required to restore consistency but this will be permitted only upto 30 minutes from the time of initial mixing of water to

cement. Any mortar which is partially set shall he rejected and removed forthwith from the site. Droppings of plaster shall not be reused under any circumstances.

5.2 Workmanship

(a) Preparation of surfaces and application of plaster finishes shall generally confirm to the requirements specified in IS: 1661 and IS: 2402.

(b) Plastering operations shall not be commenced until installation of all fittings and fixtures such as door/window panels, pipes, conduits etc. are completed as per drawing.

(c) All joints in masonry shall be raked as the work proceeds to a depth of l0mm/20mm for block/stone masonry respectively with a tool made for the purpose when the mortar is still green. The masonry surface to be rendered shall be washed with clean-water to remove all dirt, loose materials, etc., Concrete surfaces to be rendered shall be roughened suitably by hacking or bush hammering for proper adhesion of plaster and the surface shall be evenly wetted to provide the correct suction. The masonry surfaces should not be too wet but only damp at the time of plastering. The dampness shall be uniform to get uniform bond between the plaster and the masonry surface. Render with a mortar of specified parts of Portland cement and fine sand of specified thickness and rough but do not beat. Float or set with a thin coat 3 mm of Portland cement and polished well immediately with a trowel or flat board. The cement mortar to be used within 30 minutes after it leaves the mixing board or mill. Before work is started patches of plaster 150 x 150 mm. should be put on about 3 meters apart as gauges. By this means an even thickness is ensured. The finishing surface should be as specified and directed

(d) Exterior Sand Faced Plaster - This plaster shall be applied in 2 coats of total thickness of 20mm. The first coat shall be 12mm thick and the second coat shall be 8mm thick. The first coat or the rendering coat shall be approximately 12mm thick. The rendering coat shall be applied except finishing it to a true and even surface and then lightly roughened by cross scratch lines to provide bond for the finishing coat. The rendering coat shall be cured for at least two days and then allowed to dry. The second coat or finishing coat shall be 8 mm thick. Before application of the second coat, the rendering coat shall be evenly damped. The second coat shall be applied from top to bottom in one operation without joints and shall be finished leaving an even and uniform surface. The mortar proportions for the coats shall be as specified in the respective item of work. The finished plastering work shall be cured for at least 7 days. M-Sand for the finishing work shall be coarse and of even size and shall be dashed against the surface and sponged. The mortar proportions for the first and second coats shall be as specified in the respective items of work.

(e) Smooth Cement Plaster (to internal surface) - This plaster shall be laid in a single coat of 12mm thickness. The mortar shall be dashed against the prepared surface with a trowel. The dashing of the coat shall be done using a strong whipping

motion at right angles to the face of the wall or it may be applied with a plaster machine. The coat shall be troweled hard and tight forcing it to surface depressions to obtain a permanent bond and finished to smooth surface. Interior plaster shall be carried out on jambs, lintel and sill faces, etc. as shown in the drawing and as directed by the Engineer-in-Charge. Rate quoted for plaster work shall be deemed to include for plastering of all these surfaces.

(f) Wherever more than 20mm thick plaster is required, which is intended for purposes of providing beading, bands, drip moulds, etc. as per drawings this work shall be carried out in two or three coats as directed by the Engineer-in-Charge duly satisfying the requirements of curing each coat (rendering/floating) for a minimum period of 2 days and curing the finished work for at least 7 days. Rate quoted for this deemed to have been included in the external plastering item no extra payment will be made on this account.

(g) In the case of pebble faced finish plaster, pebbles of approved size and quality shall be dashed against the final coat while it is still green to obtain as far as possible a uniform pattern all as directed by the Engineer-in-Charge.

(h) Where specified in the drawings, rectangular grooves of the dimensions indicated shall be provided in external plaster by means of timber battens when the plaster is still in green condition. Battens shall be carefully removed after the initial set of plaster and the broken edges and corners made good. All grooves shall be uniform in width and depth and shall be true to the lines and levels as per the drawings.

(i) Curing of plaster shall be started as soon as the applied plaster has hardened sufficiently so as not to be damaged when watered. Curing shall be done by continuously applying water in a fine spray and shall be carried out for at least 7 days.

(j) When the specification items of work calls for waterproofing plaster the CONTRACTOR shall provide the waterproofing compound as specified while preparing the cement mortar. Cost of water-proofing compound shall be included in the rate for plastering work.

(k) For external plaster, the plastering operations shall be commenced from the top floor and carried downwards. For internal plaster, the plastering operations for the walls shall commence at the top and carried downwards. Plastering shall be carried out to the full length of the wall or to natural breaking points like doors/windows etc. Ceiling plaster shall be completed first before commencing wall plastering.

(l) Double scaffolding to be used shall be as specified in clause 5.2.2.(m).

(m) The finished plaster surface shall not show any deviation more than 4mm when checked with a straight edge of 2m length placed against the surface.

(n) To overcome the possibility of development of cracks in the plastering work following measures shall be adapted.

(o) Plastering work shall be deferred as much as possible so that fairly complete drying shrinkage in concrete and masonry works takes place.

(p) GI/Steel wire fabric shall be provided at the junction of block masonry and concrete to overcome reasonably the differential drying shrinkage/thermal movement. This GI/steel wire mesh cost shall be included in the rate of plastering work.

(q) Ceiling plaster shall be done, with a trowel cut at its junction with wall plaster. Similarly trowel cut shall be adopted between adjacent surfaces where discontinuity of the background exists.

5.3 Measurement

Measurement for plastering work shall be in sqm correct to two places of decimal for finished exposed surface. Unless a separate item is provided for grooves, mouldings, etc., these works are deemed to be included in the unit rates quoted for plastering work. The quantity of work to be paid for under these items shall be calculated by taking the projected surface of the areas plastered after making necessary deductions for openings for doors, windows, fan openings etc. The plaster work carried out on jambs/sills of windows, openings, etc. shall be measured as per IS: 1200 for payment.

6. PAINTING WORKS

6.1 General

(a) The painting work is to be executed according to the valid standards, codes and regulations on their latest revision. The following standards, codes and regulations shall be taken into consideration:

(b) The contractor has to deliver all the materials and work tools which are needed for performing the job. For instance, painting, cleaning solvents, dilution solvents, brushes, special equipment, scaffolding, ladders, collective protection material etc. Painting jobs are considered as high risk jobs and a safety and environment prevention plan has to be set up by the contractor before start of the work.

(c) Storage of the paints/ coatings and solvents: The coatings and solvents shall be stored in a ventilated container or storage room and in an ambient temperature

(d) Method of appliance of the layers: On the surfaces shall the layer been applied one after each other and between the appliance of each layer shall a drying time been respected according to the technical specification of the paint/coating manufacturer. The minimum thickness as stated in the technical specifications of the manufacturer and in this specification shall be respected.

(e) General precautions: Bolts, nuts, stud bolts, screws shall not been painted and temporarily protected for accidental paint, unless otherwise asked by the Client. Tag plates, name plates shall not been painted and temporarily protected for accidental paint. The contractor collects all removed dust, rust, spilled solvents and paints and any leftovers of paint and solvents and removes them from the site of the contractor. All these materials are destroyed or deposit conform the local regulations. The contractor shall avoid any spill of paint and /

or solvent on parts or surfaces belonging to the site of the client. To avoid spills on these parts, the contractor shall cover during the execution of the painting work (when needed) the parts.

(f) Cleaning and removal of rust or other foreign matters: Cleaning of steel and removal of rust: All the surfaces which shall be protected by a coating shall thoroughly been cleaned and prepared with as objective to remove dust, mill scale, protective coating applied during the rolling process, rust, greases, oil, humidity and other foreign matters to assure that the coating adhere on the surface and that should last as long as the normal lifetime is expected.

(g) When painting on wood, the work shall first be cleared of all such projections as glue or whiting spots being carefully removed with the stopping knife and duster, after which all knots shall be filled with one or more layers of oil and white zinc and size of glue laid on warm and rubbed down when dry with sand paper or pumice stone.

(h) The Concrete/plastered surface shall be thoroughly dried before the priming coat is applied.

(i) The steel work shall when be primed shall be either as per manufacturer's specifications or by providing with a coat of four parts by weight of white zinc mixed with one part twice boiled linseed oil.

(j) In wood works all holes, cracks and nail heads shall then be stopped with putty, and irregularities reduced with sand paper and pumice stone.

(k) Iron work shall be first thoroughly cleaned from rust and dirt, after which red lead alone shall be used as a primer.

(l) For other materials when the work is to be finished in a dark colour the priming may be zinc colour, if to be finished orange, red and similar tints the priming may be pink.

(m) All colour to be laid on evenly and properly with English made or best approved brushes. Each coat of colour to be allowed to dry thoroughly before the next is laid on and all, except the last coat to be slightly rubbed down with pumice stone.

(n) No hair marks from the brush shall be left on the work or puddle in the corners of panels, angle of mouldings etc.

(o) White paint to be made of the best mineral white zinc paint and double boiled linseed oil properly ground and mixed together with a small quantity of turpentine. A small quantity of Victoria blue to be added if directed.

(p) Linseed oil used shall be of best-approved quality limpid, pale and brilliant, yellow and sweet to the taste with every little small, and shall boiled twice.

(q) Putty shall be made of best whiting and oil, the whiting to be specially dry and passed through a sieve of 43 mashes to the inch, and then mixed with as much raw linseed oil as will form it into a stiff paste, this after being well needed,

shall be left for twelve hours and worked up in small pieces till quite smooth. If the putty become dry it should be restored by heating and working it up again while hot.

(r) When tinted colour are required, a small quantity of the proper tint should be first prepared to serve as a guide by which to mix the whole quantity. The ground white zinc shall first be well mixed with a portion of the oil, and then the tinting colour shall be added to match the pattern thoroughly after which the remaining portion of the oil or turpentine is to be added, and the whole passed through fine canvas or a fine sieve. The consistency shall be that of cream so as to work easily.

(s) Varnish to be done with copal varnish or such other as may be specified by the Engineer.

(t) Wood oiling, when employed as a substitute for painting timber work to be of linseed oil with a small quantity of dammer oiled up with it or red ochre.

(u) In case of doubt regarding the quality, the paints supplied by the contractor shall be tested in an approved laboratory as described in IS 101-1964 if considered necessary by the Engineer-in-charge.

(v) Paints, oils, varnishes etc. of approved brand and manufacture shall be used. Only ready mixed Paint as received from the manufacturer without any admixture shall be used. If for any reason, thinning is necessary in case of ready mixed Paint, the brand of thinner recommended by the manufacturer or as instructed by the Engineer-in-Charge shall be used.

(w) Approved Paints, oil or varnishes shall be brought to the site of work by the contractor in their original containers in sealed condition. The material shall be brought in at a time in adequate quantities to suffice for the whole work or at least a fortnight's work. The empties shall not be removed from the site of work, till the relevant item of work has been completed and permission obtained from the Engineer-in-Charge.

(x) Commencing Work: Painting shall not be started until the Engineer-in-Charge has inspected the items of work to be painted, satisfied himself about their proper quality and given his approval to commence the painting work. Painting of external surface should not be done in adverse weather condition like hail storm and dust storm. Painting, except the priming coat, shall generally be taken in hand after practically finishing all other building work. The rooms should be thoroughly swept out and the entire building cleaned up, at least one day in advance of the Paint work being started.

(y) Preparation of Surface: The surface shall be thoroughly cleaned and dusted off. All rust, dirt, scales, smoke splashes, mortar droppings and grease shall be thoroughly removed before painting is started. The prepared surface shall have received the approval of the Engineer-in-Charge after inspection, before painting is commenced

(z) Before pouring into smaller containers for use, the Paint shall be stirred thoroughly in its containers, when applying also, the Paint shall be continuously stirred in the smaller containers so that its consistency is kept uniform.

(aa) Where so stipulated, the painting shall be done by spraying. Spray machine used may be (a) high pressure (small air aperture) type, or (b) a low pressure (large air gap) type, depending on the nature and location of work to be carried out. Skilled and experienced workmen shall be employed for this class of work. Paints used shall be brought to the requisite consistency by adding a suitable thinner.

(bb) Spraying should be done only when dry condition prevails. Each coat shall be allowed to dry out thoroughly and rubbed smooth before the next coat is applied. This should be facilitated by thorough ventilation. Each coat except the last coat, shall be lightly rubbed down with sand paper or fine pumice stone and cleaned off dust before the next coat is laid."

(cc) The painting shall be laid on evenly and smoothly by means of crossing and laying off, the latter in the direction of the grains of wood. The crossing and laying off consists of covering the area over with Paint, brushing the surface hard for the first time over and then brushing alternately in opposite direction, two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat.

(dd) No left over Paint shall be put back into the stock tins. When not in use, the containers shall be kept properly closed. No hair marks from the brush or clogging of Paint puddles in the corners of panels, angles of mouldings etc. shall be left on the work.

(ee) In painting doors and windows, the putty round the glass panes must also be painted but care must be taken to see that no Paint stains etc. are left on the glass. Tops of shutters and surfaces in similar hidden locations shall not be left out in painting. However, bottom edge of the shutters where the painting is not practically possible, need not be done nor any deduction on this account will be done but two coats of primer of approved make shall be done on the bottom edge before fixing the shutters.

(ff) On painting steel work, special care shall be taken while painting over bolts, nuts, rivets overlaps etc. The additional specifications for primer and other coats of Paints shall be as according to the detailed specifications under the respective headings.

(gg) Brushes and Containers: After work, the brushes shall be completely cleaned of Paint and linseed oil by rinsing with turpentine. A brush in which Paint has dried up is ruined and shall on no account be used for painting work. The containers when not in use, shall be kept closed and free from air so that Paint does not thicken and also shall be kept safe from dust. When the Paint has been

used, the containers shall be washed with turpentine and wiped dry with soft clean cloth, so that they are clean, and can be used again.

(hh) Measurements (as per IS 1200)

The length and breadth shall be measured correct to a cm. The area shall be calculated in sqm (correct to two places of decimal), except otherwise stated. Small articles not exceeding 10 sq. decimetre (0.1 sqm) of painted surfaces where not in conjunction with similar painted work shall be enumerated. Painting upto 10 cm in width or in girth and not in conjunction with similar painted work shall be given in running metres and shall include cutting to line where so required. Note : Components of trusses, compound girders, stanchions, lattices and similar work shall, however, be given in sq. metres irrespective of the size or girth of members. Priming coat of painting shall be included in the work of painting works.

(ii) In measuring painting, varnishing, oiling etc. of joinery and steel work etc. The coefficients as indicated in following tables shall be used to obtain the area payable. The coefficients shall be applied to the areas measured flat and not girthed.

Equivalent Plain Areas of Uneven Surface

SNO.	Description of work	How measured	Multiplying coefficients
1	2	3	4
I.	**Wood work doors, windows Etc.**		
1.	Panelled or framed and braced Ledged and battened or ledged, battened and braced doors, windows etc	Measured flat (not girthed including) Chowkhat or frame, Edges, chocks, cleats, etc. shall be deemed to be included in the item.	1.30 (for each side)
2	Flush doors etc.	-do-	1.20 (for each side)
3	Partl panelled and part glazed or gauzed doors, window etc.	-do-	1.00 (for each side
4.	Fully glazed or gauzed doors, windows etc. (Excluding painting of wire gauze portion)	-do-	0.80 (for each side)
5.	Fully venetioned or louvered doors, windows etc.	-do-	1.80 (for each side)

6.	Trellis (or Jaffri) work one way or two way	Measured flat overall, no deduction shall be made for open spaces, supporting members shall not be measured separately	2 (for painting all over)
7.	Carved or enriched work	Measured flat	2 (for each side)
8.	Weather boarding	Measured flat (not girthed supporting frame work shall not be measured separately	1.20 (for each side)
9	Wood shingle roofing	Measured flat (not girthed)	1.10 (for each side)
10.	Boarding with cover fillets and match boarding	Measured flat (not girthed)	1.05 (for each side)
11.	Tile and slate battening	Measured flat overall no deductions shall be made for open spaces	0.80 (for painting all over)
II.	**Steel work doors, windows Etc.**		
13.	Plain sheeted steel doors or windows	Measured flat (not girthed) including frame edges etc.	1.10 (for each side)
14.	Fully glazed or gauzed steel doors and windows (excluding painting of wire gauze portion)	-do-	0.50 (for each side)
15.	Partly panelled and partly glazed or gauzed doors and windows (excluding painting of wire gauze portion)	-do-	0.80 (for each side)
16.	Corrugated sheeted steel doors or windows	-do-	1.25 (for each side)
17.	Collapsible gates	Measured flat	1.50 (for painting all over)

18.	Rolling shutters of interlocked laths	Measured flat (size of opening) all over; jamb guides, bottom rails and locking arrangement etc. shall be included in the item (top cover shall be measured separately)	1.10 (for each side)
III.	**General**		
19.	Expanded metal, hard drawn steel wire fabric of approved quality, grill works and gratings in guard bars, balustrades, railing partitions and MS Bars in windows frames.	Measured flat overall; no deduction shall be made for open spaces; supporting members shall not be measured separately	1 (for Paint all over)
20.	Open palisade fencing and gates including standards, braces, rails stays etc. in timber or steel	-do- (see note No. 12)	1 (for Paint all over)
21.	Corrugated iron sheeting in roofs, side cladding etc.	-do- Measured flat (not girthed)	1.14 (for each side)
22.	AC corrugated sheeting in roofs, side cladding etc.	-do-	1.20 (for each side)
23.	AC semi corrugated sheeting in roofs, side cladding etc. or Nainital pattern using plain sheets	-do-	1.10 (for each side)
24.	Wire gauze shutters including painting of wire gauze	-do-	1.00 (for each side)

Explanatory Notes

1. Measurements for doors windows etc., shall be taken flat (and not girthed) overall including chowkhuts or frames, where provided. Where Chowkhuts or frames are not provided, the shutter measurements shall be taken.

2. Where doors, windows etc., are of composite types other than those included in Table 1 the different portion shall be measured separately with their

appropriate coefficients, the centre line of the common rail being taken as the dividing line between the two portions.

3. The coefficients for door and windows shall apply irrespective of the size of frames and shutter members.

4. In case steel frames are used the area of doors, windows shutters shall be measured flat excluding frames.

5. When the two faces of a door, window etc. are to be treated with different specified finishes, measurable under separate items, the edges of frames and shutters shall be treated with the one or the other type of finish as ordered by the Engineer-in-Charge and measurement of this will be deemed to be included in the measurement of the face treated with that finish.

6. In the case where shutters are fixed on both faces of the frames, the measurement for the door frame and shutter on one face shall be taken in the manner already described, while the additional shutter on the other face will be measured for the shutter only excluding the frame.

7. Where shutters are provided with clearance at top or/and bottom each exceeding 15 cm height, such openings shall be deducted from the overall measurements and relevant coefficient shall be applied to obtain the area payable.

8. Collapsible gates shall be measured for width from outside to outside of gate in its expanded position and for height from bottom to top of channel verticals. No separate measurements shall be taken for the top and bottom guide rails rollers, fittings etc.

9. Coefficients for sliding doors shall be the same as for normal types of doors in the table. Measurements shall be taken outside to outside of shutters, and no separate measurements shall be taken for the painting guide rails, rollers, fittings etc.

10. Measurements of painting as above shall be deemed to include painting all iron fittings in the same or different shade for which no extra will be paid.

11. The measurements of guard bars, expanded metal, hard drawn steel wire fabric of approved quality, grill work and gratings, when fixed in frame work, painting of which is once measured else where shall be taken exclusive of the frames. In other cases the measurements shall be taken inclusive of the frames.

Width of moulded work of all other kinds, as in hand rails, cornices, architraves shall be measured by girth.

(jj) For trusses, compound girders, stanchions, lattice girders, and similar work, actual areas will be measured in sq. metre and no extra shall be paid for painting on bolt heads, nuts, washers etc. even when they are picked out in a different tint to the adjacent work.

(kk) Painting of rain water, soil, waste, vent and water pipes etc. shall be measured in running metres of the particular diameter of the pipe concerned. Painting of specials such as bends, heads, branches, junctions, shoes, etc. shall be included in the length and no separate measurements shall be taken for these or for painting brackets, clamps etc.

(ll) Measurements of wall surfaces and wood and other work not referred to already shall be recorded as per actual.

(mm) All furnitures, fixtures, glazing, floors etc. shall be protected by covering and stains, smears, splashings, if any shall be removed and any damages done shall be made good by the contractor at his cost.

(nn) Rate :Rates shall include cost of all labour and materials involved in all the operations described above and in the particular specifications given under the several items.

(oo) PAINTING PRIMING COAT ON WOOD, IRON OR PLASTERED SURFACES

(1) Primer : The primer for wood work, iron work or plastered surface shall be as specified in the description of item.

(2) Primer for plaster/wood work/Iron & Steel/Aluminum, etc surfaces shall be as specified below:

Sno.	Surfaces	Primer to be used
1.	Wood work (hard and soft wood)	Pink conforming to IS 3536
2.	Resin wood and plywood	Aluminum primer conforming to IS 3585
3.	(A) Aluminum and light alloys (B) Iron, Steel and Galvanized steel	Zinc chromate primer conforming to IS 104 Red Oxide/ Zinc chromate Primer conforming relevant IS code
4.	Cement / Concrete / RCC / concrete blocks/brick work, Plastered surfaces, non-asbestos surfaces to receive Oil bound distemper or Paint finish.	Cement primer conforming to IS 109

The primer shall be ready mixed primer of approved brand and manufacture.

Where primer for wood work is specified to be mixed at site, it shall be prepared from a mixture of red lead, white lead and double boiled linseed oil in the ratio of 0.7 kg : 0.7 kg : 1 litre.

Where primer for steel work is specified to be mixed at site, it shall be prepared from a mixture of red lead, raw linseed oil and turpentine in the ratio of 2.8 kg : 1 litre : 1 litre.

(pp) The specifications for the base vehicle and thinner for mixed on site primer shall be as follows:

1) White Lead : The White lead shall be pure and free from adulterants like barium sulphate and whiting. It shall conform to IS 103.

2) Red Lead : This shall be in powder form and shall be pure and free from adulterants like brick dust etc. It shall conform to IS 102.

3) "Raw Linseed Oil : Raw linseed oil shall be lightly viscous but clear and of yellowish colour with light brown tinge. Its specific gravity at a temperature of 30 degree C shall be
between 0.923 and 0.928."

Note : The oil shall be mellow and sweet to the taste with very little smell. The oil shall be of sufficiently matured quality. Oil turbid or thick, with acid and bitter taste and rancid odour and which remains sticky for a considerable time shall be rejected. The oil shall conform in all respects to IS 75. The oil shall be of approved brand and manufacture.

4) Double Boiled Linseed Oil : This shall be more viscous than the raw oil, have a deeper colour and specific gravity between 0.931 and 0.945 at a temperature of 30 degree C. It shall dry with a glossy surface. It shall conform in all respects to IS 77. The oil shall be of approved brand and manufacture.

5) Turpentine : Mineral turpentine i.e. petroleum distillate which has the same rate of evaporation as vegetable turpentine (distillate product of oleeresin of conifers) shall be used. It shall have no grease or other residue when allowed to evaporate. It shall conform to IS 533.

All the above materials shall be of approved manufacture and brought to site in their original packing in sealed condition.

(rr) The number of coats shall be as stipulated in the item. The Paint will be applied in the usual manner with brush, spray or roller. The Paint dries by evaporation of the water content and as soon as the water has evaporated the film gets hard and the next coat can be applied. The time of drying varies from one hour on absorbent surfaces to 2 to 3 hours on nonabsorbent surfaces. The thinning of emulsion is to be done with water and not with turpentine. Thinning with water will be particularly required for the under coat which is applied on the absorbent surface. The quantity of water to be added shall be as per manufacturer’s instructions. The surface on

finishing shall present a flat velvety smooth finish. If necessary more coats will be applied till the surface presents a uniform appearance.

(ss) QUALITY ASSURANCE

For Quality Assurance the Contractor shall ensure that color and texture of finish coats, shall match the approved sample. Also,

i) Color of priming coat shall be lighter than body coat. ii) Color of body coat shall be lighter than finish coat.

iii) Color prime and body coats as required so as not to show through the finish coat and to mask surface imperfections.

Before starting application of each type of paint, the Contractor shall apply the paint to a specimen area, not to exceed 10 square metre and get finish and texture approved and shall use it as a sample for the remainder of the work.

5.9 PAINTING OF CONCRETE MASONRY & PLASTERED SURFACES

5.9.1 Materials

(a) Acrylic emulsion paint shall be of an approved manufacture.

(b) Plastic emulsion paint shall conform to IS: 15489-2004.

(c) All the materials shall be of the best quality from an approved manufacturer. CONTRACTOR shall obtain prior approval of the Engineer-in-Charge for the brand of manufacture and the colour/shade. All materials shall be brought to the site of works in sealed containers.

6.2 Workmanship

(a) CONTRACTOR shall obtain the approval of the Engineer-in-Charge regarding the readiness of the surfaces to receive the specified finish, before commencing the work on painting.

(b) Painting of new surfaces shall be deferred as much as possible to allow for thorough drying of the sub-strata.

(c) The surfaces to be treated shall be prepared by thoroughly brushing them free from dirt, mortar droppings and any loose foreign materials. Surfaces shall be free from oil, grease and efflorescence. Efflorescence shall be removed only by dry brushing of the growth. Cracks shall be filled with Gypsum. Workmanship of painting shall generally conform to IS: 2395.

The surface shall ordinarily not be painted until it has dried completely. Trial patches of primer shall be laid at intervals and where drying is satisfactory, painting shall then be taken in hand. Before primer is applied, holes and undulations, shall be filled up with plaster of paris and rubbed smooth.

(d) Surfaces of doors, windows etc. shall be protected suitably to prevent paint finishes from splashing on them.

(e) Oil Bound Distemper: The prepared surfaces shall be dry and provided with one coat of alkali resistant primer by brushing. The surface shall be finished uniformly without leaving any brush marks and allowed to dry for atleast 48 hours. A minimum of two coats of oil bound distemper having VOC (Volatile Organic Compound) content less than 50 grams/ litre shall be applied as specified in the item of work. The first coat shall be of a lighter tint. Atleast 24 hours shall be left after the first coat to become completely dry before the application of the second coat. Broad, stiff, double bristled distemper brushes shall be used for the work. The operations for brushing each coat shall be as detailed in 5.9.2(e)

(f) Plastic Emulsion Paint: Plastic Emulsion Paint as per IS 15489 of approved brand and manufacture and of the required shade shall be used. The plastic emulsion Paint is not suitable for application on external, wood and iron surface and surfaces which are liable to heavy condensation. These Paints are to be used on internal surfaces except wooden and steel.

Plastic emulsion paint of interior grade, having VOC (Volatile Organic Compound) content less than 50 grams/ litre of approved brand and manufacture in approved shade color including applying additional coats wherever required to achieve even shade and color. The prepared surface shall be dry and provided with one coat of primer which shall be a thinned coat of emulsion paint. The quantity of thinner shall be as per manufacturer's instructions. The paint shall be laid an evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area with paint, brushing the surface hard for the first time over and then brushing alternately in opposite directions two or three times and then finally brushing lightly in a direction at right angles. In this process, no brush marks shall be left after the laying off is finished. The full process of crossing and laying off constitutes one coat. The next coat shall be applied only after the first coat has dried and sufficiently become hard which normally takes about 2 to 3 hours. A minimum of 2 finishing coats of the same colour shall be applied unless otherwise specified in the item of work. Paint may also be applied using rollers.

The surface on finishing shall present a flat velvety smooth finish and uniform in shade without any patches.

(g) Acrylic Emulsion Paint: Acrylic emulsion paint of interior grade, having VOC (Volatile Organic Compound) content less than 50 grams/ litre of approved brand and manufacture in approved shade/color including applying additional coats wherever required to achieve even shade and color. This shall be applied in the same way as for plastic emulsion paint. A minimum of 2 finishing coats over one coat of primer shall be provided unless otherwise specified in the item of work.

(h) Premium Acrylic Textured Emulsion exterior paint: The surface shall be prepared in the similar fashion as specified under lime and colour wash. In addition any existing fungus or mound growth shall be completely removed by thoroughly scrapping and rubbing down with bristle brush and sand paper and then washing down with clean

water and allowed to dry. The surface shall be brushed with a soft bristle to remove any dust particles 24 hours after the wash.

(A) With 100% Acrylic Emulsion paint

Preparation

The ready mixed exterior quality 100% Acrylic Emulsion paint shall be prepared strictly according to the manufacturer's specification.

Application of painting

The painting shall be carried out as follows.

- Apply one coat of specified primer of approved quality.
  - Apply first coat of paint as per manufacturer's specification. After allowing the first coat to dry, the excessive air holes, indentations, cracks etc. should be made up with approved fillers to yield uniform plain surface.
  - After overnight drying and light sand papering of surface, apply second coat of Emulsion paint of final approved shade.
  - If directed by the Engineer additional coat of paint should be given to bring the surface to uniform shade and tone at no extra cost.

6.3 Measurement

Measurement shall be in sq.m correct to two places of decimal. Measurement shall be for the areas as executed duly deducting for any openings etc. as detailed in the IS: code. Rate quoted shall take into account the provision of necessary enabling works such as double legged scaffolding, painter's cradle etc. Measurement shall be as per IS 1200

6.4 PAINTING OF IRON AND STEEL SURFACES

6.4.1 Materials

(a) Red oxide/Zinc chrome primer shall conform to IS: 2074.

(b) Synthetic enamel paint shall conform to IS: 2932.

(c) Aluminium paint shall conform to IS: 2339.

(d) Chlorinated Rubber Paint

(e) Epoxy micaceous Iron oxide paint

(f) All the materials shall be of the best quality from an approved manufacturer. CONTRACTOR shall obtain prior approval of the Engineer-in-Charge for the brand of manufacture and the color/shade. All the materials shall be brought to the site in sealed containers.

6.4.2 Workmanship

(a) Painting work shall be carried out only on thoroughly dry surfaces.

Painting shall be applied either by brushing or by spraying. CONTRACTOR shall procure the appropriate quality of paint for this purpose as recommended by the manufacturer. The workmanship shall generally conform to the requirement of IS: 1477 (Part 2).

(b) The type of paint, number of coats etc. shall be as specified in the respective items of work.

(c) Primer and finish paint shall be compatible with each other to avoid cracking and wrinkling. Primer and finish paint shall be from the same manufacturer.

(d) All the surfaces shall be thoroughly cleaned of oil, grease, dirt, rust and scale. The methods to be adopted using solvents, wire brushing, power tool cleaning etc., shall be as per IS: 1477 (Part-1) and as indicated in the item of work.

(e) It is essential to ensure that immediately after preparation of the surfaces, the first coat of red oxide-zinc chrome primer shall be applied by brushing and working it well to ensure a continuous film without “holidays”. After the first coat becomes hard dry, a second coat of primer shall be applied by brushing to obtain a film free from holidays.

(f) After the second coat of primer is hard dry, the entire surface shall be wet rubbed cutting down to a smooth uniform surface. When the surface becomes dry, the undercoat of synthetic enamel paint of optimum thickness shall be applied by brushing with minimum of brush marks. The coat shall be allowed to hard dry. The under coat shall then be wet rubbed cutting down to a smooth finish, taking adequate care to ensure that at no place the undercoat is completely removed. The surface shall then be allowed to dry.

(g) The first finishing coat of paint shall be applied by brushing and allowed to hard dry. The gloss from the entire surface shall then be gently removed and the surface dusted off. The second finishing coat shall then be applied by brushing.

(h) At least 24 hours shall elapse between the applications of successive coats. Each coat shall vary slightly in shade and this shall be got approved by the Engineer-in-Charge.

(i) All rust and scales shall be removed by scrapping or by brushing with steel wire brushes. Hard skin of oxide formed on the surface of wrought iron during rolling which becomes loose by rusting, shall be removed. All dust and dirt shall be thoroughly wiped away from the surface. If the surface is wet, it shall be dried before priming coat is undertaken.

(j) Treatment on Steel for Aggressive Environment: A second coat of ready mixed red oxide zinc chromate primer may be applied where considered necessary in aggressive environment such as near Industrial Establishment and Coastal regions where the steel members are prone to corrosion. The second coat (which shall be paid for separately) is to be applied after placing the member in position

and just before applying Paint. The second coat of primer is not necessary in case of painting with synthetic enamel Paint as it is applied over an under coat of ordinary Paint.

6.4.3 Measurement

Measurement shall be in sqm correct to two place of decimal for the finished work including primer. Rate shall be inclusive of enabling works such as double scaffolding, etc.
Measurement shall be as per IS 1200.

6.5 WOODEN SURFACES:

The wood work to be painted shall be dry and free from moisture. The surface shall be thoroughly cleaned. All unevenness shall be rubbed down smooth with sand paper and shall be well dusted. Knots, if any shall be covered with preparation of red lead made by grinding red lead in water and mixing with strong glue sized and used hot. Appropriate filler material conforming to IS 345 with same shade as Paint shall be used where specified. The surface treated for knotting shall be dry before Paint is applied. After obtaining approval of Engineerin-Charge for wood work, the priming coat shall be applied before the wood work is fixed in position. After the priming coat is applied, the holes and indentation on the surface shall be stopped with glazier's putty or wood putty. Stopping shall not be done before the priming coat is applied as the wood will absorb the oil in stopping and the latter is therefore liable to crack.

6.5.1 PAINTING WITH SYNTHETIC ENAMEL PAINT : Synthetic Enamel Paint (conforming to IS 2933) of approved brand and manufacture and of the required colour & finish(matt/glossy)shall be used for the top coat and an undercoat of ordinary Paint of shade to match the top coat as recommended by the same manufacturer as far the top coat shall be used

6.6 POLISHING & VARNISHING

6.6.1 (a) Melamine Polish:

For the item of melamine polish, the item includes all the sand papering required to be carried out and wiped properly for cleaning all the loose dust particles. Necessary masking tapes are to be provided where different finishing work is to be carried out, so that the melamine polish does not spread to the other surfaces. Care should be taken while removing the masking tape, so that the surface is not damaged. Cost of melamine polish includes the cost of providing and removing the masking tapes wherever required. The surface shall be sand papered using emery paper no. 180, 320 and 400 as required. Any staining required shall be carried out by applying approved stain & wood filler, to achieve the required colour and shade as directed by the Engineer-in-Charge. The item of melamine polish is deemed to include cost of such staining. Nothing extra shall be payable on this account. Melamine polish shall be applied with spray machine.

6.6.1 (b) French Polishing

French spirit polish shall be of an approved make conforming to IS 348. if it has to be prepared on site, polish shall be made by dissolving 0.7 Kg of best shellac in 4.5 liters of methylated spirit without heating. To obtain required shade pigment may be added and mixed.

Surface shall be cleaned. All unevenness shall be rubbed down smooth with sand paper and well dusted. Knots, if visible, shall be covered with a preparation of red lead and glue. Resinous or loose knots and gaps shall be filled with seasoned timber pieces and made level with rest of the surface. Holes and indentations on surface shall be filled with putty made of whiting and linseed oil. Surface shall be given a coat of filler made of 2.25 Kg of whiting in 1.5 liter of methylated spirit. When it dries, surface shall again be rubbed down perfectly smooth with sand paper and wiped clean.

Surface shall be prepared as described under "French Polishing" except that the final rubbing shall be done with sand paper which has been slightly moistened with linseed oil.

Mixture or polish shall be applied evenly, with a clean cloth pad in such a way that no blank patches are left and rubbed continuously for half an hour. When the surface is quite dry, a second coat shall be applied in the same manner and rubbed continuously for an hour or until the surface is dry. Final coat shall than be applied and rubbed for two hours or more if necessary, until the surface has assumed a uniform gloss and is quite dry showing no sign of stickiness when touched. Gloss of the polish depends on amount of rubbing, therefore rubbing must be continuous and with uniform pressure and frequent change in direction.

6.6.2 Varnishing

Surface shall be prepared as described above. After preparation of surface, two coats of clean boiled linseed oil shall be applied at sufficient interval of time. After the linseed oil has dried, two coats of varnish obtained from approved manufacturer shall be applied at sufficient interval of time. If the surface fails to produce the required gloss an additional coat shall be applied without any extra cost.

Piece of clean fine cloth and cotton wool made into shape of pad shall be used to apply polish. The pad shall be moistened with polish and rubbed hard on the surface applying the polish sparingly but uniformly and completely over the entire surface. It shall be allowed to dry and another coat applied in the same way. To give finishing coat, the pad shall be covered with a fresh piece of clean fine cotton cloth, slightly damped with methylated spirit and rubbed lightly and quickly with a circular motion, till the finished surface attains uniform texture and high gloss.

6.6.3 Wax Polishing

Wax polish shall either be prepared on site or obtained readymade from market. Polish made on the site shall be prepared from a mixture of pure bees wax, linseed oil, turpentine oil and varnish in the ratio of 2:1.5:1:1/2 by weight. The bees wax and the boiled linseed oil shall be heated over a slow fire. When the wax is completely dissolved,

the mixture shall be cooled till it is just warm and turpentine oil and varnish added to it in the required proportions and the entire mixture is well stirred.

15) WATER PROOFING TRATMENT

P & applying polymer based two compound water proofing treatment to the sunken portion, slab and raised platform of the toilets, baths and kitchen etc. by using products of approved make in the following steps: a) Thoroughly cleaning of all surfaces to be treated.
b) Providing and applying 20 mm thick water proofing cement plaster 1:4 (I cement: 4 coarse sand) mixed with water proofing compound as per manufacturer's specifications to the sunken floor, slab and sides about 300mm height from FFL, including rounding off junctions / corners with water proofing cement mortar, etc. all complete.
c) Providing & applying a coat of polymer water proofing primer and two coats of two compound based water proofing polymer/chemical of approved make as per manufacturer's specifications to the sunken floor/floor, sides, etc.; testing the treated surface by ponding method for 72 hours.
d) Repeat the treatment till no seepage is observed on the treated surface.
e) Providing and laying 15mm thick protective layer of plain cement plaster in cement mortar 1:4 (1 cement: 4 coarse sand) over the treated surface. Note: The entire area of waterproofing treatment shall be completely leakproof as observed during DLP period (five years for this item and for). If, any leakage/seepage observed during five year (DLP) the firm is liable/ responsible & accountable to rectify the defects on immediate basis, or redo the entire waterproofing / brick bat coba work for the same. At this juncture contractor must submit undertaking for warranty & guarantee for above said purpose on non-judicial stamp paper of appropriate value. The cost stamp paper shall be borne by the contractor. Plan area of the sunken floor/floor shall only be considered for payment.

7. FLOORING AND DADO WORKS

7.1 THE FOLLOWING CODES, STANDARDS AND SPECIFICATIONS ARE A PART OF THIS SPECIFICATION. ALL STANDARDS, SPECIFICATIONS, CODES OF PRACTICE REFERRED TO HEREIN SHALL BE THE LATEST EDITIONS INCLUDING ALL APPLICABLE OFFICIAL AMENDMENTS AND REVISIONS.

1. IS 13712:2006 **-** Ceramic Tiles- definitions, classifications, characteristics and marking
2. IS15622-2006 - Pressed ceramic tiles - specification
3. I.S. 1130-1969 - Specification for marble (blocks, slabs and tiles)
4. IS: 777/1988 - Specification for glazed earthenware tiles.

5. IS: 4457/1982 - Specification for ceramic unglazed vitreous acid resisting tile.

6. IS: 1443/1972 - Code of practice for laying and finishing of cement concrete flooring tiles.

7. IS: 2571/1970 - Code of practice for laying in-situ cements concrete flooring.

8. IS: 2690/1993 - Specification for burnt clay flat terracing tiles: Part 1 Machine made.

9. IS: 4631/1986 - Code of practice for laying epoxy resin floor toppings

10. IS: 5318/1969 - Code of practice for laying of flexible PVC sheet and tile flooring

11. IS: 5491/1969 - Code of practice for laying of in-situ granolithic concrete floor

12. IS 1124/ 1974 - Method of test for determination of water absorption, (Reaffirmed apparent specific gravity and porosity of natural building
2003**)** stones

7.2 VITRIFIED/SEMI VITRIFIED/ GLAZED/ANTI-SKID CERAMIC TILES/VITRIOUS

(a) VITRIFIED TILES shall be approved manufacture and shall conform to table 12 of IS 15622 (Tiles with water absorption E ≤ 0.08 per cent Group B I a) and the joint thickness in flooring shall not be more than 1mm. Ceramic tiles shall be of approved manufacture and shall generally conform to IS 15622 . The tiles shall be square or rectangular of nominal size.

Glazed earthenware tiles shall be approved manufacture and conform to the requirements of IS: 777.

The Tiles shall be flat, and true to shape and free from blisters crazing, pinholes, chips, welts, crawling or other imperfections detracting from their appearance and shall have ribs or indentations for a better anchorage with the bedding mortar. Dimensional tolerances shall be as specified in relevant IS.

(b) The size, thickness, colour, with or without designs etc of the tiles for flooring/dado/skirting shall be as specified in the respective items of work. The Ceramic / Vitrified tiles, shall be of approved manufacturer

and shall include laying them in desired pattern and colour/combination and to proper slope. The samples of tiles for flooring and dadoing etc. shall be got approved and tested before laying.

(c) The total thickness of glazed tile finish including the bedding mortar shall be as specified in item in flooring/dado/skirting. The minimum thickness and proportion of bedding mortar for flooring and for dado/skirting work as specified in item of schedule of quantity Sand mixed with just sufficient water to obtain proper consistency for laying. Sand for the mortar shall conform to IS: 2116 and shall have minimum fineness modules of 1.5

(d) Where full size tiles cannot be fixed, tiles shall be cut to the required size using special cutting device and the edges rubbed smooth to ensure straight and true joints.

(e) Coloured tiles with or without designs shall be uniform and shall be preferably procured from the same batch of manufacture to avoid any differences in the shade.

(f) Tiles for the flooring shall be laid over hardened concrete base. The surface of the concrete base shall be cleaned of all loose materials, mortar droppings etc well wetted without allowing any water pools on the surface. The bedding mortar shall then be laid evenly over the surface, tamped to the desired level and allowed to harden sufficiently to offer a fairly rigid cushion for the tiles to be set and to enable the mason to place wooden plank across and squat on it. The top surface shall be left rough to provide a good bond for the tiles. For skirting and dado work, the backing mortar shall be roughened using a wire brush.

(g) Neat cement slurry using 3.3 kg cement per one sq.m of floor area shall be spread over the hardened mortar bed over such an area as would accommodate about 20 tiles. Tiles shall be fixed in this slurry one after the other, each tile being gently tapped with a wooden mallet till it is properly bedded and in level with the adjoining tiles. For skirting and dado work, the back of the tiles shall be smeared with cement slurry for setting on the backing mortar. Fixing of tiles shall be done from the bottom of the wall upwards. The joints shall be in perfect straight lines and as thin as possible, For vitrified tiles it shall not be more than 1mm wide. The surface shall be checked frequently to ensure correct level/required slope. Floor tiles near the walls shall enter skirting/dado to a minimum depth of 10mm. Tiles shall not sound hollow when tapped.

(h) In bath, toilet W.C. kitchen and balcony/verandah flooring, suitable tile drop or as shown in drawing shall be given in addition to required slope to avoid spread of water. Further tile drop will also be provided near floor trap.

(i) All the joints shall be cleaned of grey cement with wire brush to a depth of at least
3mm and all dust, loose mortar etc. shall be removed. White cement with or without pigment shall then be used for flush pointing the joints. Curing shall then be carried out for a minimum period of 7 days for the bedding and joints to set properly. The surface shall then be cleaned using a suitable detergent, fully washed and wiped dry.

(j) Specials consisting of caves, internal and external angles, cornices, beads and their corner pieces shall be of thickness not less than the tiles with which they are used.

(k) All tile work in skirting, facia and dado shall include scaffolding, working platforms, etc. and the cost of bedding/backing materials. Tiles shall be set in cement paste and joints filled with cement slurry for matching shade (e.g. white tile joints to be filled with white cement).

(l) The rate shall include provision for extra bedding thickness to have the same finished levels when flooring is done with two different materials e.g. Kotah stone/ Granite, Vitrified tiles for adjoining areas, and laying to the required slope, gradient etc. Rate shall include all cuttings and wastage of tiles, curing , cleaning finished surfaces and adequate protection of vitrified/ceramic flooring work by a layer of Plaster of Paris which shall be maintained throughout and removed just before handing over of the works, cleaning, disposal of debris and for which nothing extra shall be payable.

(m) Measurement

Measurement for floor tiling and dado shall be in sq.m correct to two places of decimal. Actual quantity of tiling work as laid shall be measured for payment as per the respective items of work after making deductions for openings etc.

8. SANITARY, WATER SUPPLY AND DRAINAGE

This specification covers the general requirements for Supplying, installing, testing and commissioning of sanitary Installations- sanitary fixtures, piping and fittings, Water supply- Internal & External piping and Drainage - Internal & External.

8.1 Applicable Codes, Standards and Publications

13.1.1 All equipment, supply, erection, testing and commissioning shall comply with the requirements of Indian Standards and code of practices given below as amended till date. All equipment and material being supplied by the CONTRACTOR shall meet the requirements of IS, and other Codes/ Publications as given below.

IS 15801	Polypropylene- Random Copolymer Pipes for hot and cold water supplies-Specifications
IS 15778	Chlorinated Polyvinyl Chloride (CPVC) pipes for potable hot and cold water distribution supplies-specifications
IS 4985	Unplasticised P.V.C. pipes for potable water supply – Specifications
IS 13592	Unplasticized Polyvinyl Chloride (UPVC) pipes for soil and waste discharge systems inside buildings including ventilation and rainwater system
IS 14735	Unplasticized Polyvinyl Chloride (UPVC) Injection Moulded Fittings for Soil, Waste rain water pipes
IS 4984	Specification for high density polyethylene pipes for potable water supplies.
IS 13983	Stainless steel sinks for domestic purposes – Specifications.
IS:554	Dimensions for pipe threads where pressure tight joints are required on the threads
IS:779	Specification for water meters (domestic type)

IS:1068	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium
IS:1172	Code of Basic requirements for water supply drainage and sanitation
IS:1367	(Part 1) Technical supply conditions for threaded steel fasteners: Part I Introduction and general information
IS:7181	Specification for horizontally cast iron double flanged pipes for water, gas and sewage.
IS:778	Specification for copper alloy gate, globe and check valves for water works purposes.
IS:780	Specification for sluice valves for water works purposes (50mm to 300mmsize)
IS:1703	Specification copper alloy float valves (Horizontal plunger type) for water supply fittings.
IS: 3950	Specification for surface boxes for sluice valves
IS:5312	(Part 1) Specification for swing check type reflux (non-return) valves: Part 1 Single door pattern
IS:5312	Specification for swing check type reflux (non-return) valves: Part 2 Multi door pattern
IS:12992	Safety relief valves, spring loaded: (Part 1) Part1 Design
IS:13095	Butterfly valves for general purposes
IS:771	(Part 1 to 3) Specification for glazed fire clay sanitary Appliances

IS:774	Specification for flushing cistern for water closets and urinals (other than plastic cistern)
IS:775	Specification for cast iron brackets and supports for wash basins and sinks.
IS:781	Specification for cast copper alloy screw down bib taps and stop valves for water services
IS:1700	Specification for drinking fountains
IS:2326	Specification for automatic flushing cisterns
IS:2548	Part1 Specification for plastic seats and covers for Water closets: Part 1 Thermoset seats and covers
IS: 2548(Part 2)	Specification for plastic seats and covers for Water closets: Part 2 Thermoplastic seats and covers
IS:2556(Part 1)	Specification for vitreous sanitary appliances (Vitreous china): Part 1: General requirements
IS:2556(Part 2)	Specification for vitreous sanitary appliances (Vitreous china) Part 2: Specific requirements of wash down water closets
IS:2556(Part 3)	Specification for vitreous sanitary appliances
	(Vitreous china) Part 3: Specific requirements of squatting pans
IS:2556(Part 4)	Specification for vitreous sanitary appliances (Vitreous china) Part 4: Specific requirements of wash basins

IS:2556	(Part 6 Specification for vitreous sanitary appliances Sec 2) (vitreous china) Part 6 :Specific requirements of Urinals, Section 2 Half stall urinals
IS:2556	(Part 6 Specification for vitreous sanitary appliances Sec 4) (vitreous china) Part 6 :Specific requirements of urinals, Section 4 Partition slabs
IS:2556	(Part 6 Specification for vitreous sanitary appliances Sec 5) (vitreous china) Part 6 :Specific requirements of urinals, Section 5 waste fittings
IS:2556	(Part 6 Specification for vitreous sanitary appliances Sec 6) (vitreous china) Part 6 :Specific requirements of urinals, Section 6 Water spreaders for half stall urinals
IS:2556(Part 7)	Specification for vitreous sanitary appliances (Vitreous china) Part 7: Specific requirements of half round channels
IS:2556(Part 8)	Specification for vitreous sanitary appliances (Vitreous china) Part 8: Specific requirements of siphonic wash down water closets.
IS:2556 (Part 11)	Specification for vitreous sanitary appliances (Vitreous china) Part 11: Specific requirements for shower rose
IS: 2556(Part 12)	Specification for vitreous sanitary appliances (vitreous china) Part 12: Specific requirements of floor traps
IS:2556 (Part 15)	Specification for vitreous sanitary appliances
	(Vitreous china) Part 15: Specific requirements of universal water closets

IS:2692	Specification for ferrule for water services
IS:2717	Glossary of terms relating to vitreous enamel ware and ceramic metal systems
IS:2963	Specifications for copper alloy waste fittings for wash basins and sinks
IS:3311	Specification for waste plug and its accessories for sinks and wash basins.
IS: 5961	Specification for cast iron gratings for drainage purposes.
IS:6249	Specification for flush valves and fittings for marine use
IS:8931	Specification for copper alloy fancy single taps, Combination taps assembly and stop valves for water services
IS: 9758	Specification for flush valves and fitting for water closets and urinals.

8.2 General Requirements:

1. Works to comply with local regulations and rates to include all costs. All sanitary installations, water supply and drainage work shall conform to the Local Municipal Bye-Laws and/or rules and regulations of Local Bodies and the work shall be inspected and passed by the various authorities having jurisdiction.

2. The work shall be carried out through a licensed plumber.

3. The Contractor shall arrange with the Local Municipal and/or Public Authorities for obtaining water and drainage connections and the Employer will reimburse the statutory fees/Deposits on production of receipts.

4. The rates quoted shall be for complete items as fixed in position and cover all costs of materials, labour, tools, supervision, cutting of holes, chases etc. and also for providing & fixing arrangements viz. clamps, brackets, wooden blocks etc. The rate shall also include restoration to original condition of all damages to walls, floors etc. during the process of fixing of sanitary installations, water supply and drainage to the entire satisfaction of the Engineer-in-charge. All debris of plumbers, excavation etc. shall be removed without any extra charge. The plumbing work or the other building work affected by the plumber's work shall be left thoroughly cleaned to the satisfaction of the Engineer-in-charge.

6. All CI pipes, brackets, CI cisterns, GI pipes and fixtures, MS fixture and fittings shall be painted with one coat of approved primer and two coats of enamel/flat oil paint. All painting work shall be carried out to the entire satisfaction of the Engineer-incharge. If directed, additional coats of paint shall be applied to get uniform and matching finish without any extra cost.

7. In the interior of the building all pipes whether of PPR/UPVC/CPVC shall be embedded in an approved manner in chases made in walls or floors if required by the Engineer-in-charge. The plumber shall make necessary holes in the walls etc. and restore them to the original condition.

8. All water supply and sanitary fixtures, pipes and pipe fittings, traps etc. which are to be embedded into the concrete or masonry work or other building work shall be placed in position and embedded or concealed at the time of casting concrete or erecting Block work. In case where chasing or cutting of concrete, masonry or other structural or construction work is unavoidable, the locations of such fittings, pipe lines and traps etc. shall be marked suitably and the cutting, chasing or disturbing of the construction work shall proceed only after due approval of the Engineer-in-charge.

9. All cutting, chasing and fixing work shall be completed before commencement of any plastering, tiling and finishing work.

10. The Contractor shall be responsible for the adequacy and efficiency of the entire plumbing system and if, in his opinion, he finds any serious objection to the system shown on the drawings, he shall set forth his objection or his suggestions to ensure adequacy and efficiency of the said system and notify the Engineer-in-charge before proceeding with the work. Loss or damage to such materials or work prior to final acceptance of the work by the employer shall immediately be replaced by the Contractor at his expense.

11. The Tenderers while quoting the tenders should note that the maximum care will have to be taken during the construction to avoid the leakages from the Sanitary Units, Terrace Slabs, Chajjas, Drop Walls etc. All the R. C. Components including slabs should be properly consolidated with Mechanical

Vibrators and all the joints of the Sanitary Appliances must be properly filled in and made leak-proof.

8.3 Materials:

1. Materials shall be of the best quality approved make and unless otherwise specified they shall conform to the respective Indian Standard Specification. Where different makes are specified, the choice of make shall rest with the Engineer-in-charge.

2. Samples of all materials shall be got approved before placing order and the approved samples shall be deposited with the Engineer-in-charge.

3. In case of non-availability of materials in SI/ Metric sizes, the nearest size in FPS units shall be provided with prior approval of the Engineer-in-charge for which neither extra will be paid nor shall any rebate be recovered.

4. If directed, materials shall be tested in any approved Testing Laboratory and the Contractor shall produce the test certificate in original to the Engineer-in-charge and entire charges for original as well as repeated tests shall be borne by the Contractor. If required by the Engineer-in-charge, the Contractor shall arrange to test portions of the work at his own cost in order to prove their soundness and efficiency. If after any such test the work or portion of work is found, in the opinion of the Engineer-incharge, to be defective or unsound, the Contractor shall pull down and redo the same at his own cost. Defective materials shall be removed from the site.

5. It shall be obligatory for the Contractor to furnish certificate, if demanded by Engineer-in-charge, from manufacturer or the material supplier that the work has been carried out by using material and installed/fixed as per their recommendations.

8.3.1 Scope of Work : Without restricting to the generality of the foregoing, sanitary and other appliances shall inter-alia includes the following:

1. Sanitary appliances and fixtures for toilets
2. Chromium plated brass fittings
3. Stainless steel sinks.
4. Accessories e.g. towel rods, toilet paper holders, soap dish, liquid soap dispensers, towel rails, coat hooks etc.
5. Mirrors, hand driers, etc.

6. The CONTRACTOR shall provide for all appliances and fixtures all fixing devices, nuts, bolts, screws, hangers as required.

7. All exposed pipes within toilets and near appliances/ fixtures shall be of chromium plated brass unless otherwise specified.

General Requirements :

1. All sanitary wares as specified in the schedule of quantities & shall be of best quality manufactured by approved manufacturer, and shall be finally approved by the Engineer-in-charge prior to installation. All samples of materials with necessary catalogues, performance data shall be submitted and approved before use for the work. Approved samples of all materials shall be neatly displayed on a board and such a display board of samples shall always be in exhibition in the sample room of the construction office of the Engineer-in-charge. Such a display shall be used for the day-to-day checking of the materials on site.

2. All appliances, fixtures and fittings shall be provided with all such accessories as are required to complete the item in working condition whether specifically mentioned or not in the Schedule of Quantities, specifications, and drawings. Accessories shall include proper fixing arrangement, brackets, nuts, bolts, washers, screws and required connection pieces.

3. Fixing screws shall be half round head chromium plated (CP) brass screws, with CP brass washers unless otherwise specified.

4. Porcelain sanitary ware shall be glazed vitreous china of first quality free from warps, cracks and glazing defects conforming to IS: 2556. The choice of the colour of the Sanitary ware shall be that of the Employer and nothing extra shall be payable to the CONTRACTOR for fixing of Sanitary ware of any colour.

5. Sinks for kitchen shall be of stainless steel or as specified in the Schedule of Quantities.

6. Chromium plated fittings shall be cast brass chromium plated of the best quality approved by the Bank.

7. All appliances, fittings and fixtures shall be fixed in a neat workmanlike manner true to level and to heights shown on the drawings and in accordance with the manufacturer

recommendations. Care shall be taken to fix all inlet and outlet pipes at correct positions. Faulty locations shall be made good and any damage to the finished floor, tiling, plaster, paint, insulation or terrace shall be made good by the CONTRACTOR at his own cost.

8. All materials shall be rust proofed; materials in direct or indirect contact shall be compatible to prevent electrolytic or chemical (bimetallic) corrosion.

9. Sanitary appliances, subject to the type of appliance and specific requirements, shall be fixed in accordance with the relevant standards and the following:

i. CONTRACTOR shall, during the entire period of installation and afterwards protect the appliances by providing suitable cover or any other protection in order to absolutely prevent any damage to the appliances until handing over. (The original protective wrapping shall be left in position for as long as possible).

ii. The appliance shall be placed in correct position or marked out in order that pipe work can be fixed or partially fixed first.

iii. The appliance shall be fixed in a manner such that it will facilitate subsequent removal if necessary.

iv. All appliances shall be securely fixed. Manufacturers' brackets and fixing methods shall be used wherever possible. Compatible rust proofed fixings shall be used. Fixing shall be done in a manner that minimizes noise transmission.

v. Appliances shall not be bedded (e.g. WC pans, pedestal units) in thick strong mortar that could crack the unit (e.g. a ceramic unit).

vi. Pipe connections shall be made with de-mountable unions. Pipe work shall not be fixed in a manner that it supports or partially supports an appliance.

vii. Appliances shall be fixed so that water falls to the outlet (e.g. baths).

viii. Appliances shall be fixed true to level firmly fixed to anchor or supports provided by the manufacturer and additional anchors or supports where necessary. ix. Sizes of

Sanitary fixtures given in the Specifications or in the Schedule of

Quantities are for identification with reference to the catalogues of makes

considered. Dimensions of similar models of other makes may vary within +10% and the same shall be provided and no claim for extra payment shall be entertained nor shall any payment be deducted on this account.

8.3.2 European Water Closet

The European Water Closet shall consist of:

1. Approved wash down closet in white vitreous Chinaware with integral "P" trap wall hung type as specified in schedule of quantity
2. Rubber joints for inlet connection, 15mm p.v.c. connector.
3. Bakalite seat and cover with chromium-plated hinges and rubber buffers
4. All the necessary work required for satisfactory working.

8.3.3 Concealed cistern, extended flush pipe concealed dual flush WC cistern designed for locating behind the WCs, designed to be fitted with the top of the cistern at a height of 980mm, maximum width 570mm (includes fixing brackets), can be fitted with either a top or front mounted flushing plate. Comes complete with 380 low pressure (low noise inlet valve (0.1 – 10 bar supply pressure), Brackets and fixings, Integral flush bend, Isolating valve. The 15 cm cistern can operate as a single 6l flush or 6l/3l dual flush unit. For flush volumes of 4l/2l a low flush beaker is required.

8.3.4 Wash Basin:

Wash Basin shall consist of the following;

1. Wash basins of over the counter of size as specified in the schedule of quantities and shall be in white vitreous Chinaware.
2. Wash basin shall be provided with hot and cold water mixing fitting or as specified in the Schedule of Quantities.
3. Basins shall be fixed at proper heights as shown on drawings. If height is not specified, the rim level shall be 790mm from finished floor level or as directed by the Engineer-in-charge.
4. 12mm p.v.c. connector with wiped joints & 15mm chromium plated brass stop cock (stop cock measured separately)

5. All other necessary work for satisfactory working.

8.3.5 Urinals

These shall be of the approved make and shall consist of the following:

1. Vitreous Chinaware urinal basin as specified in the schedule of quantities.

2. 32mm Chromium plated brass waste coupling 12 mm dia C.P. brass, flush pipe.

3. Suitable supporting arrangement using Raw plugs with C.P. brass screws used for fixing the urinal.

4. All other necessary work for satisfactory working.

8.3.6 Sinks:

1. Stainless steel AISI 304 (18/8) kitchen sink as per IS:13983 of approved make Sinks shall be stainless steel of anti-scratch finish as specified in the Schedule of Quantities

2. Each sink shall be provided with painted CI brackets and clips and securely fixed. Each sink shall be provided with 40mm dia CP waste and rubber plug with CP brass chain as given in the Schedule of Quantities.

8.3.7 Mirrors

1. Mirrors shall be electro coated, 6.0 mm thick glass of approved make, plane or beveled edge. The size shall be as specified in the Schedule of Quantities or as shown on the drawings. The image shall be clear and without waviness at all angles of vision.

2. Mirrors shall be provided with backing of 19mm thick marine plywood, fixed with CP brass semi-round headed screws and cup washers or CP brass clamps as specified or instructed by Engineer-in-charge.

8.3.8 Toilet Paper Holder:

1. Toilet paper holder shall be as specified in the Schedule of Quantities.

2. This by means of screws/capping having finish similar to the toilet paper holder in wall/ timber partitions with raw plugs or nylon sleeves. When fixed on timber partition, it shall be fixed on a solid wooden base provided.

8.3.9 Towel Rail

1. Towel rail shall be chromium plated of size, shape and type specified in the Schedule of Quantities.

2. Towel rail shall be fixed with screws/capping having finish similar to the towel rail in wall with raw plugs or nylon sleeves and shall include cutting and making good as required or directed by the Engineer-in-charge.

8.3.10 Liquid Soap Dispenser

1. SS liquid soap Dispenser with Glass Bottle of approved make Liquid Soap dispenser shall be wall/ counter mounted suitable for dispensing liquid soaps, lotions, detergents.

2. Liquid soap dispenser shall be fixed to wall with C.P. brass screws, and screwed on to wooden raw plug.

8.4 Measurement and rates

1. Sanitary fixtures (Porcelain ware and CP fittings) shall be measured by numbers.

2. Rate for providing and fixing of sanitary fixtures, accessories, shall include all items, and operations stated in the respective specifications and Schedule of Quantities and nothing extra is payable.

3. Rates for all items under specification Clauses above shall be inclusive of cutting holes and chases and making good the same, CP brass screws, nuts, bolts and any other fixing arrangements required and recommended by manufacturers, testing and commissioning etc. complete.

9. Water supply system Scope of Work:

The water supply system shall inter-alia include the following:

1. Supply from supply main/ underground tank to overhead tank, overhead tank to all fixtures and appliances for cold and hot water.

2. Insulation for hot water pipes, Pipe protection and painting

3. Control valves, masonry chambers and other appurtenances.

4. Connections to all plumbing fixtures, tanks, appliances and municipal mains.

5. Puddle flanges, Inserts, nozzles for R.C.C. tanks

6. The term water supply is used as indicative of all water supply work required and necessary for the building including such external work as may be necessary to make the system functional.

9.1 CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPES

9.1.1 CPVC pipes & fittings used in hot & cold potable water distribution system shall conform to requirement of IS 15778. The material from which the pipe is produced shall consist of chlorinated polyvinyl chlorides. The polymer from which the pipe compounds are to be manufactured shall have chlorine content not less than 66.5%. The internal and external surfaces of the pipe shall be smooth, clean and free from grooving and other defects. The pipes shall not have any detrimental effect on the composition of the water flowing though it.

Diameter and wall thickness of CPVC pipes are as per given in Table 2 below.

TABLE 2

Sl. No.	Nominal Size	Nominal Outside Diameter	Mean Outside Diameter		Outside Diameter at any point		Wall thickness					
							Class 1, SDR 11			Class 3, SDR 17		
			Min	Max	Min	Max	Avg. Max	Min	Max	Avg. Max	Min	Max
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
i)	15	15.9	15.8	16.0	15.8	16.0	2.2	1.7	2.2	-	-	-
ii)	20	22.2	22.1	22.3	22.0	22.4	2.5	2.0	2.5	-	-	-
iii)	25	28.6	28.5	28.7	28.4	28.8	3.1	2.6	3.1	-	-	-
iv)	32	34.9	34.8	35.0	34.7	35.1	3.7	3.2	3.7	-	-	-
v)	40	41.3	41.2	41.4	41.1	41.5	4.3	3.8	4.3	-	-	-
vi)	50	54.0	53.9	54.1	53.7	54.3	5.5	4.9	5.5	-	-	-
vii)	65	73.0	72.8	73.2	72.2	73.8	-	-	-	4.8	4.3	4.8

viii)	80	88.9	88.7	89.1	88.1	89.7	-	-	-	5.9	5.2	5.9
ix)	100	114.3	114.1	114.5	113.5	115.1	-	-	-	7.5	6.7	7.5
x)	150	168.3	168.0	168.6	166.5	170.1	-	-	-	11.1	9.9	11.1

Notes

1. For CPVC pipes SDR is calculated by dividing the average outer diameter of the pipe in mm by the minimum wall thickness in mm. If the wall thickness calculated by this formula is less than1.52 mm, it shall be increased to 1.52 mm. The SDR values shall be rounded to the nearest 0.5.

9.1.2 Dimensions of Pipes

The outside diameter, outside diameter at any point and wall thickness shall be as given in Table 2.

9.1.2.1 ***Diameter :*** The outside diameter and outside diameter at any point as given in Table 2 shall be measured according to the method given in IS 12235 (part 1).

9.1.2.2 *Diameter at any point :* The difference between the measured maximum outside diameter and measured minimum outside diameter in the same cross-section of pipe (also called tolerance on ovality) shall not exceed the greater of the following two values:

(a) 0.5 mm, and

(b) 0.012 dn rounded off to the next higher 0.1 mm.

9.1.2.3 Wall Thickness: The wall thickness of the pipes shall be as given in Table 2. Wall thickness shall be measured by any of the three methods given in IS 12235 (part 1). To check theconformity of the wall thickness of the pipe throughout its entire length, it is necessary to measure the wall thickness of the pipe at any point along its length. This shall be done by cutting the pipe at any point along its length and measuring the wall thickness as above. Alternatively, to avoid destruction of the pipe, nondestructive testing methods such as the use of ultrasonic wall thickness measurement gauges shall be used at any four points along the length of the pipe.

Tolerance on Wall Thickness

(a) For pipes of minimum wall thickness 6 mm or less, the permissible variation between the minimum wall thickness (eMin) and the wall

thickness at any point (e), (e - eMin) shall be positive inthe form of +y, where y=0.1 eMin+0.2 mm.

(b) For pipes of minimum wall thickness greater than 6mm, the permissible variation of wall thickness shall again be positive in the form of +y, where y would be applied in two parts.

(c) The average wall thickness shall be determined by taking at least six measurements of wall thickness round the pipe and including both the absolute minimum and absolute maximummeasured values. The tolerance applied to this average wall thickness from these measurements shall be within the range 0.1 eMin+0.2 mm (see Table 2).

(d) The maximum wall thickness at any point shall be within the range 0.15eMin (see Table 2). (e) The results of these calculations for checking tolerance shall be rounded off to the next higher 0.1 mm.

9.1.2.4 Effective Length (Le***) :*** If the length of a pipe is specified, the effective length shall not be less than that specified. The preferred effective length of pipes shall be 3, 5 or 6 m. The pipes may be supplied in other lengths where so agreed upon between the manufacturer and the purchaser.

9.1.3 Pipe Ends

The ends of the pipes meant for solvent cementing shall be cleanly cut and shall be reasonably square to the axis of the pipe or may be chamfered at the plain end.

9.1.4 Physical and Chemical Characteristics

9.1.4.1 ***Visual Appearance:*** The colour of the pipes shall be off-white. Slight variations in the appearance of the colour are permitted. The internal and external surface of the pipe shall be smooth, clean and free from grooving and other defects.

9.1.4.2 ***Opacity :*** The wall of the plain pipe shall not transmit more than 0.1 per cent of the visible lightfalling on it when tested in accordance with IS 12235 (Part 3).

9.1.4.3 ***Effect on Water :*** The pipes shall not have any determinate effect on the composition of the water flowing through them, when tested as per 10.3 of IS 4985.

9.1.4.4 ***Reversion Test :*** When tested by the method prescribed in IS 12235 (Part 5/ Sec 1 and Sec 2),a length of pipe 200 ±20 mm long shall not alter in length by more than 5 per cent.

9.1.4.5 ***Vicat Softening Temperature:*** When tested by the method prescribed in IS 12235 (part 2), the Vicat softening temperature of the specimen shall not be less than 110°C.

9.1.4.6 ***Density :*** When tested in accordance with IS 12235 (Part 14), the density of the pipes shall be between 1450kg/m3 and 1650kg/m3.

9.1.5 Mechanical Properties

9.1.5.1 ***Hydrostatic Characteristics:*** When subject to internal hydrostatic pressure test in accordance with the procedure given in IS 12235 (part 8/Sec 1), the pipe shall not fail during the prescribed test duration. The temperatures, duration and hydrostatic (hoop) stress for the test shall conform to the requirements given in Table 3. The test shall be carried out not earlier than 24 h after the pipes have been manufactured.

TABLE 3

Requirements of Pipes for Internal Hydrostatic Pressure Test

Sl. No.	Test	Test Temperature Min	Test Period	Hydrostatic (Hoop) stress
		°C	h	MPa
(1)	(2)	(3)	(4)	(5)
(i)	Acceptance	20	1	43.0
(ii)	Type	95	165	5.6
(iii)	Type	95	1000	4.6
(iv)	Type	95	8760	3.6 (Test for thermal stability)

9.1.5.2 ***Thermal Stability by Hydrostatic Pressure Testing :*** When subject to internal hydrostatic pressure test in accordance with the procedure given in IS 12235 (Part 8/Sec 1) and as per requirement given in Table 3, Sl. No. (iv), the pipe shall not burst or leak during the prescribed test duration.

9.1.5.3 ***Resistance to External Blow at 0°C :*** When tested by the method prescribed in IS 4985, with classified striker mass and drop height as given in Table 4, the pipe shall have a true impact rate of not more than 10 per cent.

TABLE 4
Classified Striker Mass and Drop Height Conditions for the Falling Weight Impact Test

Sl. No.	Nominal pipe size	Mass of falling weight	Falling height
	mm	kg	mm
(1)	(2)	(3)	(4)
(i)	15	0.5±0.5%	300±10
(ii)	20	0.5±0.5%	400±10
(iii)	25	0.5±0.5%	500±10
(iv)	32	0.5±0.5%	600±10
(v)	40	0.5±0.5%	800±10
(vi)	50	0.5±0.5%	1000±10
(vii)	65	0.8±0.5%	1000±10
(viii)	80	0.8±0.5%	1200±10
(ix)	100	1.0±0.5%	1600±10
(x)	150	1.6±0.5%	2000±10

9.1.5.4 ***Flattening Test :*** When tested by the method prescribed in IS 12235 (part 19), pipe shall show no signs of cracking, splitting and breaking.

9.1.5.5 ***Tensile Strength :*** When tested by the method prescribed in IS 12235 (Part 19), the tensile strength at yield shall not be less than 50 MPa at 27 ± 2°C.

9.1.6 Sampling and Criteria for Conformity

The sampling procedure and criteria for conformity shall be as given in Annexure F.

9.1.7. Marking

9.1.7.1 Each pipe shall be clearly and indelibly marked in ink/paint or hot embossed on white base at intervals of not more than 3 m. The marking shall show the following:

(a) Manufacturer’s name or trade-mark

(b) Outside diameter,

(c) Class of pipe and pressure rating, and

(d) Bath or lot number

9.1.7.2 BIS Certification Marking *:* Each pipe may also be marked with the Standard Mark.

9.1.8 Fittings

The fittings shall be as follows:

(a) Plain CPVC solvent cement fittings from size 15 mm to 160 mm.

(b) Brass threaded fittings.

(c) Valve from size 15 mm to 160 mm

(d) *Brass Threaded Fittings:* All types of one end brass threaded male/female adaptors in various fittings like coupler, socket, elbow, tee are available for transition to other plastic/metal piping and for fixing of CP fittings. Ball, Gate valves in CPVC are available in all dimensions. All fittings shall carry the following information:

(1) Manufacturer's name/trade mark.

(2) Size of fitting

9.1.9 Piping Installation Support and Spacing

9.1.9.1 Concealed Piping: Pipes can be concealed in chases. The pipes and fitting are to be pressure tested prior to concealing the chases. To maintain alignment of CP fittings while joining, all alignment of fittings and pipe shall be done correctly. DO NOT USE NAILS FOR HOLDING OF PIPES IN THE CHASES.

9.1.9.2 *External Installations:* For pipes fixed in the shafts, ducts etc. there should be sufficient space to work on the pipes. Pipes sleeves shall be fixed at a place the pipe is passing through a wall or floor so as to allow freedom for expansion and contraction. Clamping of the pipe at suitable spacing is done to support it while allowing the freedom for movement.

All pipes exposed to sunlight shall be painted with a water based acrylic paint emulsion to enhance UV protection. Pipes in trenching shall be laid in accordance to the Good Plumbing practices followed for Metal piping.

Recommended Support Spacing (Distance between Pipe Clamps Horizontal Support)

Pipe size	Horizontal supports in meters

	Temperature			
	23°C	*38°C*	*60°C*	*82°C*
16 mm (1/2”)	1.22	1.22	1.07	0.92
20 mm (3/4”)	1.53	1.37	1.22	0.92
25 mm (1/0”)	1.68	1.3	1.37	0.92
32 mm (1 1/4”)	1.83	1.68	1.53	1.22
40 mm (1 1/2”)	1.98	1.83	1.68	1.22
50 mm (2”)	2.29	2.14	1.98	1.22

9.1.9.3 Expansion LOOP*:* CPVC systems, like all piping materials, expand and contract with changes in temperatures. CPVC pipes shall expand 7.5 cm per 30 m length for a 400C temperature change.

Expansion does not vary with Pipe size. Thermal expansion can be generally be accommodated at changes in direction. On a long straight run, an offset or loop based on the following chart is required.

Nominal Pipe size	*Length of Run (Meter), Loop length in cms.*				
	6 metre	*12 metre*	*18 metre*	*24 metre*	*30 metre*
15 mm	43	56	69	79	86
20 mm	38	66	81	91	104
25 mm	53	74	91	104	117
32 mm	58	81	102	117	130
40 mm	63	89	109	127	142
50 mm	71	102	124	145	63

9.1.10 Testing

All water supply systems shall be tested to hydrostatic pressure test. The pressure tests are similarto the test pressure used for other plastic/metal pipes. System may be tested in sections and such section shall be entirely checked on completion of connection to the overhead tank or pumping system or mains.

9.1.11 Measurements

The net length of pipes as laid or fixed shall be measured in running meters correct to a cm for the finished work, which shall include CPVC pipe and fittings including plain and Brass threaded fittings and jointing solvent cement. Rate shall also include for excavation/trenching in all kinds, refilling.

10. UNPLASTICISED POLYVINYL CHLORIDE PIPES AND FITTINGS

10.1 UPVC Pipes

Soil, waste and rain water UPVC Pipes shall conform to Type B pipes of IS 13592. The internal and external surfaces of the pipes shall be smooth and clean and free from grooving and other defects. The end shall be clearly cut and shall be square with the axis of the pipe. The end may be chamfered on the plain sides. Slight shallow longitudinal grooves or irregularities in the wall thickness shall be permissible provided the wall thickness remains within the permissible limit.

10.2 Colour of Pipe

Surface colour of the pipes shall be as approved by Engineer-in-charge .

10.3 Marking

Each pipe shall be clearly and indelibly marked with the following informations at intervals not more than 3 meter.

(a) Manufacturer's name or trade mark.

(b) Nominal outside dia of pipe.

(c) Type 'B'

(d) Batch number.

10.4 Dimensions

10.4.1 Diameter and Wall Thickness: Mean outside diameter, outside diameter at any point and wall thickness for type –B manufactured plain or with socket shall be as given in Table- 1 of IS 13592. UPVC soil, waste, rain water pipes shall be of the dia, specified in the description of the item and shall be in nominal lengths of 2,3,4 or 6 metres either plain or with sliding/grooved socket unless shorter lengths are required at junctions with fittings. Tolerances on specified length shall be + 10 mm and – 0 mm.

10.5 Fixing and Jointing

Pipes shall be either fixed on face of wall or embedded in masonry as required in the description of the item. Plain pipes shall be secured to the walls at all joints with PVC Pipes clips by means of 50 x 50 x 50 mm hard wood plugs, screwed with M.S. screws of required length i/c cutting Block work and fixing in cement mortar 1:4 (1 cement : 4 coarse

sand). The clips shall be kept about 25 mm clear off finished face of wall, so as to facilitate cleaning of pipes. Pipes shall be fixed perfectly vertical or to the lines as directed. The pipes shall be fitted to fittings with seal ring conforming to IS 5382 allowing 10 mm gap for thermal expansion.

10.6 Installation in Wall/Concrete

The walls/concrete slots should allow for a stress free installation. Pipes and fittings to be inserted into the slots without a cement base have to be applied first with a thin coat of PVC solvent cement followed by sprinkling of dry sand (medium size). Allow it to dry. The process gives a sound base for cement fixation. This process is repeated while joining PVC material to CI/AC materials.

10.7 Fittings

Fittings used shall be of the same make as that of the PVC pipes Injection moulded or fabricated by the manufacturer and shall have a minimum wall thickness of 3.2 mm. The fittings shall be supplied with grooved socketed ends with square grooves and provided with Rubber Gasket conforming to IS 5382. The plain ends of the fittings should be chamfered. The fittings shall be joined with the help of Rubber lubricant. The details of fittings refer IS 13592.

10.8 Measurements

The pipes shall be measured net when fixed correct to a cm. including all fittings along its length.

10.9 Rate

The rate shall include the cost of all materials and labour involved in all the operations describedabove including jointing including the supply and fixing of wall plugs and PVC clips.

11.1 CUTTING HOLES IN R.C.C. FLOORS (UPTO 15 × 15 CM)

11.1.0 Square holes of size as specified shall be cut in R.C.C. floor and roofs for passing drain pipe etc. Any damage to the adjoining portion or to any other item shall be made good as directed by the Engineer-in-Charge. All the dismantled material shall be removed from the site.

11.1.2 Cement Concrete

After insertion of drain pipe etc. the hole shall be repaired with cement concrete M20 grade and the surface finished to match with the existing surface. The top and bottom shall be finished properly to make the joint leak proof. The specifications for cement concrete work and finishing etc. shall be the same as detailed under relevant sub-heads.

11.1.3 Measurements

Rate for cutting shall be included in the respective pipe work item

11.2 CUTTING CHASES IN MASONRY WALLS

11.2.1 Making Chases

I. Cutting of chases in 200mm thick and above load bearing walls :

(i) As far as possible services should be planned with the help of vertical chases. Horizontal chases should be avoided.

(ii) The depths of vertical chases and horizontal chases shall not exceed one third and one sixth of the thickness of the masonry respectively.

(iii) When narrow stretches of masonry (or short lengths of walls) such as between doors and windows, cannot be avoided, they should not be pierced with openings for soil pipes or

waste pipes or timber joints, etc. Where there is a possibility of load concentration, such narrow lengths of walls shall be checked for stresses and high strength Blocks mortar or concrete walls provided, if required.

(iv) Horizontal chases when unavoidable should be located in the upper or lower one third of Height of story and not more than three chases should be permitted in any stretch of a wall.

No continuous horizontal chase shall exceed one metre in length. Where unavoidable, stresses in the affected area should be checked and kept within the permissible limits.

(v) Vertical chases should not be closer than 2 m in any stretch of a wall. These shall be kept away from bearings of beams and lintels. If unavoidable, stresses in the affected area should be checked and kept within permissible limits.

(vi) Masonry directly above a recess, if under than 30 cm (Horizontal dimension) should be supported on lintel. Holes in masonry may be provided up to 30 cm width x 30 cm height without any lintel. In the case of circular holes in masonry, no lintel should be provided up to 40 cm in diameter.

II. Cutting of chases in 100m thick block non-loading bearing walls

In case of non-load bearing half Block walls services should be planned with the help of verticalChases. Horizontal chases should be provided only when unavoidable.

Note:

1. No inclined chase shall be permitted inBlock masonry or stone masonry walls. In case inclined chases are unavoidable these shall be cut with written approval of the Engineer-inCharge, and shall be repaired properly to his satisfaction. However, in half Block masonry wall, no inclined chase will be permitted.

2. Chases shall be made by chiseling out the masonry to proper line & depth. Any damage to the adjoining portion or to any other item shall be made good, as decided by the Engineer-inCharge, for which no extra payment shall be made. All dismantled material shall be removed from site.

11.2.2 Filling Chases

After G.I. Pipes etc. are fixed in chases, the chases shall be filled with cement concrete 1:3:6 (1 cement: 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) or cement mortar 1:4 (1 cement: 4 coarse sand) as may be specified or otherwise directed by the Engineer-inCharge and made flush with the masonry surface. The concrete surface shall be roughened with wire brushes to provide a key for plastering.

11.2.3 Pipe Encasing/supports:

Cement concrete around pipes shall include any masonry supports, shuttering and centering, curing, cutting etc. complete as described in the relevant specifications.

11.2.4 Angles/ channels

Slotted angles/ channels shall include support bolts and nuts, length embedded in the cement concrete blocks of 1:2:4 (1cement: 2 coarse Manufacture Sand: 4 stone aggregate 20mm nominal size) formed in the masonry walls; nothing extra shall be paid for the cement concrete block and making good the masonry wall, anchor fasteners etc. complete.

11.2.5 Measurements

Rate for chasing and making good shall be included in the respective pipe work item of schedule of quantity

11.3.1 Gunmetal valves:

1. Valves 65mm dia and below shall be heavy gunmetal full way valves or globe valves conforming to Class I of IS: 778. Valves shall be tested at manufacturer's works and the same stamped unit.

2. All valves shall be approved by the Engineer-in-charge before they are allowed to be used in the Work.

3. Sluice valves: Unless otherwise specified all valves 80mm dia and above shall be CI double flanged sluice valves with non rising spindle. Sluice valves shall be provided with wheel when they are in exposed positions and with a cap top when they are located underground. CONTRACTOR shall provide suitable operating keys for sluice valves with cap tops.

4. Sluice valves shall be of approved makes conforming to IS: 780 of Class as specified.

11.3.2 Butterfly Valves:

1. Where specified Valves 80mm dia and above shall be cast iron butterfly valve to be used for isolation and/ or flow regulation as directed by the Engineer-in-charge. The valves shall be tight shutoff/ regulatory type with resilient seat suitable for flow in either direction and seal in both directions.

2. Butterfly valve shall conform to IS:13095.

11.3.3 Non Return Valve:

Where specified non return valve (swing check type) shall be provided through which flow can occur in one direction only. It shall be single door swing check type of best quality conforming to IS:5312.

11.3.4 Hot water pipes Insulation:

1. All open hot water flow and return pipes (not in chase), shall be insulated approved make thermal insulation material

2. Insulation to pipes shall be with pre moulded pipe sections as per schedule of quantity

3. Application: All surfaces shall be thoroughly cleaned with a wire brush.

4. One layer of approved primer shall be applied and pre molded pipe insulation sections shall be fixed.

5. Insulation for hot water pipes in chase: All hot water pipes fixed in wall chase shall be painted with two coats of bitumen paint of approved make.

11.3.5 **Sterilization of installation:** The water supply installation shall be sterilized as per standards and as follows:

1. Tanks and pipes shall be filled and flushed out.

2. All bib cocks (taps) shall be closed.

3. Tanks and pipes shall be re-filled while adding a sterilizing admixture containing 50 parts chlorine to one million parts water.

4. When the installation is filled all bib cocks (taps) shall be opened progressively and each allowed running until the water smells of chlorine.

5. The installation shall be topped up and more sterilizer added.

6. The installation shall then be left for three hours and shall then be tested for residual chlorine; if none is found, the installation shall be drained and the process repeated.

7. The installation shall be finally drained and flushed with potable water before use.

11.4 INTERNAL AND EXTERNAL DRAINAGE SYSTEM INTERNAL DRAINAGE Scope of Work:

13.10.1 All soil, waste and storm water disposal for the portion above ground level to the public sewers/ drainage shall be by gravity whereas from the basements it shall be by pumping. Without restricting to the generality of the foregoing, the soil, waste, vent and rain water pipes system shall inter-alia include the following:

1. Vertical and horizontal soil, waste, vent and rainwater pipes and fittings, joints, clamps and connections to fixtures/sanitary wares.

2. Connection of all pipes to sewer lines as shown on the drawings at ground level.

3. Floor and urinal traps, clean out plugs, inlet fittings and rainwater (roof) pipes and outlets.

4. Testing of all pipes and fittings before installation.

5. Testing of all pipes lines after installation.

11.4.2 General Requirements

1. Clause13.2.2 (1) and (2) shall apply.

2. Drainage lines and open drains shall be laid to the required gradients and profiles. Location of all manholes, etc. shall be got confirmed by the Engineer-in-charge before the actual execution of work at site. As far as possible, no drains or sewers shall be laid in the middle of road unless otherwise shown on the drawings or directed by the Engineer-in-charge in writing.

11.4.3 TECHNICAL REQUIREMENTS

(a) Standards and Materials - uPVC SWR Drainage Systems

All materials and the installation shall meet latest of the standards and as specified in clause 13.6 above, uPVC SWR drainage piping shall be factory made complete systems of approved makes with all the fittings. The pipes and fittings shall meet with the relevant IS codes. All joints shall be snap fit type with rubber ring and shall always produce a 100% water tight joint. Pipe and fittings shall be suitable for the snap fit joint.

(b) Cleanouts

Cleanouts other than those integral with the fitting, shall be of brass and screw down type. Cleanouts shall be accessible from the floor served.

(c) Supports; hangers & clamps

All pipe supports, hangers & clamps shall be standard pre-fabricated galvanized (after fabrication) units. Pipe supports shall generally follow the types specified in the specifications drawings. Any other type of support, suspension or clamping to meet site conditions shall be got approved before use.

(d) Cleaning plugs

Cleaning plugs shall be easily accessible and convenient for rodding. Such plugs shall be liberally provided so that the entire drainage system could be easily cleared of all possible chokes. All clean outs shall be behind the flow and as far as possible, plug bends may be avoided. In the case of under slung drainage systems, the clean outs should be on top of the floor and NOT under the floor.

(e) Traps & Seals

1. All traps shall be self-cleaning and the material and the seal depth shall be as specified below wherever the traps are not integral with the appliances or ware.

Appliance or ware	Trap		
	Material	Type	Seal depth (mm)
Lavatory/Wash basin (1)	CP brass	P	50
Sinks (1)	CP brass	P	50
Floor drain	uPVC	P or S	50
Kitchen Floor drain	uPVC	P	50

(All P-traps shall have cleaning eye or other cleaning facility)			
Roof Drain outlet	uPVC	-	-

Any other appliance shall have an appropriate trap as specified by the employer. All floor drains shall be cockroach proof covered with perforated stainless steel grating of size specified or required. Roof drain outlets shall have dome grates unless specified otherwise Plant room floor drains shall have cast iron or fabricated steel grating. (g) Drainage System Installation

1. All pipes before and after testing shall be protected with wooden plugs to prevent ingress of dust, sand or any extraneous matter.

2. All openings and chases in Block walls shall be made neatly and finished with 1:2:4 cement sand plaster on chicken mesh but the final, finish will be done by others. Openings in concrete walls shall, however, be made only with the approval of the Engineer-in-charge. Pipe penetrations, through wall or floor, shall be sealed with an approved fire resistant sealant.

3. Good workmanship and neat pipe layout are the prerequisites of these specifications. Horizontal pipes shall be truly horizontal with necessary slopes and hangers or supports as specified and shown on drawings. Vertical pipes shall be truly vertical and shall be laid away from the walls at least by 50 mm or as per instruction of Engineerin-charge. All pipe runs shall be parallel to the ceiling or walls for presenting a neat appearance. Pipes buried in wall shall be laid in machine-made chases with galvanized steel anchors.

4. Shop drawings for the routing of pipes shall be prepared generally on the basis of layout drawings issued. However, the drawings shall reflect the site conditions, structural beams and columns obstructions by way of any construction elements or any other service pipes, ducts etc duly co-ordinate with other services. The drawings should clearly indicate openings required in Block or concrete walls and invert levels at every 15m intervals. The drawings should also indicate typical details of hangers, supports, brackets etc. After approval of the drawings, pipe routes shall be marked with a distinct colour of paint on the site and got approved by the Engineer-in-charge.

(h) Soil & Waste Piping

1. Pipes shall be laid to an optimum slope of 1 in 90 as far as possible. A liberal provision of easily accessible cleanouts shall be made on all horizontal pipes. Cleaning facility shall preferably be from the floor above the ceiling slab for all underflow installations. Where horizontal pipes are laid in a sunken floor slab, adequate slopes shall be achieved through galvanized saddles or cement mortar bedding. All such pipes, after testing, shall be covered with and set in cement concrete of M20 so that the pipes are not disturbed during the filling up of the sunken floor.

2. Horizontal pipes shall be suspended from the structural ceiling slab or wall brackets at centers specified in the drawings

3. Vertical stacks shall be truly vertical and parallel to the wall and supported on saddles so that the pipes are at least 50mm away from the finished surface. Branch pipe connections shall be aligned with the bend or tee on the stack. Where the vertical stack meets the horizontal run or a manhole, a 45^{o} tee connection with a cleanout shall be employed to facilitate smooth flow and easy clean ability.

4. All pipes shall be fixed in a gradient towards the outfalls of drains. Pipes inside a toilet room shall be in wall chase unless otherwise shown on drawings. Where required, pipes may be run at ceiling level in suitable gradient and supports as shown in the drawings

5. Building vent stacks shall be not less than 75mm dia. Where the vent stack becomes one with the main soil or waste stack the main stack size shall not be reduced. Vent connections on any branch waste drain line shall be at least two thirds the diameter of the branch drain subject to a minimum of 25mm. Vent connection to a soil drain line shall be a minimum of 32mm dia. Vent connections shall be as near to the crown of the trap as possible.

6. No water shall enter vent lines. Vent lines shall be laid vertically terminated at least
150mm above the open-to-air roof. Vents may be connected back to the waste or soil
stack above the highest appliance connection and the said stack extends beyond the roof by at least 150mm into the air.

11.4.4 Acceptance, Testing & Commissioning

(a) Pre-commissioning checks. A walk-through inspection shall be carried out & the following checks made:

1. Layouts are according to the drawings. Identify variations.
2. Materials used are as specified, new and as per approved samples.
3. All fixtures viz. suspenders, brackets, clamps etc. are adequate and firmly fixed and spaced as specified.
4. Cleaning eyes are duly plugged and are easily accessible.
5. No visible damages or cases of bad workmanship.
6. Check water seals in traps by discharging adequate number of appliances.

(b) During construction, the piping shall be tested in sections so that the maximum static head of water is not more than 4.5m. All such sectional tests shall be witnessed and signed by the Engineer-in-charge. Records of these tests shall form the Acceptance Test documentation.

(c) An air test shall be conducted as specified in IS: 5329 with a test pressure of 50mm water gauge. If the pressure is not holding, then a smoke test shall be conducted through a smoke generator to track down the leaking points. After attending to the leaks, the piping shall be air tested again.

(d) Hydraulic Performance Tests shall be conducted on each stack by simultaneous release of water through various appliances like WC's and bathtubs to ensure water sealing of traps.

11.4.5 Mode of measurement

The following notes shall be taken into account while arriving at the unit rates.

1. UPVC SWR waste piping from wash basins, sinks, fan coil units, AH units and bath tubs are directly connected to cpvc swr waste stack necessary fittings shall be provided in the stack for making the connection, and this shall be measured along with the waste pipe and no extra shall be payable on this account.
2. All waste & vent pipes shall be measured net when fixed correct to a centimeter including all fittings along its lengths including supports, suspenders, brackets, clamps, jointing etc. When collars are used, in soil, waste and vent pipes they shall be measured along with and paid as pipes and no extra

shall be paid for collars or fixing them to wall with holder bat clamps. No allowances shall be made for the adjacent pipes or fittings. The above will apply whether pipes are fixed on wall face or pipes are embedded in masonry or pipes suspended from the ceiling.

12. TECHNICAL SPECIFICATIONS FOR ALUMINUM SYSTEM WINDOWS

12.1 GENERAL

12.1.1 Extent and Intent

The Contractor shall furnish all materials, labour accessories, equipment, tools and plant and incidentals required for providing and installing Aluminium system windows, and other items as called for in the drawings. The drawings and specifications cover the major requirements only. The supplying of additional fastenings, accessory features and other items not mentioned specifically herein, but which are necessary to make a complete installation, shall be a part of this contract.

The scope of work shall include the following.

- Removal of already installed m.s. windows with minimum or NO damage to the office infrastructure.
- Repairing and Levelling of walls, window sills & jambs with required thickness cement plaster in cm 1: 4 (1 part cement: 4 parts sand)
- Providing and fixing of customised factory manufactured Powder Coated Aluminium System Windows with all hardware fittings, sealing of any leftover gap, scaffolding, cleaning, etc. all complete at all heights & levels. It shall be ensured that the windows are installed in a manner that shall not allow any dust/ water seepages in the office premises.
- All engineering, equipment, labour, materials etc. require for satisfactorily completion of the work as per specification.
- Any other ancillary work, related to the work but not mentioned above, required for satisfactorily completion of the job.
- The tenderer should indicate in her/his tender the complete description of the working of the system for which the tender is submitted with all relevant brochures/literature etc. in addition to those called for in the Technical Specifications.

Drawings and Documents

- The successful tenderer shall submit, in duplicate, on receipt of acceptance of the tender, detailed working drawings and specifications showing the complete

details of all work required. He/she will be held responsible for any discrepancies, errors, omissions and commissions in the drawing or particulars submitted by him/her even if these have been approved by RBI. The drawings will be scrutinized by RBI.

Packing and Dispatch

All Aluminium windows /components shall be properly and securely packed for multiple handling and transportation by sea/ air / rail / road etc. All Aluminium window /components shall be delivered at RBI KOLKATA.

12.1.2 Aluminium system windows comprising of: -

i. All aluminium system windows (fixed, side hung openable) with associated aluminium works of **factory make**.

ii. Any reveals, angles, returns, sills, jambs, copings, flashing for any other features described or indicated in drawings and / or in the specifications/schedule of quantity.

iii. All clear and obscure frosted, flat, energy efficient and tempered / toughened glass units, Double Glass Units.

iv. Sealants, caulking, joint fillers, weeps, vents, gaskets, and metal-to-metal or metal-to-glass factory sealed joints and all internal joints to ensure proper gutter system and watertight construction.

v. All required supporting elements and their anchorage including without limitation all necessary inserts, supports, stiffeners, fasteners, brackets, secondary steel, anchors, clips, tie-backs, base plates drilling in concrete and brick work etc. and connection of same to the structure.

vi. All finishes are to be the colors and finishes as specified and approved by the Bank

vii. Providing of all temporary covers, coating and packing etc. of protection of glass, aluminium and other items and removal of the same at the completion of package and as per the instruction of Bank.

viii. Erection of all exposed works in clean condition.

ix. Cutting/welding/grinding at site and at the factory as required and prior approval of the Bank.

x. Design and shop drawings, finishes, samples and visual mock-up for architectural approval.

xi. On-site mock-up for testing and off-site mock-up for laboratory testing (if required).

xii. Fixed / openable glazing unit including all fixtures, accessory gasket etc. required for glass installation as well all proprietary iron mongery and fittings.

xiii. All external fixed / openable windows and ventilators

xiv. Double scaffolding, transportation, off-loading of equipment and materials.

xv. All fixing brackets, assemblies and attachments required for installation.

xvi. Cutting of holes in metal/aluminium panel for light fixtures, with sealing of such holes.

This scope of work to be read in conjunction with drawings.

12.1.3 General
Only skilled & competent labours shall carry out the work.

12.1.4 Submissions Required Prior to Fabrication

a) Submit before fabrication, complete system description including the following information:

- Name of manufacturers of products.
- Types, model numbers and names of products, and indication whether products are “off the shelf” or custom fabricated. Include specific information on finishes
- – thickness, patented process name, process description and test data.
- Detailed information on products to be manufactured specially for this project.
- **Detailed system description including standard details and manufacturer’s literature; and large-scale details of specially fabricated products.**

b) Statement that the proposed system **meet the statutory regulatory requirements,** thermal, aesthetic, wind loading and waterproofing criteria, and all construction, glazing and warranty requirements specified; noting in detail any exceptions.

c) Shop drawings: Provide Shop drawings showing the following information where appropriate to the items.

- Layout (sectional plan and elevation of complete assembly)
- Full size section of members.
- Methods of assembly, type and location of exposed non-corrosive screws.
- Methods of glazing.
- Methods of installation, including fixings, anchorage, caulking, flashings.
- Provision for thermal expansion - Junctions and trim to adjoining surfaces.
- Fittings and accessories.

d) Engineer's calculations on Resistance to Wind loads.

e) Sealants: Submit manufacturer's product specifications, handling, installation/curing instructions and performance test data sheets for each elastomeric product proposed.
Submit test report certificates for elastomeric sealants on aged performance, including hardness, stain resistance, adhesion, cohesion or tensile strength, elongation, low temperature flexibility, compression set, modulus of elasticity, water absorption, and resistance to ageing, weight loss, and deterioration through exposure to heat, ozone and ultraviolet light.

12.1.5 Sections

Framework for Aluminium windows, glazing, etc. shall be manufactured using extruded aluminium sections, extruded by approved extruder.

The sections shall be of aluminium alloy T6 6063 and shall also conform to IS 733-1956, being of commercial quality and free from any defects impairing strength, durability and appearance.

Use extruded sections boxed or ribbed for rigidity free from distortion and of suitable wall thickness. All glazing is intended to be fitted into the glazing rebate and held by approved Aluminum bead.

As far as practical extrusion sections shall be such as will permit the interlocking of parts to weather tight fit with a flush face without the use of built up strips and exposed screws.

The aluminium profiles shall be used in the construction of the frame excluding glazing beads, nibs, interlocks and similar features shall be, at minimum tolerance, not less than 1.5mm thick.

12.1.6 Samples - Mock-up

The Contractor shall fabricate and install full size specimens of the Windows/ glazing as called for by the Engineer at the expense of Contractor.

12.1.7 Performance Requirement

12.1.7.1 General

The Contractor shall be responsible for the design, manufacture, testing, delivery to site and installation of the double glazed aluminium system windows. This section specifies the performance requirements for the double glazed windows Systems. **The design report is to be vetted by structural consultant.**

12.1.7.2 Design Life

The Design Life for the aluminium Glazed system windows shall be 30 years.

The Design Life is defined as the period when the cost of regular and properly executed maintenance of the system is within normal economic limits.

12.1.7.3 Warranties

Manufacturer warranty of 10 years on profiles & 2 years on hardware from virtual completion of the work.

12.1.7.4 Compatibility

The Contractor shall ensure compatibility between materials used within the Glazing Systems. Compatibility with adjoining elements supplied by others shall also be ensured.

In order to prevent corrosion due to electrolytic action, at every point where dissimilar metals could come into contact, they shall be isolated with an electrically inert material to the Engineer's approval. Special attention shall be paid to fixings in this respect.

12.1.7.5 Aesthetic Requirements

The general arrangement of the Glazing shall be as shown on the Drawings. Final selection of colors and approval of the appearance of the system by the Bank will not be made until after submission and approval of samples and witnessing of mock-ups installed.

All metal surfaces externally shall be as approved by the Architect. The finish shall be uniform throughout, both in terms of colour and level of gloss. All finishes shall be stable and not prone to chalking, flaking, blistering, colour fading or other potential defects associated with the finish. Any colour fade or change in level of gloss anticipated during the Design Life shall be uniform across the surface of the panel and shall not visibly vary between different elements of the building envelope. All fixings shall be concealed. Exposed bolt or screw heads, nuts, washers or rivets will not be permitted.

12.1.7.6 Climatic Conditions

The Aluminium system window (glazing) system will resist air and water infiltration. The opaque area of the spandrel / glazing system will be as recommended by Architect.

The glazing system should be designed to accommodate the following external conditions: Further information can be obtained on temperature, wind speed and rainfall from the Meteorological department of India.

The data above is only indicative. Contractor to design aluminium system window with glazing to take care of Meteorological data of last fifty (50) years.

12.1.7.7 Thermal Performance

Thermal Movement:

Spandrel areas shall achieve a 'U' value as specified by use of glass of appropriate thickness. The Contractor shall submit to the Bank with the working drawings, all thermal performance criteria and any details as may be requested for each element or composite component.

12.1.7.8 Resistance to Water Penetration

The Aluminium windows shall be designed, fabricated and installed to prevent leakage of rainwater into the building, even when in combination with high winds.

The glazing space shall be self-draining with baffled ventilation and shall form an effective pressure equalized rain screen barrier to prevent fine sand and rainwater entering into the building.

All components shall be vented and drained to the building exterior i.e. each panel defined by mullions and transoms shall be individually drained. The system of draining shall be via the transom into the vertical mullion. Any moisture or water shall be collected within the external groove of the mullion. Each mullion shall be drained at each expansion joint level by special accessories or split transoms.

Resistance of water penetration shall be tested as directed by Engineer. There shall be no water penetration during any of the static or dynamic tests.

12.1.7.9 Thermal Safety Study

The guidelines as per relevant IS Code shall be adopted. A report shall be provided for the approval of the Bank. The report shall include a statement from an approved specialized glazing Bank, confirming the adequacy of the selected glass types and thickness in their proposed locations. Full data regarding relative heat gain, light transmission etc. for the glass must also be included in the report.

The study shall take into account restraint imposed by the method of fixing the glass and the thermal stresses caused by shadows being cast across a proportion of the area of the pane.

12.1.7.10 Structural Design Requirements

a) **Wind Loading Design**: Window to have a rating of 2KPa.

b) **Water Penetration**: No water penetration as defined in the test method at inward test pressure of 170 Pa.

c) **Acoustic and Noise reduction requirement**: The system designed and proposed shall be adequate to reduce the decibel levels to extent of 35Db in double-glazing.

12.1.7.11 Aluminium Components

All extrusions shall be as per the approved shop drawing of adequate thickness and strength, not only to meet the structural requirements but also to eliminate any risk of distortion in the finished surfaces. The thickness of extrusions shall be sufficient to ensure their complete rigidity in the lengths required in the final installation. The aluminium sheet for all external facings of aluminium panels and flashings shall be of suitable thickness and quality to be retained in position without showing any deformation under thermal influence or wind load.

12.1.7.12 Anchorages and Fixing Supports

Anchorages and supports shall be designed, fabricated and installed to comply with all performance criteria specified for the system, including the accommodation of thermal and building movements, dead, imposed and wind loadings and all other building dynamics, without having a detrimental effect on any other component of the system.

All connections to the building structure shall be capable of accommodating the structure being out of position by the specified tolerance, multiplied by a factor of safety.

Bolts, screws and nuts shall be stainless steel. They shall be designed in accordance with Indian Standards and used in accordance with the Manufacturer's recommendations. Where no appropriate Indian Standard is available, the strength of bolts and other fixings shall be substantiated by tests. Bolts used in bending will not be permitted.

The Contractor shall be responsible for supplying and fixing of all necessary anchorage and supports for the complete installation.

12.1.7.13 Toughened Glass

Glazing panels of windows, partitions etc, shall be toughened (fully tempered) glass as specified in the drawings.

12.1.7.14 Use of Sealants

The Contractor shall avoid the use of wet applied sealants and in preference shall adopt dry sealing materials such as rubber gaskets. Sealant shall comply with the requirements given below:

- Joint width shall be as specified in drawings with maximum tolerance of ±1mm and alignment within the tolerances as stated above. All joints shall be filled with joint sealant of a make that is to be approved prior to its use by the Engineer. The sealant used shall be of **non-stainable and flexible type, with bonding characteristics** to suit material and local conditions.

- The aspect ratio (width to depth ratio of sealant in joint) shall be 1:1. The sealant shall be retained in place by the use of polyurethane backer rod of the required diameter.

- Colour of sealant, wherever visible on the exterior, shall be black. The sample shall be approved by the Bank prior to application in order to determine the acceptable colour for the Works.

- Sealer shall be applied strictly in accordance with manufacturer's instruction. Masking and cleaning of panels and sections shall be strictly in accordance with best international practice.

12.1.8 Design Provisions

a) **General**: The drawings are to be considered essentially schematic except for profiles of exposed surfaces and panel arrangements where shown. If, in the opinion of the Contractor a change of profile is required in order to meet the specifications, the Contractor shall request a review meeting for approval.

b) **Drawings and Related Documents**: These Specifications will be read with the Drawings, Schedule/Bill of Quantities and other Contract Documents. The drawings indicate required profile of exterior surfaces and show the proposed method of assembly and anchorage. The details shown are diagrammatic and indicative only of minimum aesthetic appearance and architectural requirements. The Contractor shall undertake the engineering design requirement and has to site measure and submit his/her solutions as complete shop

drawing vetted by structural enginer/consultant for Bank approval.

c) **Tolerances**: Design frames to accommodate building tolerances, and when completed, within the specified tolerances (refer details)

12.1.9 Packing, Transport, Storage and Handling

All materials are to be stored and installed in accordance with the Manufacturers recommendations and the Contractor shall supply the Manufacturer with all relevant details and afford them every facility for inspecting the work during progress in order to ascertain that their products are being used correctly, and allow them to take samples of their materials from the site if so desired (Glass, adhesives, etc.)

Manufacturer's nameplates shall not be permanently attached to any part of the contract works where, in the opinion of the Engineer, the nameplates would be objectionable if visible after the installation of the Works.

- The Contractor to co-ordinate all deliveries to site and comply with construction and installation schedule and to get prior approval of the Bank of the schedule of deliveries.

- All storage at site to be arranged off the ground under cover and in an approved location.

- All material and component to be adequately protected against damage, dirt, weather and other climatic conditions.
- Exercise extreme care in handling glass to prevent chipped edges and scratches.

12.1.10 Submittals:

a) Shop drawings:

- **Submit detailed shop drawings for Window to Bank for Review and approval.**

- **Bank's review will be for conformance to the design concept and for the general arrangement only. And such review shall not relieve the Contractor of any responsibilities**

as stated herein or any other applicable items herein specified.

- **Submit shop drawings for all work of this section, including mock-up. Show joinery techniques, provisions for horizontal and vertical expansion, glass and metal thickness, framing and anchor member profiles identify all materials including metal alloys, glass types, fasteners and glazing materials identify all shop and field sealants by product name and locate on drawings. Anchorage details to the building structure and coping details at the parapet are also to be submitted.**

- **Submit die drawings for all gaskets, weather strips and Aluminium extrusions for record only and not for review.**

- **Shop drawings shall be signed and sealed by the Qualified Structural Engineer with specific experience in Structural/ Window wall glazing construction and design, appointed by the contractor.**

- **No work shall be fabricated until the shop drawings, structural calculations and all other related submissions, documentation, certification samples and the mock-up for the work have been reviewed and approved by the Bank.**

- **Sequence of installation shall be designated on the applicable plans, elevations and/or sections.**

b) Glass analysis:

Submit for record only, glass manufacturer's wind pressure analysis and thermal analysis showing that the specified maximum deflections and probabilities of breakage are not exceeded.

c) Silicone Adhesive Tests:

Submit for record sealant manufacturer's test report for weather seal silicone adhesive to all relevant substrate. Test must include seven days water immersion after which silicone must have excellent adhesion to substrates. Report adhesion strength in terms of shear stress and tensile stress. Test samples shall approximate sealant joint sizes and configurations intended for production materials.

d) Certification:
Submit a letter of certification from the sealant manufacturer stating that the sealant has been tested for adhesion and compatibility on production samples of metals, glass and other glazing components and that all sealant details and application procedures shown on the reviewed Shop Drawings are acceptable for use.

12.1.11 Samples:

The Contractor shall submit samples for review two (2) sets of labelled samples of each required type and colour of metal finish, on 300mm long sections of aluminium extrusion shapes. Samples must show extremes of colour texture variation. Samples will be reviewed by the Bank for colour and texture only. Compliance with other requirements is the responsibility of the Contractor. Colour and texture range of production material shall match approved samples.

The Bank reserves the right to require samples which will show the fabrication techniques and workmanship of the component parts and the design of accessories and other exposed auxiliary items, before fabrication of this work proceeds.

Within two weeks of signing this contract submit for review 2 sets of samples sealant backers, anchor components, anchor assemblies and epoxies.

The following samples of actual job site materials shall be submitted in triplicate, unless otherwise noted, and in the

sizes noted, for Bank's review and approval. Any omission of an item, or item, which required the Contractor's compliance with these documents, does not relieve him/her from such responsibility.

- Aluminium extrusions: one only of each section; 300mm long of specified thickness.

- Glass: each type and kind, 300 x 300mm of specified thickness and including frame.

- Glazing gaskets, tapes, separators, glass setting blocks, etc.: each section or unit, 300mm long or unit.

- Fasteners and connecting devices: each type and size.

- Finish samples: after approval of the finishes coatings provide the Bank with approved samples each of all colours in the applied coatings

- Window and door ironmongery and accessories.

- SS channel and finish samples.

- Samples submitted should also include assembly of various components forming typical fixing details complete with flat sheets, glazing, extrusions, fastener, sealants, etc.

- Maintenance manual: submit 3 copies each of detailed procedures for the periodic inspection, maintenance and cleaning of all applicable Structural/ Window wall glazing elements, finishes etc.

12.1.12 Documentation

12.1.12.1 Glass and Glazing Documentation

The applicable glass manufacturer shall submit written certification for Bank's review and approval stating that all glass and glazing requirements as detailed and specified on the shop drawings have been reviewed and approved for use relative to their specific application and/or design parameters, compatibility to adjacent materials and in conformity with all requirements as detailed and specified in the contract documents. Certification shall further state that the

proposed glass and glazing materials are most appropriately suited for the use or uses intended and recommended for the specific use or uses. The glass and glazing requirements shall include the selection of the glass and the glazing materials including, but not limited to, gaskets, setting blocks, sealants, the design and dimensional parameters of the glass pockets and the compatibility of materials.

12.1.12.2 Sealant Documentation

All sealant application must be clearly designated on the applicable shop drawing details and referenced to a master sealant schedule specifying materials, special instructions and application procedures. The applicable sealant manufacturer shall submit written confirmation that all sealant requirements as detailed and specified on the shop drawings have been reviewed and approved for use relative to their specific application and/or design intent, compatibility to adjacent materials and in conformity with all the requirements as detailed and specified in the contract documents. The manufacturer's certification shall specify the optimum life expectancy, in years, for the proposed sealant materials as detailed and specified on the shop drawings and/or master sealant schedule and shall further state that the proposed materials are most appropriately suited for the use or uses intended and recommended for the specific use or uses.

12.1.12.3 Quality control Documentation

In-plant and job site quality control procedures shall be documented in writing for Engineer's review and approval to ensure the design integrity and performance of the as-built product. Documentation shall include schedule, detail, isometric and/or schematic explanatory sketches cross-referenced to the shop drawings, data sheets, etc., all as required to intelligently witness and assess methods and materials and to ensure that both the fabrication and installation are in accord with the contract documents.
The Engineer shall be given free access to the plant to inspect fabrication procedures. No fabrication or assembly of job site materials shall commence until the first production unit is personally inspected and approved by the Bank.

The in-plant quality control procedures shall include but not necessarily be limited to, the following items:

Fabrication	:	Tolerances, joinery, sleeves etc.
Finish match	:	Approved finishes and controls required for the match of exposed surfaces.

Assembly	:	Welds, fastener, sealants, gaskets, separators, glazing, etc.
Protection	:	Handling, protection, shipping etc.

The job site quality control procedures shall include, but not necessarily be limited to, the following items:

Anchorage	:	Lines, grades and related building tolerances.
Installation	:	Tolerances finish match, joinery, sleeves, flashing, welds, fasteners, sealants, etc.
Sealing	:	As recommended by the applicable sealant Manufacturer.

Protection & cleaning as recommended by the applicable material manufacturer.

2 FABRICATION:

All joints shall be of mechanical type. All joints and members of windows and glazing shall be designed to withstand a wind load of 2 kPa, with a maximum deflection not exceeding 1/180 of the span of the members concerned or as determined under IS Code. All members shall be accurately machined and fitted to form hairline joints

Framing system: Fabricate from extrusions to profiles shown on Shop drawings approved.

Junctions shall be formed in such a way that no fixings, such as pins, screws, pressure indentations and the like are visible on exposed faces. Shop drawings to clearly show where fixing will be exposed. All cut edges, drilled holes, rivet joints, and flat sheets, shall be cleaned, and be neat, free from burrs and indentations. Sharp edges will be removed without excessive deformation, and fit mitered joints accurately to a fine hairline.

Pre-assemble and match mark before delivery.

2.1 Handling and Stacking

Fabricated material shall be crated where required to protect the material from any damage during transportation. The loading and unloading shall be carried out with utmost care. On receipt of the materials at site, they shall be carefully examined to detect any damaged pieces. Damaged items shall be replaced in an expeditious manner. Materials found to be acceptable on inspection shall be repacked in crates and stored safely.

2.2 Installation

All frames shall be installed into true to line & level using adequate number of expansion bolts or other appropriate fastening. The openings shall be properly plastered, and prepared to correct sizes in proper line & level to receive the frames so that there is practically no gap between the prepared openings and the aluminium members. Frames shall be fixed through proper fixings, adequate to take all live and dead loads specified.

2.3 Gaskets, Weather seal, etc.

All gaskets, weather strips, etc., shall be neoprene/EPDM and shall be of the required profile to ensure absolute water tightness.

Provide non-structural external waterproofing sealants of low modulus neutral curing silicone rubber compounds. Only sealants from manufacturers approved by the Engineer – in-charge shall be used.

Supply spacer gaskets, glazing tapes and setting blocks compatible with sealants. The gaskets shall not contribute to sealant colour change or affect the adhesion of the sealant to substrates when the sealants and gaskets are exposed to ultraviolet light.

Silicon sealants shall be clear in colour unless otherwise specified, and compatible with the materials they are applied to.

Accessory materials such as joint primer/sealer bond breaker tape, sealant backer rod, glazing tape, etc. shall be of the best and appropriate makes recommended by the sealant manufacturer and be fully compatible with the materials with which they come into contact.

Exposed screws shall be countersunk type, anodised aluminium or non-magnetic stainless steel, evenly and neatly located in an approved manner. Exposed fasteners shall fully match the aluminium member finish.

2.4 Mock-ups

Sub-assemblies and complete trial assemblies of the glazing Systems shall be prepared for inspection by the Engineer and must be available and approved at appropriate and agreed stages before final production is commenced.

Sub-assemblies shall be provided at site as follows:

- Sample double glazed units

The Contractor shall also conduct a mock-up trial erection on site or at their works of the following typical areas:

- Typical Aluminium glazed window units

The above to be complete with all glass, panels, fittings, fixtures and accessories etc. for inspection and approval by the Bank.

2.5 Inspection and Quality Control

The Contractor shall be responsible for conformity with all relevant Standards with respect to Quality Control and Quality Assurance in the manufacture of structural glazing, window /wall glazing, glazed door and windows, ventilators and Louvers Systems.

The quality or quantity of materials and / or workmanship shall not be altered without the authorisation of the Bank.

2.6 Shop Fabrication

2 2.6.1 Glazing shall be fabricated from extruded aluminium members of alloys specified. Complete the cutting, fitting, forming, drilling and grinding of all metal work prior to cleaning, finishing, treatment and application of coatings. Remove arises from cut edges and ease edges and corners to approx. 4mm.

2.6.2 Fabricate and shop assemble frame and sash members into complete Curtain wall, structural glazing system as indicated along with anchors for support to the structure and with hairline joints where mechanical fasteners are used.

2.6.3 No bolts, screws or fastenings to impair independent movement.

2.6.4 Openable windows, typically, shall be fabricated to allow for inside replacement of glazing.

2.6.5 Miter all corners and mechanically stake over solid aluminium corner block, set and sealed in epoxy leaving hairline joinery and then seal weather tight.

2.6.6 Joining methods must not discolour finish or be unsightly. Welding and brazing to comply with industry standards using system and rods for assembly for fabrication.

2.6.7 All frame corners and meeting rail intersections shall be made permanently leak proof.

a) Fasteners should be concealed except where otherwise shown, indicated or approved.

b) Provision for anchorage to the structure allowing for erection tolerances, thermal expansion and building deflections to make the unit vibration free with no visible or audible evidence of movement.

c) For glass to be fixed with minimum ‘edge clearance’ and ‘bite’ on glass. Cutting is to be done precisely taking into consideration the recommendations by glass manufacturers and design parameters along with performance requirement and gaskets and other practical considerations. Do not nip glass edges. Edges may be wheel cut or sawed and seamed at manufacturer’s option. For glass to be cut at site provide glass larger than required so as to obtain clean cut edges without the necessity of seaming or nipping, grind, polish, and ease arises, nip or abrade glass after heat tempering.

d) For weather stripping by EPDM extruded gaskets provision shall be made to ensure that water will not accumulate and remain in contact with the perimeter areas of glass and securely staking and joining at corners.

e) All glass pockets, fixed and moving, shall be weeped to provide positive drainage. Water shall be weeped to the exterior via frame weep slots protected by snap-in weep cover integral drips.

f) Except as otherwise indicated provide each continuous unit of framework and all accessory items as a packaged unit. Complete the fabricated assembly, finishing and all other work to the greatest extent possible in the factory before brought to the project site. Disassemble only to the extent necessary for transportation and installation.

g) After fabrication all glazing units (including disassembled parts) shall carry their designation viz., W-1, W-2 etc. size and location to be fixed well identified through self-adhesive non-staining removable PVC tape.

2.7 Fittings

Hinges, stays, handles, locks with keys and other fittings shall be of size, quality and manufacture as approved by the Engineer. Sliding gear for sliding windows shall be of design and make approved by the Engineer and shall ensure smooth operation of the windows. The fittings shall be of approved make.

2.8 Acceptance Testing of Finishes

The Contractor shall make provision for acceptance testing. Such inspections shall be made at the applicator's finishing plant before parts are shipped and, if possible, before small individual parts are pre-fabricated into large un-widely items.

The inspection certificates should demonstrate that the appearance of the surface finish complies with agreed samples. These certificates should also demonstrate that all relevant tests in accordance with the appropriate Standard have been carried out and that the finish complies with the appropriate standard in all respects.

3. INSTALLATION:

3.1 General

During installation of the system, the Bank may reject any materials or workmanship that are, in his/her opinion, unsatisfactory and not of the same quality as the approved samples, sub-assemblies and full-scale mock-ups. Rejected materials or workmanship shall be immediately removed from Site.

Materials shall be installed in accordance with the Manufacturers' specifications, and shall comply with all related standards, ensuring compatibility of each material.

The Contractor shall not alter the quality or quantity of materials or workmanship without the authorisation of the Bank.

3.2 Examination

The Contractor shall inspect site conditions before start of work on site and before delivery of materials. He/she shall ensure that conditions are satisfactory for installation. He/she shall verify that metal clamps, holdfasts and other anchorage devices are built-in and located at correct positions as required to suit positive and permanent fixing.

Isolate dissimilar metals at interfaces with bitumen based or nylon shim materials to prevent galvanic action.

3.3 Assembly and Installation

The various components received at the site shall be assembled where required and installed in position as per the drawings, true to line and level.

3.5 Glazing

Glass shall be secured in accordance with the glass manufacturer's recommendations allowing for thermal expansion, etc.

a) Joint preparation: Clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, moisture and other foreign materials and make surface absolutely clean.

b) Prime or seal joint surfaces as required without spilling on to adjoining surfaces.

3.6 Application of Sealants

All sealants shall be applied in accordance with the Manufacturer's recommendations. The following are general recommendations for application of sealants supplement

a) Surfaces to be sealed shall be sound, dry, and free from dirt, water, frost, loose scale. Corrosion, asphalt, paints or other contaminants which may adversely affect the performance of the sealing materials.

b) Cleaning shall be performed to the extent required to achieve acceptable joint surfaces.

c) Joints and spaces which are to receive sealing compound shall in no case be less than 6 mm deep; nor shall they be less than neither 6mm wide nor more than 24mm wide.

d) Mask areas adjacent to the joints as required. Prevent contamination of adjacent surfaces. Remove masking promptly after the joint has been completed. Perform priming immediately before installation of sealant

e) Before any sealing is commenced, test the materials for indications of staining or poor adhesion.

f) Use sufficient pressure to fill all voids and joints. Sealants shall bond to all sides of joints except where backup material is used. Sealant shall bond to both sides of joints and shall not adhere to the backup materials.

g) Sealant installations shall be a full bead free from air pockets and embedded impurities and having smooth surfaces, free from ridges, wrinkles, sags and embedded impurities.

h) After joints have been completely filled, tool them neatly to a slight concave profile.

i) Cover all fasteners penetrating the air seal with sealant.

j) Seal all gasket at sills & jambs, etc.

k) Immediately clean adjacent surfaces which have been soiled and leave work in a neat clean condition. Remove excess materials and droppings using recommended cleaners and solvents.

l) The fact that the Drawings do not show all locations to be sealed does not limit responsibility to seal all locations required to create and secure a continuous enclosure.

3.7 Adjustments

Upon completion of the works and prior to the handing over of the building to the Client or at a time as directed, the Contractor shall inspect the installation and make good any defects noted and adjust all windows to ensure proper and trouble free operation.

3.8 Protection

a) Framing system: Protect metal surfaces as necessary until Practical Completion. Finished surfaces shall be free from imperfections such as scratches, scrapes, scuffs, streaks, specks, spots, stains, smudges, soiling and dents.

b) Glass: Protect glass from breakage immediately upon installation and until Practical Completion. Remove and replace glass and metal panels which are broken, cracked, abraded, chipped or damaged in any other way before, during or after installation, at no cost to the Principal.

The Contractor shall be responsible for replacing breakage and damage to the installation until Practical Completion.

3.9 Cleaning

The Contractor shall:

a) Remove labels, excess glazing compounds, stains, spots and other foreign matter from glass, frames, hardware and other finished surfaces immediately upon installation of glazing for each light.

b) Remove rubbish and debris resulting from glazing operations, each day.

3.10 final cleaning:

The PVC tape wrapping, protecting the anodized finish shall be retained until the glazing work is complete. After the glazing and all work connected with installation of windows is complete, all aluminium work shall be cleaned by removing of marking tapes, and shall be washed with a suitable thinner that will not attack the surfaces and components, and left in finished condition, in uniform appearance and free from all marks and blemishes.

If during installation stage, and **prior to handover and acceptance of the finished works by the end uses**, any portion of the protective taping is removed, torn or damaged, the Contractor will reapply immediately marking

tape to prevent any damage to anodised finish. No extra is payable to the Contractor on account of this.

3.11 Training:

On completion of the installation, the Contractor shall provide training on the cleaning and maintenance of the Aluminium window by a suitably qualified technical supervisor, for adequate number of persons as decided by the Bank.

4.1 Relevant Standards

4.1.1 INDIAN STANDARDS

IS 875 (Part 3) Design loads for Buildings and structures for wind Loads.

IS 733 Wrought Aluminium and Aluminium Alloy Bars, Rods and Sections

4.1.2 GASKETS

EPDM gaskets

4.2 Code compliance:

Requirements of regulatory agencies: Must comply with applicable Indian Standards.

4.3 Contractor's Qualifications:

a) Work of the section shall be performed by one Contractor, who is regularly engaged in the engineering, fabrication, finishing and installation of Structural/ Window wall glazing, aluminium doors and windows, etc. including glazing and sealing of glass, comparable to work on this project. The Contractor shall demonstrate to the satisfaction of Bank and Employer that he has successfully performed comparable projects over the previous five years.

4.4 Source Quality Control:

Shop and field materials and workmanship shall be subject to inspection of the Employer and Bank and their representatives at all time. Such inspections do not relieve the Contractor from obligations to provide

materials conforming to all requirements of the Contract Documents and industry standards for material quality.

4.5 Design and Execution Responsibility:

a) The contract documents define only the design intent and general performance requirements. The Contractor is overall and totally responsible for design, structural calculations, shop drawings, fabrications, installation, warranties, certifications and related documents.

b) The Structural/ Window Wall glazing system manufacturer shall be entirely responsible for the design, fabrication and erection of the systems, and all work shall be performed entirely by his/her own forces. No Contractor labor will be acceptable unless specified through written confirmation which required.

c) Design metal framing members to accommodate expansion and contraction of components without buckling, creating stress and glass, structural components and fasteners, joint seals or other damaging effects when subject to a surface temperature range of 5^{o}C to 100^{o}C.

d) The Contractor shall provide a detailed write up on the following: -

- Conceptual design
- Component description
- Design, fabrication & execution
- Detailed bar chart & showing all activities to last detail
- Method statement

This is a performance specification. Drawings and specifications indicate the required basic dimensions, profiles and performance criteria. The Contractor shall have the option of modification and addition of details provided the visual concept and performance requirements are fulfilled. Proposed modifications shall be clearly shown on shop drawings as “Design Modifications” and acceptance of same will not relieve the Contractor from sole responsibility for performance of the metal wall cladding/structural/ Window wall glazing system/doors windows glazing.

4.6 Design & Engineering

The contractor for the work should possess adequate engineering background and facilities inclusive of trained system personnel from them/their parent company and should be able to prove their design.

4.7 Structural Properties

The aluminium system window wall and all its related components shall be designed in accordance with Bureau of Indian Standards or other standards called for**.**

The work's glazing elements including sealants and sealed joints shall sustain permanent deformation or failure under loading equivalent to 1.5 times the design wind pressure herein specified.

Deflections: The specified deflections must be reduced if they are, in any way, cladding/Structural/ Window wall glazing elements, sealants and/or sealant joints, glass and/or glazing, related components and adjacent structural and/or building elements.

The maximum deflection of design wind pressure shall not exceed 1/240 of height (Double glazed) and 1/175 of height (Single glazed) or 15mm whichever is lesser for mullion.

No deflection shall exceed 1/300 of space for glass supporting member.

Under 1.5 times for design pressure with no permanent deflection of framing member exceeding 1/1000 of span length.

Anchorage of support of Structural/ Window/ metal wall cladding wall glazing elements.

Wall braces, support steel and connection for support of Structural/ Window wall glazing / metal wall cladding shall be designed, provided and installed complete. Supporting elements for the Structural/ Window wall glazing/ metal wall cladding/ anchorage assemblies to the structure, and all structural connections of the metal wall cladding/Structural/ Window wall glazing shall conform to the following requirements.

Conform to the schematic layouts indicated on the drawings. Variations from such layouts may be permitted by the Banks, but only if a proposed revision

does not, in the Bank's opinion, deviate from the design intent, cause excessive stress in the structure, cause excessive deflection, inhibit thermal and building movement or conflict with other requirements.

Member shapes and/or profiles on the drawings are not necessarily the exact shapes required or best suited for the particular condition.

No holes shall be burned or field drilled in any structural steel members unless expressly approved by the Engineer in writing.

The Contractor shall get approved by Engineer detailed layouts, alignments jigs, etc., for the proper and exact placement of all welded anchor studs, anchorage components, embedded anchor assemblies, etc.

All Structural/ Window wall glazing/ metal wall cladding elements and their applicable anchorage assemblies shall be designed to accommodate all thermal and building movements without any harmful effect to the metal wall cladding, as herein specified, including glass and glazing and sealant application and the Structural/ Window wall glazing system.

No field forming, cutting and/or alterations of primary wall elements will be allowed. All framing members shall be shop fabricated and finish coated. No unfinished surfaces will be permitted on exposed surfaces.

4.8 Water-Spray Testing on Completion of Installation

Movement of water behind and on exposed surfaces must be controlled to ensure that water is not retained and that elements will not be damaged or corroded by water and to minimise the potential for algae and fungus growth as a result of standing or trapped water.

At the completion of Structural/ Window wall glazing and glazed cladding installation including windows and shop fronts, progressively in separable parts or in total, areas designated by the Bank shall be water-spray tested in compliance with the field test method set out in AAMA 502.1. Areas for testing shall be designated at the completion and approval of installation. The Contractor shall be responsible for supplying the designated test nozzle, appropriate hoses and water at sufficient pressure to conduct these tests. Cranes, mobile platforms, scaffolding and the like required for access to conduct field spray tests shall be provided by the Contractor at his/her own cost. The Structural/ Window wall glazing Agency shall give the Employer and Engineer at least 14 days prior notice of completion of areas designated for testing.

4.9 Structural & Weatherproofing Silicone Sealants

All silicone products used for Structural/ Window wall glazing and weatherproofing of the construction shall be sourced from approved manufacturer.

Silicones used for Structural/ Window wall glazing, for other adhesive purposes within panels of the Structural/ Window wall glazing system and for weatherproof seals within and between elements of the Structural/ Window wall glazing shall be approved make one-part neutral cure structural grade sealant.

Silicone used for sealing and adhering metal smoke flashings, slurry dams, baffles, weatherproof flashings and moisture barriers extending between the reinforced concrete structure and glazed panels of the Structural/ Window wall glazing system shall be of approved make one-part neutral cure structural grade sealant.

Silicone used for site-applied seals between elements of the Structural/ Window wall glazing and natural stone veneer cladding shall be of appropriate type of approved make.

All structural and weather seal silicones covered by this specification of frames are **not** covered by this requirement. Small joint sealants shall be chemically compatible with structural and weather seal silicones during fabrication of Structural/ Window wall glazing panels shall be removed before curing. Sealants used for weather seals shall not experience adhesive or cohesive failure. Sealants shall withstand movements up to the limits prescribed by the manufacturer. Exposed sealant surface shall not crack or bubble.

4.10. Provenance

The Contractor shall retain and make available to the Bank on request, documents identifying the source, production batch numbers, date of manufacture, date of purchase, date of delivery and date of use of all structural and weather seal silicone products incorporated in the works.

To prevent excessive shelf life and facilitate the correlation of batches of sealant with panel production, silicone sealants generally shall be used in the sequence of their manufacture.

Note: Due to a combination of poor training of glaziers and the relatively high cost of silicone sealants, the practice of using plastic cartridges of tubes to tool

silicone sealants and retrieve excess material for re-use has become common in India and Southeast Asia. While this practice is permissible in factory conditions, it leads to contamination of the sealant by dust, dirt, sawdust, cardboard, masking tape and the like in site glazing and sealing. The practice also encourages deliberate application of excess material and is therefore not permissible in site glazing and shall be strictly avoided.

4.11 Surface Preparation, Installation and Curing

Unless otherwise specified, surface preparation, installation and curing of silicone sealants shall comply strictly with the recommendations published in respective Sealant manufacturer's product information sheets:

Silicone sealants shall not be applied to damp surfaces. Remove from surfaces to receive silicone all foreign matter and contaminants such as grease, oil, dust, water and other liquids, resin from timber shipping crates, perspiration, rust, angle-grinder swarf, surface dirt, residues of protective coatings, masking tape adhesives and extraneous glazing compounds.

Backing rods and tapes shall consist of open-cell polyurethane or closed cell polyethylene foam compressed to not more than 50% of the unstressed diameter.

4.12 Accessories:

Extruded gaskets, weather stripping, extruded seals and spacers which do not come into contact with structural silicone sealant shall be of ethylene propylene diene monomer (EPDM). Where in parallel contact with structural silicone sealants, all gaskets, setting blocks and spacers other than foam glazing tapes shall be of heat-cured silicone rubber, chemically compatible with the silicone sealant and suitable for the specific purpose intended. All extruded gaskets, weather-stripping and spacers other than foam glazing tapes shall have continuous mechanical engagement to framing members; adhesive attachment is not acceptable. Unless otherwise approved, gaskets, weather stripping, extruded seals and spacers shall have a hardness of 40 +/- 5 durometer Shore A.

The Glazing, cladding system shall be constructed with (and shall maintain during its design life) a standard of seal which shall not result in any reduction of sound insulation performance.

Gaskets, weather stripping and seals used to achieve the required weather proof ness and/or air tightness shall be selected to accommodate fully the range of dimensional tolerances associated with fabrication and installation of the

cladding system. Gaskets, weather stripping and seals shall be formed from materials capable of retaining their elastic qualities, dimensions and resistance to physical and chemical attack sufficient to maintain the full water tightness, air tightness and acoustic performance for the design life of the Structural/ Window wall glazing.

Note: Extruded synthetic rubber gaskets, weather-stripping, seals and so on are often drawn into and along tight-fitting flutes or channels in aluminium framing extrusions. One unforeseen result is that these elastomeric materials are stretched and held in tension by frictional contact with aluminium at the time their ends are trimmed. As frictional restraint diminishes through cycles of temperature change, movement and wetting, the gaskets retract along their major axis to an unstressed state, leaving gaps at their ends through which water and air infiltrate, household liquid detergents are sometimes used to lubricate synthetic rubber extrusions. These materials can be trapped in extrusion flutes and later run down the interior surface of spandrel glass, leaving a drip trail of highly reflective flakes which may damage glass coatings and give the appearance of cracks in the glass.

Extruded gaskets, weather stripping, seals and spacers mechanically engaged by flutes or pockets extruded in framing member shall be installed without residual tension or extension. Dry lubricants may be used to reduce drag during installation of synthetic rubber extrusions and to induce compression so as to prevent gradual elastic shrinkage and retraction from their ends. Wet lubricants containing detergent shall not be used in any location from which spillage onto glass and aluminium surfaces cannot be immediately and completely removed at the factory. Concentrated detergents shall not be used for any purpose which may bring the liquid into contact with the coated surfaces of vision and spandrel glass.

Setting blocks shall be dense heat-cured rubber with a hardness of 80 to 90 durometer Shore A. Side blocks and anti-walking blocks shall be dense heat-cured silicone rubber with a hardness of 60 to 70 durometer Shore A.

4.13 Product Handling:

- Procedures to be indicated by the Contractor within two weeks of signing this contract.
- Package and store materials in a manner that will prevent surface damage or contamination, distortion, breakage or structural weakening.
- Replace any material damaged during manufacture, shipping, storage or erection.

- Protect materials in place from contamination and damage.
- Protect factory applied finishes from staining and scratches.
- Field cutting of anodized / power coated components shall not be permitted, unless authorized by Bank.

4.14 Inspection:

All shop and field materials and workmanship shall be subject to review by Engineer-incharge at all times. Such reviews shall not relieve the Contractor from the obligation to provide materials conforming to all requirements of the Contract Documents, and matching approved samples. The Contractor shall promptly correct any deficiencies reported and carry out his own control measurements for all materials, whether reviewed or not.

4.15 Fabrication:

Except where otherwise shown, specified or directed, the method of assembly and joining shall be the Contractor's option provided the results are satisfactory. The manufacturer's proven methods that will produce the required standards of workmanship shall be used subject to approval. Fabricate and fasten metal work so that the work will not be destroyed nor the fasteners over stressed from the expansion and contraction of the metal.

4.16 All welding shall be in accordance with the appropriate recommendations of the Indian welding codes and shall be done with electrodes and/or by methods recommended by the manufacturer of the alloys being welded. All welds behind finished surfaces shall be done as to minimize distortion and / or discoloration on the finished side. All weld spatter and welding oxides on finished surfaces shall be removed by de scaling and / or grinding.

Unless otherwise shown or specified, all weld beads or exposed surfaces shall be ground and finished to match and blend with finish on adjacent parent metal. Grinding and polishing of nonferrous metal shall be done only with clean wheels and compounds free from iron and iron

compounds. No soldering and /or brazing shall be allowed.

Conceal fasteners where visible in the finished work.

4.17 Execution:

4.17.1 Inspection:

Verify that surface and conditions are suitable to receive the work of this section, and that condition will not adversely affect the installation and performance of the installed work. Correct all unsatisfactory conditions prior to beginning erection of specified work.

4.17.2 Execution Generally:

The drawings shall be considered essentially schematic, except for profiles of exposed surfaces which shall be as indicated. If, in the opinion of the Contractor, a change of profiles is required in order to meet the specifications, he shall consult with the Bank for a review of the conditions.

The method of assembly, reinforcing and anchorage of the metal wall cladding/Structural/ Window wall glazing system, where indicated, is schematic. Location and method of providing same shall be the Contractor's responsibility, who shall design, assemble, reinforce and anchor to suit each specified condition in an acceptable manner complying with the requirements specified herein and the works that are to be interfaced with main building structure shall be co-ordinate according to main contractor's program.

Visible joints shall be as shown on the drawings.

All parts shall be secured by concealed means and screws exposed to view shall not be allowed.

All components shall be assembled, secured, anchored, reinforced, sealed and made weather tight in a manner not restricting thermal or wind movement of the metal wall cladding/Structural/ Window wall glazing system. Where possible, sealants shall be concealed.

Free and noiseless movement of all components of the metal wall cladding/ Structural/ Window wall glazing system due to thermal structural, wind pressure

or dead loads, shall be achieved without strain to glass, without buckling of any components and without excessive stress to any members or assemblies.

The entire metal wall cladding/Structural/ Window wall glazing system and other windows, glazing, etc. shall be assembled and installed so that all leakage and condensation shall be drained and discharged to the exterior face of the wall.

Movement of water behind and on exposed surfaces shall be controlled to ensure that water is not retained and that elements will not be damaged or corroded by water and to minimise the potential for algae and fungus growth as a result of standing or trapped water.

4.18 Erection

Erect of Aluminium Window and glazing, etc. in accordance with the approved shop drawings.

Provide labour, material, staging, scaffolding, accessories and supervision necessary to erect the complete material.

Do not install components which are defective in anyway, including warped, bowed, dented, abraded and broken members and glass with edge or surface damage.

Remove and replace all damaged components to Banks satisfaction.

Set wall plumb, square, level and fasten securely in correct vertical and horizontal alignment. Seal joints within wall and between adjacent constructions.

Do not cut, trim or weld components during erection in any manner which would damage the finish, decrease strength or result in a visual imperfection or failure of such components.

Return components which require alteration to the shop for re-fabrication or from the replacement with new parts or components.

Install components level, plumb, true to line and with uniform joints and reveal. Attach to structure with non-staining and non-corrosive anchors, fasteners, spacers and fillers as required.

4.19 Tolerances:

Diameter of pocket shall not exceed 1mm.

Provide accurate benchmarks for use in wall erection of all floors and promptly correct any errors or inconsistencies.

Furnish a schedule of fabrication tolerances for all major wall cladding components. In addition to the fabrication tolerances, provide for and schedule thermal movement including assembly and installation tolerances for all major and/or applicable wall cladding components and/or assemblies.

4.20 Assembly and Anchorage:

Anchor component parts securely in place by bolting, welding or other permanent, mechanical attachment system, which will comply with performance requirements and permit movements which are intended or necessary. Install slip pads between moving parts.

Provide a separator at contact surface of dissimilar material wherever there is a possibility of corrosive or electrolytic action.

Remove weld slag and apply prime paint over welds. Also paint exposed portions on inserts. Touch up shop applied paint that is damaged by welding or other causes.

Anchorage system and building frame: Each mullion shall be fixed to the structural slab at each floor level. All steel fasteners shall be galvanized, coated with zinc chromate primer and supplied by the Contractor. Any bolts or angles to be cast in concrete shall be supplied and delivered to site by the Contractor and check the building frame and the exact position of fixing bolts or angles on site. The Contractor shall also make necessary modifications to the anchor ties to suit different site conditions of steel reinforcement without additional charge.

Shop assembly: As far as practicable, all fitting and assembly of the work shall be done in the shop. Work that cannot be permanently shop assembled shall be temporarily assembled in the shop and marked, before disassembly to ensure proper assembly later in the building.

Sleeves: Unless otherwise noted, all aluminium sleeves shall be extruded sections designed to accurately interlock with adjacent sections and incorporate serrated surfaces for the secure bedding of sealant between the parent metal and the sleeve.

Fasteners: All fasteners shall be stainless steel with self-locking devices, unless otherwise noted, and of sufficient size and strength to withstand the applicable design wind load and dead load forces with safety allowance factors as required for the specific materials. The spacing and quantities of fasteners shall be as required to develop the maximum strength of the member they secure or support. Washers and/or other accessory items shall be of the same material as the fastener. Torqueses tighten all assembly fasteners to achieve the maximum torque-tension relationship in the fasteners.

All fasteners shall be concealed unless otherwise shown or approved. The head style for all exposed fasteners shall be countersunk oval head unless otherwise noted on the drawings. Exposed fasteners shall be finished to match surrounding metal.

All fasteners including washers and accessory items shall be scheduled and designated on the shop drawings so that anyone can witness and assess the assembled units to ensure that all fasteners conform to the designated and approved type, size, material, spacing, etc. When certain items are not readily apparent, such as material and alloy or torque tightening requirements, special instructions for the identification and appraisal of such items shall be issued.

4.21 Glazing:

Preparation: Clean all surfaces, which will be in contact with glass immediately prior to glazing. Remove all dirt, oil and other bond reducing film. Use cleaning material only as recommended by the specialist manufacturer.

All glass shall be new. Mock-up glass shall not be used in the building. Glass used shall be with seamed edges and corners. Inspect all lights of glass before installation.

Before setting glass, inspect frame for proper dimension square ness. Adjust frame and / or glass size as required to meet specified requirements.

Thoroughly clean glazing pocket before setting glass. Solvents shall be compatible with aluminium, glass and glazing materials. Place setting blocks at quarter points. Place side blocks in the upper half of each jamb light. Side blocks shall be positively retained in position.

Remove and replace stops and apply sealants as required for a complete glass after the construction period.

Defer glazing of openings, which are obstructed during construction. Glaze such openings when constructions are removed.

Replace any glass, which breaks or sustains edge damage surface damage or damage to reflective coating as defined above.

B. TECHNICAL SPECIFICATIONS FOR INTERIOR FURNISHING WORKS

GENERAL

1. For all items of work described in the Bill of quantities, the work shall be carried out strictly in accordance with description in General Specifications, particular BOQ specifications and drawings. The description, drawings and specifications shall be taken complementary to each other and shall form part of this contract.

2. In case items are not exhaustively described in parts described above, the general specifications of CPWD in respect of material & workmanship shall be followed for which nothing extra shall be paid.

3. The quoted rates shall be deemed to include all necessary hardware, tools & plants, props, material, labour, duties, taxes, insurance premium etc., all needed to make the individual item functional, to the complete satisfaction of the Engineer-in-charge, whether specifically mentioned in the individual item or not.

4. Scope of Work: - The Scope of the work under this contract includes for full & final and entire completion of all works including all internal services in all respects described in General Specifications, particular specifications and as shown on drawings forming part of the contract.

5. Although all the details of construction have been by and large covered in these documents, any item or detail of construction not specifically covered but obviously implied and essential to consider the works and all internal services complete and functional, shall be deemed to have been covered in the item rate quoted. The tenderer may however, consider a minimum level of specifications conforming to IS Code or National Building Codes to cover these missing details.

6. Approved Samples of Materials: The contractor shall produce samples of all materials at least two weeks before incorporation in the work and shall obtain approval of these in writing from the Engineer-in-charge, before he places bulk order for the materials. Materials to be incorporated in the work shall conform to latest relevant ISI specifications, ISI marked goods where manufactured shall be used. (This will apply to the materials where specific brand, names of manufacturer not stipulated) where brand, names are given then the material should be out of the brands, names as specified.

7. Bar Chart: Contractor shall submit Bar Chart to the Engineer-in-charge for the entire work in the contract.

8. The above bar chart shall be submitted by contractor within one week of acceptance of contract. Bar chart as submitted shall be scrutinized by the Bank Engineer-in-charge. The contractor shall carry out the changes as suggested by Bank Engineer-in-charge. The mutually agreed Bar chart shall be signed by contractor and Bank Engineer-in-charge. This shall be binding on contractor for progressing the work for completion by due date.

9. Standard of Work: To determine the acceptable standard of workmanship and also to decide if any variations are required in the layout of internal services or finishes, the contractor shall execute on samples for areas as required. Approval of these in writing from the Bank Engineer-in-charge, before he places bulk order for the materials. Materials to be incorporated in the work shall conform to latest relevant ISI specifications, ISI marked goods where manufactured shall be used. (This will apply to the materials where specific brand, names of manufacturer not stipulated) where brand, names are given then the material should be out of the brands, names as specified.

10. The samples shall be put up for inspection and approval and specific dates put up in the bar-chart mentioned above for each of the following

11. All items of works, services and finishes such as panelling, door shutters, false ceiling, Glazing, joinery including all fittings and hardware, sanitary fittings, electrification, entire wall finishes and painting etc. shall be completed in all respects before putting up for inspection and approval.

12. All materials fittings / fixtures to be incorporated in the sample rooms conforming to specifications makes and brands as given in the Contract Agreement shall be got approved at least one week before they are required at site for incorporation. The order should be placed by the contractor in such a way that they can be procured in time and incorporated in the samples to be made. All samples shall be jointly approved by Architect and Bank Engineer-in-charge and record of approval stage wise duly signed and dated shall be kept by the Bank Engineer-in-charge.

13. The Bank Engineer-in-charge, wherever mentioned shall be the Engineer-in-charge appointed by the client, who would be in charge of the project.

14. The contractor must clearly understand that this project involves coordination with different agency working at a time, hence immaculate planning and co-ordination with the Bank Engineer-in-charge and other agency shall be needed and the contractor must ensure that his team consists of qualified and compatible workers/interior designers/engineers. Certain decisions may be taken on the site and shall need to be documented and dealt with accordingly.

I) **Partitions and cabinet work**: -

General: Partitions, cabinets, etc. shall be fabricated and assembled in the site. 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 rubber wood edging, glued and nailed in approved manner.

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 tar 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, doors, cabinet work etc. shall be Duco painted/ polished to approve finish. Door shutters, internal faces of cupboards and cabinets etc. shall be enamel painted to approved finish. Drawer bottoms, sides of drawers, etc. oiling etc. shall be carried out as specified. All the paints & polishes should be of LOW VOC content as per Green building norms.

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 substitute for this purpose.

Plywood

Plywood to be used shall be grade BWP, i.e., it shall have bounded with BWP (Boiling Water Proof) type synthetic resin adhesive shall be equal or superior quality that is laid down in IS: 710.

Acoustical partition work: -

A) BASE DRY WALL: Full height from floor finish to roof: Providing, fabricating & fixing of drywall partition with acoustic factors. Framing: MS square hollow section (SHS) 50 X 50 X 2 mm welded framing of 600 X 600 mm c/c both ways horizontally and vertically. Leaving space for opening of glazed portions and suitable supporting extra members beside opening to be provided with necessary welding at junctions & joints. Fixing the frame to wall/ceiling/floor with steel dash fasteners of 8 mm dia, 75 mm long bolt and the members to be extended up to the original ceiling/ RCC roof and fixed. Next one layer of 50mm thick, 48kg/CuM density of Mineral Wool is inserted in the framework. Then (6mm cement particle boards + 1.7mm thick sound proof membrane (Tecsound35 or similar approved by Bank) + 8mm cement particle boards one side and 12mm cement particle boards on other side approved by Bank to be fixed on the Mineral Wool filled MS framework upto RCC ceiling/ beam bottom.

B) Supply fabrication and installation of approved make and colour FIBER WRAPPED SOAK CORD PANELS (NRC 0.95, FR) FIXED VERTICALLY on both side of partition -from 1200mm to false ceiling ht. on both side . Supply and installation of Soak cord fiber wrapped pinewood square edged fiber panel of size 600x 1200 x 2400 x 20mm. The framework for soak cord panel includes CC22 cross channel fixed horizontally @600 c/c over cement board, then strut H splines is fixed vertically @ 600 c/c to hold the fabric wrapped soak cord panels.

C) Supply fabrication and installation of approved make and colour perforated SLATS PANELS (NRC 0.77, FR) FIXED VERTICALLY on both side - from floor finish to +1200mm above floor finish level. Supply and Installation of slats made from E1 grade fiber board, melamine laminated grove perforated L16-2 mm Slats. The Frame work for slats include Aluminium cross channel (CC18) for slats@ 450 horizontally with clips over 10mm thick CC10 GI Section @600 c/c fixed vertically over cement board.

Extra wood frame to be provided at openings (doors). Apply 1st class hard wooden frame of size 70mmx50mm is to inserted inside MS frame where doors will be installed.

Door Shutters – Flush Shutters: -

1. All Flush door shutters shall be 30mm thick single leaf solid core type non-decorative Industrial made conforming to IS – 2202 and ISI certified with block board core (confirming to the requirements as per IS-1659), for which the manufacturer shall produce the necessary evidence. The flush shutters shall be made with internal lipping of hardwood 25 mm thick and Adhesive used shall be phenol formaldehyde synthetic resin conforming to BWP types specified in IS-848-1974. solid core flush door shutters of approved make to be both side post formed laminated door finished of approved shed colour. The door is to be fixed in post formed laminate finished jambs made up of 18.0mm ply of size 50cm of matching shade. The cost of door shall include cost of door jamb, s.s. finish nickel plated 150mm door closer, door stopper handles, latch, aldrop, s.s. finish silencer etc. complete in all respect as per drawing and direction given by Bank Engineer in charge.

2. Contractor shall obtain the approval for the name of the manufacturer of the flush door shutters from the Bank Engineer-in-charge before placing the supply order. While asking for the approval, copy of the “Bureau of Indian Standard” letter under which manufacturer has been authorized to mark the product with ISI marking should be attached. Bank Engineer-in-charge, before giving the approval shall ensure that the validity date of license has not expired.

Testing of Flush Door Shutters: -

On receipt of the shutters at site, the Bank Engineer-in-charge shall be entitled to get the samples of door shutters tested in any approved laboratory. From each lot of shutters, one shutter shall be selected at random by the Bank Engineer-in-charge. The cost of the door shutters selected as samples, their transportation to the laboratory and cost of testing by the laboratory shall be borne by the Contractor, and shall be deemed to be included in the quoted rates.

REBATING:

a) The shutters shall be single leaf or doubled leafed as shown in the drawings and as directed by Bank Engineer-in-charge. In case of double leafed shutters, the meeting of the stiles shall be rebated by one third the thickness of the shutter.

b) On all door shutters, laminate, 1.0 mm thk. shall be pasted with adhesives as specified by the Bank approved list. The laminate shall be as per approved shade & texture, of make.

c) The bottom of shutters shall be 5mm above the finished floor level.

d) Vision panel, wherever needed shall be 8.0mm. thk. itching pattern glass of the size as mentioned in the drawings. The panel shall be fixed within the cut-out made from within the door shutter. The cut edges shall be fixed with TW lipping 35 x 8mm. The lipping shall be flushed with the outer edges of the door and the glass fixed in the center of this lipping with quarter round beadings, 15x15 mm.

Laminates:

a) Thickness of the laminate to be used shall be 1.0 mm.

b) Joints in the laminates will not be permitted until and unless the same is unavoidable or is required as per the drawings.

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

Samples: Samples of each different item of hardware including screws or any particular item of hardware shall be submitted to the Bank Engineer-in-charge 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 the interior work.

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 lipping, glazing frame, Venetian frame and other exposed parts where such binding is done.

Nails, spikes, screws and bolts:

Nails, spikes and bolts shall be of the best quality mild steel or wrought and of length and weights approved by the Bank Engineer-in-charge. Nails shall comply with IS: 1959-1960 or equivalent approved quality, samples, Bolts with I.S. or equivalent approved quality samples. Brass headed nails 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 hard wood.

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. Wherever it is necessary or 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 Bank Engineer-in-charge.

II. **Column/ Wall panelling with Ply & Laminate**: -

Providing, fabricating and fixing 35mm thick plain/curved panelling on masonry plastered surface using standard Aluminium hollow sections of approved quality and make, fixed firmly to the floor at base and adjacent wall/partition/ceiling as indicated in the following specifications

a. Vertical Members- Aluminium hollow sections 50x25x1.2 mm of spaced at approximately 600mm c/c fixing firmly on floor at base and ceiling/beam at top. Al the vertical members shall be extended up to the ceiling/beam level with additional aluminium angle/cleat.

b. Horizontal members - Aluminium hollow sections 50x25x1.2 mm spaced at approximately 600mm c/c fixed with screw including additional members for raceways opening etc.

c. The framing shall be covered top side using 9 mm thick Century Club Prime or approved make conforming to IS-710 and finish with laminate of

1.00 mm thick in decorative pattern outside of panelling as per design / direction of Bank's Engineer.

III) **False ceiling works**: -

1.Gypsum false ceiling: -

Plain False Ceiling - Providing and fixing multi layered suspended type (Rawl Plug, M6X12 mm Hex Bolt & Hex Nut 27X37x25X1.6 mm Soffit Cleat Saint Gobain make or other approved by bank for suspended from RCC ceiling) 12.5 mm thk. moisture resistant Glasroc H board or other approved equivalent make by Bank, coving and for column capitals in different levels firmly fixed on GI frame work section of M/s Saint Gobain or other approved equivalent make as per manufacturer's specifications all as required and directed by Bank's engineer finally boards are to jointed and finished so as to have flush look and levelling the board so as to be in one single plane which includes filling and finishing the board edges with jointing compound, paper tape etc. rate shall also include Painting the false ceiling surface with two or more coats of first quality 100% acrylic emulsion paint of approved make and shade over a coat of oil bound cement primer after adequate surface preparation, 1 or 2 coats of putty work over the entire Glasroc H board surface to get premium finish, etc. All complete as directed by Bank's engineer. Note: Rate shall include making cut out/ openings for

fixing light fittings with necessary additional frame work, wastages, finishing etc. all complete.

No deduction in area measurement will be made for openings not exceeding 0.4 sqm and no extra measurement will be made for forming such opening. Horizontal plan area and Side Elevation area for vertical drops will be measured for payment.

2. Grid false ceiling: -

Providing and fixing soft fiber ceiling solution of approved make with Silhouette frame work to form a module of 600 mm X 600 mm. The tiles shall be of 600mm X600mmX15mm like Armstrong Classic RH95 Micro look tiles mineral fiber board NRC 0.55 or approved equivalent by Bank with fine fissured texture finish. The suspension system shall be as per the manufacturer (Armstrong or any other approved by Bank) specification. Installation consists of main runners securely fixed to structural soffit approved hanger at 1200 mm c/c (max), long cross 'T's inter locked between main runner at 600 mm c/c to form grid of 600 X 600 mm etc. complete all as per manufacturers' specification and as directed by Bank's Engineer.

Note: - Rate shall include providing and erecting the necessary scaffolding at any level and height required during executing the work, cutout /opening to be made for light fittings etc. No deduction in area measurement will be made

for openings not exceeding 0.4 sqm and no extra measurement will be made for forming such opening. Exposed area shall only be measured and paid for.

3. Acoustical False ceiling: -

Providing and fixing soft fiber ceiling solution of approved make with Silhouette frame work to form a module of 600 mm X 600 mm. The tiles shall be of 600mm X600mmX15mm like Acoustic Board (Mineral Fiber Acoustic Ceiling Tiles Armstrong/ Anutone make) board NRC 0.9 or approved equivalent by Bank with fine fissured texture finish. The suspension system shall be as per the manufacturer specification. Installation consists of main runners securely fixed to structural soffit approved hanger at 1200 mm c/c (max), long cross 'T's inter locked between main runner at 600 mm c/c to form grid of 600 X 600 mm etc. complete all as per manufacturers' specification and as directed by Bank's Engineer.

Note: - Rate shall include providing and erecting the necessary scaffolding at any level and height required during executing the work, cutout /opening to be made for light fittings etc. No deduction in area measurement will be made

for openings not exceeding 0.4 sq m and no extra measurement will be made for forming such opening. Exposed area shall only be measured and paid for.

IV) **M.S Framing works**: -

Providing, fabricating and fixing MS Square Hollow Sections (SHS) frame made of 40mm x 40mm x 3.2mm thick MS SHS frame work at as per Drawing on floor and at top using 40mm x 40mm x 3.2mm MS SHS maintaining proper line, levels as directed and as specified as per requirement , cutting to required size and shape, fixing the MS

SHS to the floor and adjacent walls using dash fastener of approved quality, make and size and fixing the intersection, junctions of MS SHS with approved quality fittings, fixtures and hardware, including cross diagonal bracings so as to provide lateral movement & vertical movement free structure. Following minimum bracings are to be provide.

I. Diagonal double cross bracings along the line of MS SHS (width of the Class room Gallery & Stage) wherever there is change of floor levels as indicated in the drawing (between +0.00 to 150mm, +150mm to +300mm, + 300mm to + 450mm, +450mm to +600mm, +600mm to +750mm).

II. Diagonal Double cross bracings as per drawing.

Including painting the MS SHS with 2 coats of approved quality synthetic enamel paint over a coat of approved quality Zinc rich primer etc. all complete as per the directions of the Banks Engineer (additional member may be provided as directed for class room Gallery & Stage at no extra cost) (welding in approved manner)

v. ACOUSTIC TREATMENT

a. RESIN BONDED GLASS WOOL.

1. Chemical stability – Chemically inert.
2. Application should not cause or accelerate corrosion. Should rot proof.
3. Fire safety – Non – Combustible in accordance with BS 476 Part 4, 1970.
4. Biological – Inorganic, should not encourage growth of fungi and vermin.
5. Vibration & jolting resistance – conform to BS 2972.
6. Moisture content – less than 2% in accordance with BS 2972.
7. Water absorption – less than 2% in accordance with BS 2972.
8. Shot content – Nil, in accordance with BS 2972.
9. Odourless – Conforms to BS 2972.
10. No mould growth – Conforms to BS 2972.
11. Recovery after compression – More than 95% in accordance with BS 3958 Part 5.

b. WOOD WOOL NATURAL SOUND SMOOTH (ANUTONE BOARD)

1. Wood wool – Pune Pinewood.

2. Density – 400Kg/ m3 (+- 10%).

3. Sound Absorption – as per ISO 354 equivalent to ASTM C423.

4. Sound Insulation – as per ISO a 40 – III 1995 and rating as per ISO 717 – 1.

5. Non – Combustibility as per ISO 1182 – AT 750, C.

6. Ignitable classification as per BS 476 Part 5 – 'P' not easily ignitable.

7. Fire propagation index as per BS 476 Part 6 – 5.17.

8. Moisture – 15%.

9. Straight lines of edges - + - 1mm < 1250 + - 2mm > 1250.

10. Straightness of edges - +- 1mm.

11. Weathering - < 1mm change in dimension < 5% changes in density.

c. **FABRICS.**

All fabric o be used shall be fire rated for at least two hours. The contractor has to give the fire retardant certificate.

d. TECSOUND

Tecsound is polymer based asphalt Free, high density (1.99 / cm3) systematic sound proofing membrane, that offers good acoustic Insulation in different building elements. It is available in Tecsound 5kg / M2 & 10 kg /M2Membrane sheet. It has very good sound insulation property.

vi. CARPENTRY & JOINERY, FURNISHING WORKS

11. 1 GENERAL

1. The wood selected shall be II class Teak wood or as specified.

2. Specified timber shall be of good quality and well-seasoned. It shall have uniform colour, reasonably straight grains and shall be free from knots, cracks, shakes and sapwood.

3. Wood work shall not be painted/ polished, oiled or otherwise treated before it has been approved by the Engineer-in-charge.

4. All portion of timber including architrave abutting against masonry, concrete, stone or embedded in ground shall be painted with approved wood preservative or with boiling coal tar.

5. Anti-termite Treatment and fire retardant paint to be provided of approved brand and manufacturers as directed.

6. All fittings and fixtures shall be got approved from Engineer-in-charge before procurement well in advance and the approved samples shall be kept at site till completion of the work.

7. Before starting the work, the Contractor shall procure and submit the samples of timber for the approval of the Engineer-in-charge.

8. The samples of species of timber to be used shall be deposited by the contractor with the Engineer-in-charge before commencement of the work. The contractor shall produce cash vouchers and certificates from standard kiln seasoning plant operator about the timber section to be used on the work having been kiln seasoned by them, failing which it would not be so accepted as kiln seasoned.

9. Testing

i) The shutters shall be tested for species, seasoning & treatment, defects in the timber, panel material, construction & workmanship in the approved Laboratory at the frequency as per relevant IS.

ii) If shutters are found defective in any one of the criterion, the shutter shall be tested & if found permissible can be accepted. If shutter is found defective in more than one criterion, the whole lot shall be rejected.

iii) Finish

a) All components of door shutter shall have smooth finish.

b) Panels of the door shutters shall be flat and well sanded to a smooth and level Surface.

c) All the surfaces of door shutters which are required to be painted or polished or varnished shall be got approved from the Engineer-in-charge before applying protective coat of primer, polish or varnish.

10. Poly-sulphide: -The gaps between frames and supports and also any gaps in the door and windows sections shall be raked out as directed and filled with poly-sulphide of approved colour and make to ensure complete water tightness. The poly-sulphide shall be of such colour and composition that it would not stain the masonry/concrete work, shall receive paint without bleeding, will not sag or run and shall not set hard or dry out under any conditions of weather. The sample of poly-sulphide to be used for this purpose shall be got approved from the Engineer-in-charge before its actual use.

vii. HARDWARE

(i) Hardware

All hardware for doors and windows shall be of stainless steel or as specified. All hardware shall be installed using routers and counter sunk screws. Panic hardware will be provided in all staircase and escape doors. Drawer slides with steel roller ball-bearings and drawer locking system with master keying option is to be provided for all built in cabinetry work and drawer units.

(ii) The contractor shall procure all the hardware as specified in the schedule. The rate shall include for making mechanical chases to receive the hardware, and also the cost of approved screws, nails, clamps etc. The fixing shall be done in the best workmanship like manner and in accordance with that employed for fixing hardware. Any damage to the joinery or the hardware shall be made good at no extra cost to the Bank.

(iii) Locks

All locks will have a stainless steel body with a stainless steel bolt or as specified. Each furniture unit in fixed cabinetry work such as credenzas, drawer units and shutters shall be openable with a single key.

viii. All the ply woods used in the furniture shall be of approved make and confirm to **IS 710-2010**: Marine Plywood- Specifications.

ix. DOORFRAMES

1. "Timber for door frames shall be as specified. Timber shall be sawn in the direction of the grains. All members of a frame shall be of the same species of timber and shall be straight without any warp or bow. Frames shall have smooth, well-planed (wrought) surfaces except the surfaces touching the walls, lintels, sill etc., which may be left clean sawn. Rebates, rounding or moulding shall be done before the members are jointed into frames. The depth of the rebate for housing the shutters shall be 15 mm, and the width of the rebates shall be equal to the thickness of the shutters. A tolerance of ± 2 mm shall be permitted in the specified finished dimensions of timber sections in frames.

2. Fixing of Frames

"The frames shall be got approved by the Engineer-in-charge before being painted, oiled or otherwise treated and before fixing in position. The surface of the frames abutting masonry or concrete and the portions of the frames embedded in floors shall be given a coating of coal tar. Frames shall be fixed to the abutting masonry or concrete with holdfasts or metallic fasteners as specified. After fixing, the jamb posts of the frames shall be plugged suitably and finished neat. Vertical members of the door frames shall be embedded in the floor for the full thickness of the floor finish and shall be suitably strutted and wedged in order to prevent warping during construction. A minimum of three hold fasts shall be fixed on each side of door and window frames one at centre point and other two at 30 cm from the top and bottom of the frames. In case of window and ventilator frames of less than 1 m in height two hold fasts shall be fixed on each side at quarter point of the frames. Hold fasts and metallic fasteners shall be measured and paid for separately.

3. Measurements

"Wood work wrought, framed and fixed shall be measured for finished dimension without any allowance for the wastage or for dimensions beyond specified dimension. However, in case of members having mouldings, roundings or rebates and members of circular or varying sections, finished dimensions shall be taken as the sides of the smallest square or rectangle from which such a section can be cut. Length of each member shall be measured over all to the nearest cm so as to include projection for tenons. Width and thickness shall be measured to the nearest mm and the quantity shall be worked out in unit of upto three places of decimal.

4. Rate

"The rate shall include the cost of material and labour involved in all the operations described above including the hold fasts or metallic fasteners.

5. SPECIFICATION FOR SHUTTERS (FLUSH DOORS)

1) The shutters to conform to I.S. 2202 part I

2) The timber to be of hard wood, well-seasoned and kiln, dried.

3) The core to be built of timber strips of about 25 mm width closely packed and surfaced to flat uniform and smooth condition. All belt joint to be staggered.

4) The cross bands to be laid at right angles to the core extending the full width of the door shutter. The thickness of cross bands to be about 3 mm.

5) The face veneers to be laid with grain at right angles to the grain of the cross bands, the Thickness of veneers to be about 4 mm.

6) The entire binding to be done with synthetic resin of the hot press type to conform to boiling Waterproof type as per I.S. 848-latest revision.

7) The adhesive should be phenol formaldehyde. The specific letter from the manufacturers should be produced along with the vouchers of the flush door.

8) The beading of equal thickness of flush door and 12mm thick to be provided around the flush door shutter to protect the come out veneer surface over and above the lapping provided as suggested above.

9) Factory made shutters, as specified shall be obtained from factories to be approved by the Engineer-in-charge and shall conform to IS: 2202 (Part-I) 1999. The contractor shall inform well in advance to the Engineer-in-charge names and address of the factory where from the contractor intends to get the shutters manufactured. The contractor will place order for manufacture of shutters only after written approval of the Engineer-in-charge in this regard is given.

10) The contractor is bound to abide by the decision of the Engineer-in-charge and recommend a name of another factory from the approved list in case the factory already proposed by the contractor is not found competent to manufacture quality shutters. Shutters will however, be accepted only if this meet the specified tests. The contractor will also arrange stage wise inspection of the shutters at factory by the Engineer-in-charge or his authorized representative. The contractor will have no claim if the shutters brought at site are rejected by the Engineer-in-charge in part or in full lot due to bad workmanship/quality. Such shutters will not be measured and paid. The contractor shall remove the same from the site of work within 7 days after the written instructions in this regard are issued by the Engineerin-charge.

ix. **A. MELAMINE POLISH:**

For the item of melamine polish included respective item of wood work, the polishing shall include all the sand papering required to be carried out and wiped properly for cleaning all the loose dust particles. Necessary masking tapes are to be provided where different finishing work is to be carried out, so that the melamine polish does not spread to the other surfaces. Care should be taken while removing the masking tape, so that the surface is not damaged. Cost of melamine polish also includes the cost of providing and removing the masking tapes wherever required. The surface shall be sand papered using emery paper no.180,320 and 400 as required. Any staining required shall be carried out by applying Apcolite Wood Stain or equivalent, to achieve the required colour and shade as directed by the Engineer-in-charge. The melamine polish is deemed to include cost of such staining. Nothing extra shall be payable on this account. Melamine polish shall be carried out with spray machine.

For Quality Assurance the Contractor shall ensure that color and texture of finish coats, shall match the approved sample. Also, Colour of priming coat shall be lighter than body coat Colour of body coat shall be lighter than finish coat. Colour prime and body coats as required so as not to show through the finish coat and to mask surface imperfections.

Before starting application of each type of polish, the Contractor shall apply the polish to a specimen area and get finish and texture approved and shall use it as a sample for the remainder of the work.

B. For French polish, varnish etc refer technical specification under Masonry, plastering and painting works.

XI. GLASS AND GLAZING WORK
(in partitions and doors)

(a) GENERAL

Glass panels as indicated in the respective item shall be fully tempered /toughened. Frameless glass used should be highly polished edges using CNC machines.

(b) **Glazing**

The contractor shall furnish all labour, material and equipment required completing the installation of all glass and related items. A glass shall be of the type, quality, and substance specified in the schedule of quantities. The contractor shall cut glass sizes by field measurements or dimensions of the approved shop drawings. The responsibility for correct glass sizes shall rest with the contractor. No cracked, chipped or disfigured glass shall accepted, and the contractor shall replace all breakages or faulty installation without extra cost.

The glass shall be set in wood or metal glazing straps and metal sash with elastic glazing and compound. The glass shall be beaded first and so installed as to achieve a completely watertight result. The opaque glass, where called for, shall be set with the smooth surface outside. At the completion of the work all glass shall be thoroughly cleaned off paint and other marks removed. No cracked, chipped or disfigured glass shall be accepted, and the contractor shall replace all breakage or faulty installation without extra cost to the owner before acceptance of fit-out.

The Contractor shall be responsible for protecting all mirrors and glasses fixed by him till final handing over to employer and shall replace at his own expense any broken or damaged mirror / glass caused through lack of adequate protection or care in installation or handling.

c) **Tempered / Toughened Glass:**

Tempered /Toughened glass shall be examined by the glass manufacturer to detect and discard any glass which exceeds the following tolerance: 1.5mm bow in 600mm: 3mm bow in 1500mm; 6mm bow in 3000mm; 9 mm bow in 4500mm. Where the strengthening process results in essentially parallel ripples or waves, the deviation from flatness at any peak shall not exceed 0.13 mm and the difference between adjacent peaks shall not exceed 0.13mm.
Where bow tolerance and wave tolerance differ, the stricter requirements shall govern. Direction of ripples shall be consistent and in conformance with architectural design.

Following test shall be also carried out by the contractor at his own cost as per following provisions.

Thickness	Impact Strength	Fragmentation	Surface Compression	Bending Strength
IS-2835-1987	IS-2553-PART-I	IS-2553-PART-I	ASTM C-1048-90	DIN 1249-PART – 12

d) Float Glass

Glass that gives distorted reflections will not be accepted. Reflections due to pressure, paints poor manufacturing process, uneven thickness or poor storage are some of the reasons for distortion. All clear float glass quality should conform to BS – 952 and ASTM C 1036 – 90.

e) Mirrors

(i) Mirrors shall be fabricated from best clear plate or float glass of approved quality in imported variety and shall match the International Standards. All fixed panel mirrors shall be +/- 0.30mm tolerance. The edges of mirrors shall be polished and beveled and mitered as per I.S. specifications wherever, it's indicated in the drawing.

(ii) Mirrors shall be electro coated, 6.0 mm thick glass of approved make, plane or bevelled edge. The size shall be as specified in the Schedule of Quantities or as shown on the drawings. The image shall be clear and without waviness at all angles of vision.

(iii) Mirrors shall be provided with backing of 12mm thick marine plywood, fixed with CP brass semi-round headed screws and cup washers or CP brass clamps as specified or instructed by Engineer-in-charge.

LIST OF ACCEPTABLE MAKES OF MATERIALS

Acceptable makes of materials to be used in the work are as given in the table below. In case of non-availability of these makes, the Engineer-in-charge may allow use of alternative makes. Only BIS marked materials shall be used in the work. Non-BIS marked materials may be permitted by the Engineer-in-charge only when BIS marked materials are not manufactured.

Sl. No.	Materials	List of Approved Make
1	(i)Ordinary Portland Cement/ Portland Pozzolana Cement.	Ultratech (Chitaurgarh), Wonder, Nuvoco Duraguard (Chitaurgarh), J.K. Supper Cement A.C.C., Ambuja or any other approved equivalent.
	(ii) White Cement	Birla White, J.K. White or any other approved equivalent.

2	Reinforcement Steel	SAIL, Tata Steel, JSW Steel Ltd., Jindal Steel & Power Ltd. or any other approved equivalent.
3	Structural Steel	SAIL, Tata Steel, JSW Steel Ltd., Jindal Steel & Power Ltd. or any other approved equivalent.
4	Water proofing for bathroom/ toilet/ balcony & other wet areas	Fosroc, Sika, Dr. Fixit or any other approved equivalent.
5	Grouts, Tile Adhesive	Latecrete, Kerokoal, BASF, Ardex Endura Ferrous Crete or any other approved equivalent.
6	AAC BLOCKS	AEROCON, SIPOREX, ULTRA TECH, ECOLITE, GODREJ or any other approved equivalent.
7	AAC Block Adhesive	Ultratech, Ardex Endura, Ferrous Crete or any other approved equivalent.
8	Ceramic Tiles	Kajaria, RAK, Bellissimo, NITCO, H & R Johnson, Somany or any other approved equivalent.
9	Vitrified Tiles (Antiskid. Matt/Glazed)	Kajaria, RAK, Bellissimo, NITCO, H & R Johnson, Somany, Marbonite or any other approved equivalent.
10	Aluminium system windows	Aluk, Schueco, Raynaers, Technal, Eternia(Hindalco) or any other approved equivalent
11	Plywood	Kitply, Duro, Green Ply, Century, Merino, Durian, Greenlam or any other approved equivalent.
12	Particle Board	Kitply, Action Tesa, Greenlam, Merino or any other approved equivalent.
13	Laminates	Kitply, Greenlam, Action TESA, Century Ply, Merino or any other approved equivalent.
14	Cement Board	NCL Industries BISON or approved equivalent
15	Clear/ Float/ Frosted/Refractive/ Coated Glass	Saint Gobain, AIS, Modiguard, Ashai Float or any other approved equivalent.
16	Cement Based wall putty	Birla Wall care, JK white, Berger, Asian Paints or any other approved equivalent.

17	Acrylic Emulsion Paints	Asian Paints, Nerolac, Berger, Dulux or any other approved equivalent.
18	Synthetic Enamel paint	Asian, Nerolac, Berger, Dulux or any other approved equivalent.
19	Cement Primer	Nerolac, Berger, Asian, Dulux or any other approved equivalent.
20	Steel Primer (Red Oxide ZincChromate Primer)	Asian, Nerolac, Berger, Dulux or any other approved equivalent.
21	Wood Primer	Asian, Nerolac, Berger, Dulux or any other approved equivalent.
22	Epoxy Paint	Asian, Nerolac, Berger, Akzo Nobel or any other approved equivalent.
23	Melamine Polish	Asian Paints Melamine Gold, Wudfin of Pidililte, Timbertone of ICI Dulux or any other approved equivalent.
24	Corian	Dow Cornice, Du pont or any other approved equivalent.
25	(a) Aluminium section	Hindalco, Jindal, Indian Aluminium Co. or any other approved equivalent.
	(b) Anodised Aluminium Hardware (Heavy Duty)	Kilong, Alualpha, Ebco or any other approved equivalent.
26	Adhesives	Fevicol SH, Araldite, or approved equivalent
27	Frosted Film	3M, Garware or any other approved equivalent
28	False Ceiling system	Armstrong, Hunter Douglas, USG Boral, Gypsum India Gyproc, Aerolite, Durlum, Interarch or any other approved equivalent.
29	Acoustical items	Anutone, Soprema, Tiki Dan, Fibrecreat, Bollard, FX acoustic, Dow corning, MA coy, Gyproc, Knuf Boral, Hilux, Saint Gobain or any approved equivalent
30	Mineral wool	Anutone, Lloyd or any approved equivalent
31	Glass Wool	Dow Corning, U.P. Twiga, Isover or any other approved equivalent.
32	Sound proof membrane 1.5mm thick	Tecsound , Sken T2 or any other approved equivalent.
33	Floor Spring & Door Closure	Geze, Dorma, Doorset, Godrej or any other approved equivalent.

34	S.S. Door & window Fittings	JINDAL, Dorma, Doorset, GEZE, Hettich, ENOX, Godrej or any other approved equivalent.
35	Dash/Anchoring Fasteners	HILTI, Fischer, Bosch, Wurth or any other approved equivalent.
36	G.I./ M.S Pipe	Tata, Jindal (Hisar) or any other approved equivalent.
37	G.I. Fittings	Unik, AVR, Zoloto or any other approved equivalent.
38	UPVC pipe and fittings	Supreme, Astral, Ashirwad, Finolex or any other approved equivalent.
39	CI Fittings	NECO, Neel, Kartar, Sarkar or any other approved equivalent.
40	CP Brass Fittings	Hindware, Jaquar (Continental Series),ESSCO, Parryware or any other approved equivalent.
41	Sanitary ware, Fittings & accessories	Hindware, CERA, Parryware, Jaquar or any other approved equivalent.
42	Mirror Glass	Atul, Modi Guard or any other approved equivalent.
43	CPVC Pipe & Fitting	Supreme, Astral, Ashirwad, Finolex or any other approved equivalent.
44	uPVC Pipe & Fitting	Astral, Supreme, Ashirwad, Finolex or any other approved equivalent.
45	UPVC Doors and windows (Profile makers and their authorized fabricators only)	Fenesta, Encraft, KOMERLING, REHAU, Aluplast, Wintech, Prominance or any other approved equivalent.
46	UPVC doors and window Hardware's	Rotto, Doorset, Kinlong or any other approved equivalent.
47	Gypsum Plaster	Ferrous Crete, Gyproc, Saint Gobain,Ultratech or any other approved equivalent.
48	Antistatic false/raised flooring (Frames & tiles)	SNS, ZK, KIBO or any other approved equivalent.
49	Vinyl flooring	Armstrong, wonder floor, LG or any other approved equivalent.

50	Ready Mix Mortar	Build wall (wallplast), Ultratech Readyplast Cement, BASF, Pidilite,Fosroc or any other approved equivalent.
51	Polymer Modified Mortar	ACC, Fosroc, Ultratech or any other approved equivalent.
52	Laminated Wooden Flooring	Action Tesa, EGO, Egger, CCIL or any other approved equivalent.
53	Mineral Fiber Board False Ceiling System	Armstrong, Ecostone, Gyproc, Techno Ceiling Products, Hunter Douglas or any other approved equivalent.
54	Polyster Accoustic Fire Resistant Baffle Board	Continum, Tenco, Unidus, Eomac, etc. or any other approved equivalent.
55	Modular Urinal Partition	Merino , BESCO or any other approved equivalent.
56	Valves	Leader, GM, Zoloto or approved equivalent
57	Tower bolts,handles, aldrops, hinges, Door stoppers	Jaguar, Godrej, Hettich, Dorma, Haffele, Shalimar or any other approved equivalent.
58	Door Closers	Dorma, Everite, Hardwyn, Godrej, Ozone, Hettich or any other approved equivalent.
59	Door Floor Springs	Goderj, Dorma, Everite, Hardwyn, Ozone or any other approved equivalent
60	Locks and Latches	Godrej, Ebco, Ozone, Hettich, Dorma, Haffele, Europa or any other approved equivalent.
61	Washbasin	Jaguar, Parryware, Hindware, Roca, CERA, Kohler, RAK or any other approved equivalent.
62	C.P Brass Bib Cock, Stop cock, Pillar cock, Mixer cock, Angular stop cock	Jaguar , Hindware, Kohler or any other approved equivalent.
63	SS Kitchen Sink	Nirali , Neelkanth, Anupam, Diamond or any other approved equivalent.
64	CP Brass Swivel type long neck sink tap	Jaguar , Hindware ,Kohler or any other approved equivalent.
65	M.S Tubes/Sections/Pipes	Tata, Jindal (Hisar), Nalco or any other approved equivalent.

C. TECHNICAL SPECIFICATIONS- FIRE FIGHTING Sprinkler

IS CodeS for Fire Fighting Work

IS 1239-1968 (Part-I)	Specifications for mild steel tube, tubular and other steel pipe fittings.
IS 1239-1968 (Part-II)	Specifications for mild steel tube, tubular and other steel pipe fittings.
IS 3589-1981	Specification for electrically welded steel pipes for water, gas and sewage.
IS 1648-1961	Code of practice for fire safety of buildings (General) Firefighting equipment and its maintenance (with amendment No.1)
IS 5312- 1984 Part I	Swing check type reflux (non-return) valves Part I-single door pattern (with amendments nos. 1 & 2)
IS 5312- 1986 Part II	Swing check type reflux (non-return) valves Part II-Multi door pattern (with amendments nos. 1 & 2)

NOTE: All capacity given in above is only for guidelines.

1. Technical Specification fire

Work under this sub-head consists of furnishing all Labour, Materials, equipment and accessories necessary and required to completely install the Fire Fighting equipment etc., specified hereinafter and given in the

Without restricting to the generality of the foregoing the work of Fire Fighting System shall include the followings:

- Providing M.S. black steel (Class C) pressure pipe line main including Valves, Fire Hydrants, Excavation for Pipe, Laying of pipe, Painting of pipe and Making Connection to supply system.
- Black Steel Pipe, Mains Laterals, Branches, Valves, Hangers, sprinkler and Appurtenances.

b) General Requirements

All materials shall be of the best quality conforming to the Specifications and subject to the approval of the Engineer-in-Charge.

Pipes and Fittings shall be fixed truly Vertical, Horizontal or in slopes as required in a neat workman like manner.

Pipes shall be fixed in a manner so as to provide easy accessibility for repair and maintenance and shall not cause any obstruction in shaft, passage etc.

Pipes shall be securely fixed to walls and ceiling by suitable clamps at intervals specified. Only approved type of anchor fasteners shall be used for RCC ceilings.

Valves and other appurtenance shall be so located that they are easily accessible for operation, repairs and maintenance.

c) Pipes

All pipes for fire fighting system shall be M.S. Pipes as per the bill of quantities & drawings.

d) Pipe Fittings

Pipes and fittings means tees, elbows, couplings, flanges, reducers etc. And all such connecting devices that are needed to complete the piping work in its totality.

Fabricated fittings shall not be permitted for pipe diameters 50 mm and below.

When used, they shall be fabricated, welded and inspected in workshops under supervision of Engineer-in-Charge whose welding procedures have been approved by the TAC as per TAC rule 4102 for sprinkler system and applicable to hydrant and sprinkler system. For "T" connections, pipes shall be drilled and reamed. Cutting by gas or electrical welding will not be accepted.

e) Jointing

Screwed (50 mm dia pipes and below)

Joint for black steel pipes and fittings shall be metal-to-metal thread joints. A small amount of red lead may be used for lubrication and rust prevention. Joints shall not be welded or caulked. (With screwed MS forged fittings)

Welding (65 mm dia and above)

Joints between MS pipes and fittings shall be made with the pipes and fittings having "V" groove and welded with electrical resistance welding in an approved manner. Buried pipes will be subject to X Ray test from an approved agency as per the TAC norms at the cost of contractor. (With welded M.S. fittings heavy class with V-Groove). The welding machine shall be 3 Phase rectifier of required current and capacity. The vendor for welding will be approved by Engineer-in-Charge.

Flanges

Flanged joints shall be provided on:

- Straight runs not exceeding 30 m on pipelines 80 mm dia and above.
- Both ends of any fabricated fittings e.g. bend tees etc. of 65 mm dia or larger diameter.
- For jointing all types of valves, appurtenances, pumps, connections with other type of pipes, to water tanks and other places necessary and required as good for engineering practice.
- Flanges shall be as per IS 6392-1971, Table 17/18 with appropriate number of G.I. nuts and bolts, half threaded of with 3 mm insertion neoprene gasket complete.

Unions

Provide Approved type of dismountable unions on pipes lines 65 mm and below in similar places as specified for flanges shall be provided.

f) Pipe Protection

All pipes above ground and in exposed locations shall be painted with one coat of Red Oxide Primer and two or more coats of Synthetic Enamel Paint of approved shade.

All black steel pipes under floors or below ground shall be provided with protection against corrosion by application of 100mm wide and 4mm thick layer of PYPKOTE/ MAKPOLYKOTE over the pipe, as per manufacturers specifications.

g) Pipe Supports

All pipes shall be adequately supported from ceiling or walls from existing/new inserts by Structural clamps fabricated from M.S. Structural e.g. Rods, Channels,

Angles and Flats as per details given in approved shop drawings and specifications. All clamps shall be painted with one coat of red lead and two coats of black Enamel paint.

Where inserts are not provided, the Contractor shall provide anchor fasteners. Anchor fastener shall be fixed to walls and ceilings by drilling holes with Electrical drill in an approved manner as recommended by the manufacturer of the fasteners.

h) Testing

All pipes in the system shall be tested to a hydraulic pressure of 1.5 times of the working pressure or minimum of 15 kg/cm2 without drop in the pressure for at least 2 hours. Rectify all leakages, make adjustment and retest as required.

i) Anchor Block

Contractor shall provide suitable cement concrete, anchor blocks of ample dimensions at all bends, tee connection and other places required and necessary for overcoming pressure thrusts in pipes. Anchor blocks shall be of cement concrete 1:2:4 mix (1 cement: 2 coarse sand: 4 stone aggregate 20 mm nominal size).

j) Valves, Gauge and Orifice Plates

Sluice Valves above 65 mm shall be of Cast Iron body and Bronze/Gunmetal seat. They shall conform to type PN 1.6 of IS:780-1980, valves up to 65mm shall be of Gunmetal Full way Valve with wheel tested to 20 kg/cm2 class-II as per I.S: 778-1971. Valve wheels shall be of right hand type and have an arrow head engraved or cast thereon showing the direction for turning open and closing. Non-return valves shall be of Cast Iron body and Bronze/Gunmetal seat. They shall conform to class of IS: 5312 and have flanged ends. They shall be swing check type in horizontal runs and lift check type in vertical runs of piping. They shall not be spring-loaded type.

Shop Drawings & Specifications

The Contractor shall submit to the Consultant two copies of Shop Drawings for Fire Fighting works as an Advance Copy to the Engineer-in-Charge for approval before start of work. Subsequent to the approval of the shop drawings, the Contractor shall submit six copies of Shop Drawings for execution to the Engineer-in-Charge. Also the Contractor shall submit four copies of the Technical Specifications and Catalogues.

Shop drawings shall be submitted for the following conditions:

- Structural supports/hanging/laying and jointing details for all types of pipes as required.

- Fire Fighting layout plans as required and for any changes in the layout of Fire Fighting/Architectural drawings.

The Contractor can only commence the work after the approval of above documents by Consultant.

k) Piping

Pipes for suction and delivery shall be galvanized/M.S tube (heavy duty) confirming to I.S:1239 up to 150mm dia and as per I.S:3589 for dia 200mm and above. The M.S flanges shall confirm to I.S:6392-1971.

Gate valve and check valve above 65mm dia shall be C.I. double flanged conforming to I.S:780 manufactured by the reputed manufacturers or C.I. double flanged butterfly valves.

Full way and check valves 65mm dia and below shall be gunmetal tested to 20Kg/cm2 pressure certified and conforming to I.S:778.

Suction strainer or foot valves shall be C.I., confirming to I.S:4038 - 1979.

l) Joints

All pipes and fittings shall be provided with flanged joints, with flanges either screwed or welded complete and jointed with 1.5mm thick gasket complete with nuts, bolts and washers etc.

m) Testing

All G.I pipes (except fire pipe) shall be tested hydrostically for a period of 30 minutes to a pressure of 7 Kg/cm2 without drop in pressure and all G.I pipes for fire shall be tested hydrostically for a period of 30 minutes to a pressure of 10 Kg/cm2 without drop in pressure.

D. LIST OF APPROVED MAKES - FIRE FIGHTING Work

1	BUTTERFLY VALVE		AUDCO/ CRANE/KITZ/ ZOLOTO/ /SANT
2	GATE VALVE		AUDCO/ CRANE/KITZ/ ZOLOTO/ /SANT
3	NON RETURN VALVE		AUDCO/ CRANE/KITZ/ ZOLOTO/ /SANT
4	DASH FASTENERS		HILTI/ FISHER
5	PIPE HANGERS/CLAMPS/SUPPORT		EURO CLAMP/ CHILLY/GRIPPLE
6	PAINT		Asian, Nerolac, Berger, Dulux or any othe approved equivalent
7	MS PIPE		TATA STEEL/JINDAL HISSAR
8	SPRINKLER HEAD		TYCO/VIKING/NEWAGE/EVERSAFE
9	WELDING ROD		ESAB/ ADOR/ SUPERON OERLIKON

NOTE: All makes shall conform to specifications of each item as enclosed with the tender documents.

E. GENERAL CONDITIONS FOR ELECTRICAL WORK

1. All the works shall be carried out as per CPWD General Specification for Electrical Works, Part-I (Internal) 2013 & Part-II (External) 1995, amended up to date and should also comply with relevant provisions of the Indian Electricity Rules and Acts as applicable, amended up to date.
2. The order of preference in case of any discrepancy as indicated in condition No. 8.1 under "Conditions of Contract" given in standard CPWD Contract form may be read as the following:
   (a) Nomenclature of items as per Schedule of Quantities
   (b) General/ Special Conditions and Particular Specifications as provided forming part of the tender document.
   (c) National electrical code and statuary guidelines as local electrical laws
   (d) CPWD Specifications with up to date Correction slips
   (e) Architectural/Structural/Electrical Drawings
   (f) Indian Standard Specifications of BIS
   (g) National Building Code - 2016
   (h) Manufacturer's specifications.
   (i) Sound Engineering Practices
   (j) Decision of Engineer-in-charge

   A reference made to any Indian Standard Specifications in these documents, shall imply reference to the latest version of that standard, including such revisions/amendments as issued by the Bureau of Indian Standards upto last date of receipt of tenders. The contractor shall keep at his own cost all such publications of relevant Indian Standards applicable to the work at site.
3. The contractor shall take all safety precautions to avoid accidents by exhibiting caution boards, red flags, red lights and by providing necessary barriers and all other measures required from time to time. The contractor shall be responsible for all damages and accidents due to negligence on his part. **The work shall be executed under supervision of license certificate holder of statuary guidelines of local laws and Indian electricity laws (as amended recent) .**
4. The contractor shall give due notices to Municipality, Police and/or other authorities that may be required under the law/rules under force and obtain all requisite permissions/licenses for temporary obstructions/enclosures and pay all charges

which may be livable on account of his execution of the work under the agreement. Nothing extra shall be payable on this account.

5. The contractor shall leave such recesses, holes, openings, etc., as may be required for the electric, air-conditioning and other related works. (For this purpose, any required inserts, sleeves, brackets, conduits, base plates, insert plates, clamps etc. shall be arranged by the contractor and fix the same at the time of casting of concrete, stone work & brick work, if required, and nothing extra shall be payable on this account.
6. The contractor shall give a trial run of the equipment and machinery for establishing its capability to achieve the specifications within laid down tolerances to the satisfaction of the Engineer-in-charge before commencement of work.
7. The work will be carried out in close coordination with the building work and other agencies. Conduits will be laid in the slab within the specified time and it will have to be ensured that the casting of slabs is not delayed for want of laying of conduits. The conduits will also be laid in walls before the Plaster work is undertaken so as to avoid breaking cutting of plaster while making chase for laying of conduits subsequently. The contractor will have to employ adequate labour for carrying out the work. No claim regarding the idle labour for any reason will be entertained by the Bank.
8. No tools and plants including special T&P etc. shall be supplied by the Bank and the contractor will have to make his own arrangements at his expenses.
9. All tools, plant and machinery provided by the contractor shall, when brought at the site, be deemed to be exclusively intended for the construction and completion of this work and the contractor shall not remove the same or any part thereof (save for the purpose of moving it from one part of the site to another) without the consent of the Engineer-in-charge.
10. All materials shall be got checked & approved by the Engineer-in-charge on receipt of the same at site before use and rejected material is to be removed from the site immediately.
11. No foreign exchange shall be made available by the Bank for the purchase of equipment, plants, machinery, materials of any kind or any other items required to be carried out in execution of work.
12. The contractor shall carry out his work, so as not to interfere with or hinder the progress or completion of the work being performed by other contractor (s) or by the Engineer-in-charge and shall as far as possible arrange his work and shall place and dispose of the materials being used or removed, so as not to interfere with the

operations of other contractors, or he shall arrange his work with that of the others in an acceptable and coordinated manner and shall perform it in proper sequence to the entire satisfaction of Engineer-in-charge.

13. All items which are not covered while carrying out electrical work shall be removed and shall be cleared by the contractors as soon as the work is completed.
14. It shall be responsibility of the main contractor to sort out any dispute involved with the associated contractor without any time and cost overrun to the Bank. The main contractor shall be solely responsible for settling the dispute/litigation arising out of his agreement with the associate contractor. The contractor shall ensure that the work shall not suffer on this account.
15. The main contractor shall be responsible for coordinating the activities of all works and essential progress of works as per milestone and laid down program.
16. The contractor shall be responsible for the watch and ward of the site/property/material provided by him and materials issued by the Bank against pilferage and breakage during the period of execution and thereafter till the work is completed and physically handed over to the Bank.
17. Samples of all materials, fittings and other materials/articles required for execution of the work shall be got approved from the Engineer-in-charge. Materials/articles manufactured by the firms of repute as indicated in tender documents and approved by the Engineer-in-charge shall only be used.
18. The contractor shall ensure quality construction in a planned and time bound manner. Any sub-standard material or work beyond set out tolerance limits shall be summarily rejected by the Engineer-in-charge.
19. Even ISI marked materials shall be subjected to quality test at the discretion of the Engineer-in-charge besides testing of other materials as per the specifications described for the item/material. Whenever ISI marked materials are brought to the site of work; the contractor shall, if required by the Engineer-in-charge, furnish manufacturers test certificates to establish that the materials procured by the contractor for incorporation in the work satisfy the provisions of IS codes relevant to the material and/or the work done.
20. The contractor shall have to engage well experienced skilled labour and deploy modern T&P and other equipment to execute the work.
21. The associate contractors executing the electrical works must fulfill the eligibility criteria mentioned in the tender otherwise they will not be permitted to execute the electrical works.

22. The contractor shall be responsible for removal of all defects in the work during the guarantee/warranty period. The Bank shall carry out routine maintenance only. However, if any failure is noticed during this period which is attributable to poor quality of material and bad workmanship, the contractor will be required to rectify the same at his own cost, failure of which the Bank will be at liberty to get the defects rectified at the risk & cost of the contractor. The contractor will also be required to carry out his own inspection/testing during the guarantee/warranty period and attend to any defect taking place during this period.
23. Priority to arrange the material shall be decided by the Bank. However, material required for the work shall be brought at site only at the appropriate time keeping in view the progress of building works as well as Electrical & Mechanical works. Decision of Engineer-in -charge in this regard shall be final.
24. The contractor has to intimate his authorized representative, who will be receiving instructions in his absence. The contractor /his authorized representative is bound to sign the site order book as and when required by the Engineer-in-charge and to comply with the instructions therein.
25. Suitable back plates providing for fixing the wall brackets and ceiling flush fittings shall be supplied by the contractor and the cost towards the same shall be included in the main item
26. It shall be responsibility of contractor to provide polythene/PVC plastic cover for all SDBs/meter boards/feeder pillars/panels etc. so as to protect them from wear & tear/damage during execution stage. Contractor shall provide the covers for the materials if any being supplied by Bank also. Nothing extra shall be paid on this account.
27. Contractor is fully responsible for any kind of damage to the LT/HT cable during execution of work. No joints shall be allowed if the cable is damaged. Contractor has to replace the full length at his own cost.
28. A suitable brass/tinned copper neutral link shall be fixed at suitable place in the Metallic outlet boxes of all sizes to terminate neutral wire properly. Nothing extra shall be paid on this account.
29. An earth termination with earth stud of brass/tinned copper i/c 2 No. metallic washers or suitable earth bar of Brass/tinned copper with tinned copper thimbles/ferrules/lugs should be suitably fixed at suitable place in the Metallic outlet box for termination of protective earth conductor. Nothing extra shall be paid on this account.

30. In the outlet boxes, phase from one switch to other switch shall be looped with suitable size of solid copper conductor. Nothing extra shall be paid on this account. Stranded conductor shall not be accepted.
31. Only required number of knockouts should be removed from Metallic outlet boxes for entry of conduits. If more than required number of knockouts are removed, the Metallic outlet box shall not be accepted.
32. Separate G.I. boxes shall be used for staircase light switches and bell push. Nothing extra shall be paid on this account.
33. Metal sheath of Co-axial T.V. cable shall be terminated using 'U' shape thimble/lugs/ferrules. Nothing extra shall be paid on this account.
34. To facilitate drawing of wires 16/18 SWG GI fish wire be provided along with laying of recessed conduit. Nothing extra shall be paid on this account.
35. Cable connection to switch gear is deemed to be included in the item of end termination. No extra payment shall be made for that.

ADDITIONAL CONDITIONS FOR ELECTRICAL WORKS

1.0 **All the works shall be carried out as per CPWD General Specifications for Electrical Works & AC ducting works, as amended up to date and should also comply with relevant provisions of the Indian Electricity Rules and Acts as applicable, amended up to date.**

2.0 **The contractor is advised to visit the site of work to have an idea of the execution of the work; failure to do so shall not absolve them from their responsibility to do the work as specified in agreement.**

3.0 **Completeness of Tender:**

All sundry fittings, assemblies, accessories, hardware items, foundation bolts, termination lugs for electrical connections as required, and all other sundry items which are useful and necessary for proper assembly and efficient working of the various components of the work shall be deemed to have been included in the tender, whether such items are specifically mentioned in the tender documents or not.

4.0 **Works to be done by the contractor:**

Unless and otherwise mentioned in the tender documents, the following works shall be done by the contractor, and therefore their cost shall be deemed to be included in their tendered cost: -

(i) Foundations for equipment and components where required, including foundations bolts.

(ii) Cutting and making good all damages caused during installation and restoring the same to their original finish.

(iii) Sealing of all floor openings provided by him for pipes and cables, from fire safety point of view, after laying of the same.

(iv) Painting at site of all exposed metal surfaces of the installation other than pre-painted items like fittings, fans, switchgear/distribution gear items, cubical switchboard etc. Damages to finished surfaces of these items while handling and erection, shall however be rectified to the satisfaction of the Engineer-in-Charge.

(v) Testing and commissioning of completed installation.

(vi) Storage space for all equipment, components and materials for the work

5.0 **Storage and Custody of Materials:**

The contractor has to make his own arrangement for the storage of the material at site & necessary watch and ward of the electrical installation during the execution of work till the same is handed over to the Bank. No extra payment will be made on this account. The storage space shall however be arranged by the Bank at site, if available.

6.0 **Electric Power Supply and Water Supply:**

Power and water supply will be arranged by the contractor at the site for installation, testing and commissioning purpose. Contractor will take due care to ensure safety of electrical installation during execution of work.

7.0 **Tools for handling and Erecting:**

All tools and tackles required for handling of equipment and materials at site of work as well as for their assembly and erection and also necessary test instruments shall be the responsibility of the contractor.

Co-ordination with other agencies:

The contractor shall co-ordinate with all other agencies involved in the building work so that the building work is not hampered due to delay in his work. Recessed conduit and other works, which directly affect the progress of building work, should be given priority.

7.1. **Care of buildings:**

Care shall be taken by the contractor to avoid damage to the building during execution of his part of the work. He shall be responsible for repairing all damages and restoring the same to their original finish at his cost. He shall also remove, at his costs, all unwanted and waste materials arising out of his work, from the site.

8.0 **Structural Alterations to Buildings:**

(i) No structural member in the building shall be damaged/altered, without prior approval from the competent authority through the Engineer-n-charge.

(ii) Structural provisions like openings, cutouts, if any, required to be made, such contingent works shall be carried out by the contract at his cost.

(iii) All such openings in floors shall be closed by the contractor after installing the cables/conduits/rising mains etc. as the case may be, by any suitable means as approved by the Engineer-in-charge without any extra payment.

(iv) All chases required in connection with the electrical works shall be provided and filled by the contractor at his own cost to the original architectural finish of the buildings.

9.0 **Drawings:**

(i) The work shall be carried out in accordance with the drawings and the tender documents and also in accordance with modification thereto from time to time as approved by the Engineer-in-charge.

(ii) All wiring diagrams shall be deemed to be 'Drawings' within the meaning of the term . They shall indicate the main switch board, the distribution boards (with circuit numbers controlled by them), the runs of various mains and sub mains and the position of all points with their controls.

(iii) After award of the work, the firm will be required to submit the drawings for the proposed work including layout plan, conduit routes showing location of points and height etc. Work will be carried out as per the approved drawings before start of work.

10.0 **Conformity to IE act, IE Rules, and standards:**

10.1. All electrical works shall be carried out in accordance with the provisions of The Electricity Act, 2003 and Indian Electricity Rules, 1956 amended up to date (Date of call of tender unless specified otherwise). List of rules of particular importance to electrical installations under these General Specifications is given in Appendix C for reference.

11.0 **General requirements of components:**

11.1. **Quality of material:** All materials and equipment supplied by the contractor shall be new. They shall be of such design, size and materials as to satisfactorily function under the rated conditions of operation and to withstand the environmental conditions at site.

11.2. **Adequate care to ensure that only tested and genuine materials of proper quality are used in work shall be ensured by firm. The firm shall ensure that**:

(i) Material will be ordered & delivered at site only with the prior approval of the Bank.

(ii) As and when the order is placed for the fittings/ fixtures, cables, switchgears, poles, rising main, other main items etc., its copy shall be endorsed to the Bank.

(iii) The firm will be required to procure material like exhaust fans, MCB's & DB's, switches & sockets, wires & cables, conduits and switchgears etc directly from the manufacturer/ authorized dealers to ensure genuineness

& quality and as per the approved makes only. Proof in this regard shall be submitted by the contractor before installation at site to the Bank.

(iv) Inspection at factory or at godown of the manufacturer, if , required, shall be arranged by the firm for a mutually agreed date. Certificate for genuineness of the fittings shall have to provided duly signed by the manufacturer's officer not below the rank of Regional Manager.

(v) Delivery of material shall be taken up only with the consent of Bank, after clearance of the material.

(vi) Bank shall reserve the right to waive inspection in lieu of suitable test certificate, at its discretion.

11.3. Similarly, for fabricated equipment, the contractor will first submit dimensional detailed drawings for approval before fabrication is taken up in the factory. Suitable stage inspection at factory also will be made to ensure proper use of materials, workmanship, and quality control.

12.0 Ratings of components:

12.1. All components in a wiring installation shall be of appropriate ratings of voltage, current and frequency, as required at the respective sections of the electrical installations in which they are used.

12.2. All conductors, switches and accessories shall be of such size as to be capable of carrying the maximum current, which will normally flow through them, without their respective ratings being exceeded.

13.0 Conformity to standards:

13.1. All components shall confirm to relevant Indian Standard Specifications wherever existing. Materials with ISI certification mark shall be preferred.

13.2. Relevant Indian Standards including amendments or revisions thereof up to the date of tender acceptance shall be applicable in the respective contracts for respective items, firm to ensure its compliance.

14.0 Interchangeability:

Similar parts of all switches, lamp holders, distribution fuse boards, Switch gears, ceiling roses, brackets, pendants, fans and all other fittings of the same type shall be interchangeable in each installation.

15.0 Workmanship:

15.1. Good workmanship is an essential requirement to be complied with. The entire work of manufacture/fabrication, assembly and installation shall confirm to sound engineering practice.

15.2. Proper supervision/skilled workmen: He shall engage suitably skilled/licensed workmen of various categories for execution of work supervised by supervisors / Engineer of appropriate qualification and experience to ensure proper execution of work. They will carry out instruction of Engineer-in-charge and other senior officers of the Bank during the progress of work.

15.3. Use of quality materials: Only quality materials of reputed make as specified in the tender will be used in work.

15.4. Fabrication in reputed workshop: Switch boards and LT panels shall be fabricated in a factory/workshop having modern facilities like quality fabrication, seven tank process, powder/epoxy paint plant, proper testing facilities, manned by qualified technical personnel. These shall be as per make / item approved.

16.0 **Testing:**

All testes prescribed in this General Specification, to be done before, during and after installation, shall be carried out, and the test results shall be submitted to the Engineer-in-charge in prescribed Performa, forming part of the Completion Certificate.

17.0 **Commissioning on completion:**

(i) After the work is completed, it shall be ensured that the installation is tested and commissioned.

18.0 **Completion plan and completion certificate:**

18.1. For all works completion certificate after completion of work shall be submitted to the Engineer-in-charge.

18.2. Completion plan drawn to a suitable scale in A2 Sheet (It shall be laminated if desired by the Site- in-Charge) indicating the following, and three copies of the same shall also be submitted.

(i) General layout of the building.
(ii) Locations of main switchboard and distribution boards, indicating the circuit numbers controlled by them.
(iii) Position of all points and their controls.
(iv) Types of fittings, viz. fluorescent, pendants, brackets, bulk head, fans, exhaust fans etc.
(v) Name of work, job number, tender reference, actual date of completion, names of site and name of the firm who executed the work with their signature.
(vi) Cable layout showing general distribution diagram along with position of cable joints, if any.

19.0 **Guarantee / Defect Liability**

The installation will be handed over to the Bank after necessary testing and commissioning along with the complete Project. The installation will be guaranteed against any defective design/workmanship. Similarly, the materials supplied by the contractor will be guaranteed against any manufacturing defect, inferior quality. The guarantee period will be for a period of 12 months from the date of handing over of the complete project to the Bank. Installation/ equipment's or components thereof shall be rectified/ repaired to the satisfaction of the Engineer-in-charge.

Note: The quantity of material in the BOQ is indicative. Contractor has to assess the actual requirement of material at site before placing the order keeping in view the drawing and site requirement from the shortest route. No claim for payment for unused excess material shall be entertained.

A. GENERAL:

1. All hardware items such as screws, thimbles, connectors, earth/neutral terminals, wires etc. which are essentially required for completing any item as per specifications will be deemed to have been included in the item even when the same have not been specifically mentioned.
2. All hardware material such as nuts/bolts/screws/washers etc. to be used in the work shall be zinc/cadmium plated iron. The galvanized boxes of modular switch/sockets etc. shall be of the same make as of switch/socket etc.
3. While laying conduit, suitable minimum number of junction boxes shall be left for pulling the wires. These shall be placed in such a way that the same do not remain noticeable.
4. Any conduit which is not be wired by the contractor shall be provided with GI fish wire for wiring by some other agency subsequently. Nothing extra shall be paid for the same.
5. Multi stranded FRLS PVC insulated copper conductor's wires are to be used in the work. Termination of multi-stranded conductors shall be done using crimping type copper thimbles at both the ends. Nothing extra shall be paid for the same.
6. The connections of switches, sensors, earthing conductors & interconnections cables shall be made by adequate rating thimbles of approved standard makes only and nothing extra on this account shall be paid.
7. Check nuts shall be provided while terminating the M.S. conduits (wherever applicable) in switch board boxes for which nothing extra shall be paid.
8. All distribution boards shall be marked with circuits controlling the rooms/area/SDB controlled
9. Material to be used in the work shall be one of the approved makes and shall be ISI marked. The makes of material have been indicated in the list of acceptable makes. No other make will be acceptable. The material to be used in the work shall be got approved from the Engineer-in-charge before its use at site. The Engineer-in-charge shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not as per specifications
10. While deciding the size of switch boxes for light points/fan point, exhaust fan point items, extra two modules will be provided for each fan point for fixing of regulator(s) (fan regulator is to be provided under different item). Wherever extra modules are available, the same shall be provided with blanking plates.

11. Modular type switches/sockets/telephone outlets/TV sockets are to be provided wherever indicated in the items. The same shall be of only one make. The modular plates of switches, sockets, telephone & TV sockets etc. shall be in two parts i.e. plates with frames with in quoted rates.
12. The building shall be provided with false ceiling in various areas. In order to avoid maintenance problem, the contractor will not provide any ceiling rose/connector/looping box etc. above the false ceiling. The point wiring in that case will be extended up to the fitting/fan etc. directly without provisions of any termination arrangement in between. The wire from the end point up to the fixture shall be considered to be included in the point wiring. Nothing extra shall be paid for the same.
13. Wherever it is not possible to provide rigid conduits, flexible conduit pipe shall be provided for drawing/running the wires. However, such arrangement has to be kept to the barest minimum and only with the prior approval of Engineer-in-charge.
14. Earthing and all hidden items of work shall be carried out in the presence of the Engineer-in-charge or his authorized representative.
15. The fan box cover shall be made from 3mm thick phenolic laminated sheet as per CPWD specification.
16. The junction boxes & looping boxes shall be covered with approved makes of phenolic laminated sheet.
17. The firm has to go through the site order book kept with the Bank's Engineer regularly and has to sign the same and carryout the instructions recorded therein by various officers of the Bank.
18. The quantities of various items may vary from the quantities given in schedule of work. The agency shall bring the various items & materials as per actual requirement at site at the time of execution of work. Excess quantities shall not be accepted & paid by the Bank.
19. The ceiling roses wherever required to be provided are included in the scope of work and the same shall also be of modular type & of the same make as that of switches & sockets along with earthing provision.
20. The MCB should be of same make as that of MCB DBs.
21. The MCB distribution boards shall be factory fabricated in the works of the manufacturer of the MCB's of any of the makes specified and the same shall be duly pre-wired in the works. The board shall be brought to site in ready for installation condition. The MCBs and the MCB distribution board shall be of the same make.

22. MCCB should have centrally adjustable overload setting 80% to 100% & short circuit setting adjustable from 500% to 1000% of nominal current for thermal type & overload setting 40% to 100% & short circuit setting adjustable from 150% to 1000% of nominal current for microprocessor type MCCB. All MCCB should be ICS=ICU.

Suitable crimping tools shall be used for crimping the lugs/thimbles/ferrules. Nothing extra shall be paid on this account. The lugs/thimbles/ferrules pressed by conventional/ordinary pliers shall not be accepted.

B. Technical Specifications Electrical

Sub Head I – Internal Electrical Installation

1. GENERAL

The system of wiring shall consist of FRLS single-core / multi-core PVC insulated Copper conductor wires in PVC conduits concealed/exposed as called for.

2 STANDARDS AND CODES

Updated and current Indian Standard Specifications and Codes of Practice as stipulated below shall apply to the equipment's and the work covered in this section. In addition the relevant clauses of the CPWD Specification for Electrical Works-2013, IS code , The Electricity Act 2003, Indian Electricity Rules 1956, National Building Code 2016, National Electric Code 1985, Code of Practice for Fire Safety of Building (general) : General Principal and Fire Grading – IS 1641 and IEE wiring regulation 16th edition as amended up to date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable.

3. CHECKING OF DRAWINGS

Before commencing the conduiting work, the Contractor shall carefully examine the drawings indicating the layout of conduits, check the number and size of conduits with respect to number of wires, location of junction boxes, sizes and location of switch boxes and other relevant details. Any changes suggested by the Contractor shall be got approved from the Bank before the actual laying of conduits. Any discrepancy found in the drawings shall be brought to the notice of the Bank promptly before execution of the work.

4. MATERIAL

4.1 Conduits shall be black enameled mild steel and be solid drawn or lap welded conduits, stove enameled inside and outside with minimum wall thickness of 1.6 mm for conduits upto 25 mm diameter and 2 mm wall thickness for conduits above 25 mm diameter.

The PVC conduits shall be of minimum 2 mm thick. PVC Conduits shall be rigid unplasticized PVC conduits of 2 mm thickness. The conduits shall be delivered to the site in original bundles and each length of conduit shall bear the label of the manufacturer. The number of insulated copper conductor wires that may be drawn in the conduits of various sizes are given below and the

conduit fill shall not exceed 40%. The minimum size of conduits shall be 20mm diameter for lighting and outlets and conduit size shall be increased as per relevant IS code depending on the number of wires. Wires shall be FRLS PVC insulated copper conductor and ISI marked.

4.2 FRLS PVC insulated wires

Flame Retardant Low Smoke (FRLS) PVC insulated wires shall be single core unsheathed in voltage grade 1100 V as per IS 694 – 1990 with 99.97% pure electrolytic grade bright annealed stranded bare copper conductors. Special parameters of FRLS PVC insulation like critical oxygen index, temperature index, smoke density and flammability test shall conform to relevant IEC and ASTM Standards. Coil packings shall be ISI marked as stipulated in IS 694

5. CONDUIT FILL: -

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

Nominal cross sectional area of conductor in sq.mm.	20 mm		25 mm		32 mm		38 mm		51 mm		64 mm	
	S	B	S	B	S	B	S	B	S	B	S	B
1	2	3	4	5	6	7	8	9	10	11	12	13
1.50	5	4	10	8	18	12	–	–	–	–	–	–
2.50	5	3	8	6	12	10	–	–	–	–	–	–
4	3	2	6	5	10	8	–	–	–	–	–	–
6	2	–	5	4	8	7	–	–	–	–	–	–
10	2	–	4	3	6	5	8	6	–	–	–	–
16	–	–	2	2	3	3	6	5	10	7	12	8
25	–	–	–	–	3	2	5	3	8	6	9	7
35	–	–	–	–	–	–	3	2	6	5	8	6
50	–	–	–	–	–	–	–	–	5	3	6	5
70	–	–	–	–	–	–	–	–	4	3	5	4

The columns headed ‘S’ apply to runs of conduits which have distance not exceeding 4.25 m between draw in boxes and which do not deflect from the straight by an angle of more than 15 degrees. The columns headed ‘B’ apply to runs of conduit, which deflect from the straight by an angle of more than 15 degrees.

6. JOINING OF CONDUITS: -

PVC Conduits shall be joined by means of PVC solvent cement. Proper jointing compound recommended by manufacturers shall be used for the same. Where there are long runs of straight conduit, inspection boxes shall be provided at 10 meter intervals. Junctions between conduits and adaptable boxes, switch outlet boxes must be provided with entry spouts and smooth PVC bushes.

7. CONDUIT CONNECTIONS: -

The threads of pipe and sockets shall be free from grease and oil and shall be thoroughly cleaned before making the screwed joints. All joints shall be fully water tight. Junction boxes and running joints shall be provided at suitable places to allow for subsequent extension if any, without undue dismantling of conduit system. As far as possible, diagonal run of conduits and adaptable boxes, back outlet boxes, switch boxes and the like must be provided with entry spouts and smooth rubber bushes. Joint between conduit and iron clad distribution boards and control gear shall be effected by means of conduit couplers into each of which will be coupled smooth rubber bushes from the inside of box or case.

Conduit system shall be vertical and straight as far as possible. Traps where water may accumulate from condensation shall be avoided, however if it is unavoidable suitable provision for draining the water shall be made. Separate conduits shall be run for lighting and 15 amps power outlet wiring. Wires belonging to different phases shall no be run in the same conduit. For every phase wire a separate neutral wire shall be run. Conduits connections for MS conduits shall be screwed metal to metal and be painted with one coat of self-etching zinc chromate primer and two coats of enamel paint. The threads and sockets shall be free from grease and oil. Connections between screwed conduit and sheet metal boxes shall be by means of a rubber bush. The joints in conduits shall be free of burrs to avoid damage to insulation of conductors while pulling them through the conduit. External conduits (exposed to elements) should be insulated through clamp and water tight fitting.

8. BENDS IN CONDUIT: -

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

PVC conduits in location where ambient temperature is 50° C. Use of PVC conduits where temperature is 60°C. or above is prohibited

Large right angle bends (more than 75 mm radius) or non right angle bends in conduit runs shall be made by means of conduits bending machines carefully so as not to cause any crack in the conduit. Small right angle bends in conduits runs can be made by standard conduit accessories (solid/inspection bends/elbows). No run of conduit shall have more than four right angle bends from outlet to outlet. Bends in multi runs of conduits shall be parallel to each other and neat in appearance, maintaining the same distance as between straight runs of conduits.

9. Flexible Conduit

All final connections specially to vibrating equipment's shall be made through steel flexible conduits. However, the use shall be restricted to only those areas where it is not possible to use rigid PVC conduits with approval of Project Manager.

10. Conduit Accessories.

10.1 Standard accessories

PVC standard conduit fittings and accessories like standard/extra-deep circular boxes, looping in boxes, junction boxes, solid /inspection elbows, solid/inspection tees, couplers, nipples, saddles, check nuts, earth clips, ball socket joints, bushes etc. shall be of superior quality and of approved makes. Heavy duty covers screwed with approved quality screws shall be used. Samples of all conduits fittings and accessories shall be got approved by Project Manager before use.

10.2 Fabricated accessories

Wherever required, outlet/junction boxes of required sizes shall be fabricated from 1.6 mm thick MS sheets excepting ceiling fan outlet boxes which shall be fabricated from minimum 3 mm thick sheets. The outlet boxes shall be of approved quality, finish and manufacture. Suitable means of fixing connectors etc., if required, shall be provided in the boxes. The boxes shall be protected from rust by zinc phosphate primer process. Boxes shall be finished with minimum 2 coats of enamel paint of approved colour. A screwed brass stud shall be provided in all boxes as earthing terminal.

- <u>Outlet Boxes for Light Fittings.</u>
  These shall be minimum 75mm x 75mm x 50mm deep and provided with required number of threaded collars for conduit entry. For ceiling mounted florescent fittings, the boxes shall be provided 300 mm off centre for a 1200 mm fitting and 150 mm off centre for a 600 mm fitting so that the wiring is taken directly to the down rod. 3 mm thick perspex/hylam sheet cover of matching colour shall be provided.

- Outlet Boxes for Ceiling Fans

  Outlet boxes for ceiling fans shall be fabricated from minimum 3 mm thick MS sheet steel. The boxes shall be hexagonal in shape of minimum 100 mm depth and 60 mm sides. Each box shall be provided with a recessed fan hook in the form of one 'U' shaped 15 mm dia rod welded to the box and securely tied to the top reinforcement of the concrete slab for a length of minimum 150 mm on either side. 3 mm thick Perspex/hylam sheet cover of matching colour shall be provided.

11. Modular Cover Plated Mounted Wiring Accessories

11.1 Switches

All 6 and 16 amps switches shall be of the modular enclosed type flush mounted 220 Volt AC of the best quality and standard. The switch moving and fixed contacts shall be of silver nickel and silver graphite alloy and contact tips coated with silver. The housing of switches shall be made from high impact resistant, flame retarding and ultra violet stabilized Project Managering plastic material. The switch shall be connected on to the phase wire of the circuit.

11.2 Molded Cover Plates

Switches, receptacles and telephone system outlets in wall shall be provided with molded cover plates of shape, size and colour approved by the Project Manager made from high impact resistant, flame retarding and ultra violet stabilized Project Managering plastic material, and secured to the box with counter sunk round head chromium plated brass screws. Where two or more switches are installed together, they shall be provided with one common switch cover plate as described above with notches to accommodate all switches either in one, two or three rows.

One and two gang switch cover plate, telephone outlet cover plate, 6 and 16 amps switched/unswitched plates, shall have the same shape and size. Three and four gang switch cover plates shall have the same shape and size. Six and eight gang switch cover plates shall have the same shape and size. Nine and twelve switch cover plates shall have the same shape and size. Wherever five switches, seven switches, ten switches and eleven switches are to be fixed the next higher size of gang switch cover plate to be used and openings shall be provided with blank-off covers at no extra cost.

11.3 Wall Socket Outlets

All 6/16 amps wall socket outlets unless otherwise mentioned on the drawings shall be switched, with round pins and fitted with automatic linear safety shutters to ensure safety from prying fingers. Unswitched 6/16 amp wall socket outlets where called for in the drawings shall be of three pin type. The socket outlets shall be made from high impact resistant, flame retarding and ultra violet stabilized Project Managering plastic material. The switch and sockets shall be located in the same plate. The plates for 6 amp

switched/unswitched plugs and telephone outlets shall be of the same size and shape. All the switched and unswitched outlets shall be of the best standard. The switch controlling the socket outlet shall be on the phase wire of the circuit. An earth wire shall be provided along the cables feeding socket outlets for electrical appliances. The earth wire shall be connected to the earthing terminal screw inside the box. The earth terminal of the socket shall be connected to the earth terminal provided inside the box.

12. CONDUIT INSTALLATION

12.1 System

The whole conduit system shall be installed to comply fully with relevant provision in Indian Standard Specifications, Indian Electricity Rules and IE wiring regulations. Conduits shall be laid either recessed in walls and ceilings or on surface on walls and ceilings or partly recessed and partly on surface, as required. **Same rate** shall apply for recessed and surface conduiting in this contract. Stranded copper conductor insulated wire of size as per schedule of quantities shall be provided in entire conduiting for loop earthing. steel wire of suitable size to serve as a fish wire shall be left in all conduit runs to facilitate drawing of wires after completion of conduiting.

12.2 Layout

- Conduit's layout and routes shall be submitted for Project Manager's approval prior to execution. Allowance for adjustments due to site conditions shall be provided with no extra cost.
- Conduit routes shall be chosen for easy, straight runs with a minimum of bends and crossings. Generally they shall follow the structure of building, running at right angles or in parallels to floors and ceilings. Conduit shall be kept within 300 mm of floors and ceiling when running parallel to them.

- Outlets boxes for housing accessories shall be used as draw boxes. The total number of draw boxes shall be kept to a minimum and shall be provided so that conduits runs do not exceed 12 m or have more than two right angle bends.
- All conduits shall be kept clear of gas and water pipes. In particulars, conduits shall be at least 150 mm away from gas pipe. Where proximity to these pipes is unavoidable, they shall be effectually segregated e.g. using rubber or other insulating material to prevent appreciable voltage difference at possible points of contact. Segregation from extra low voltage circuits and telecommunication circuits shall also apply unless these are wired to the same voltage requirements as lighting and power circuits.
- Conduits from different distribution boards shall not be connected to the same junction box. Each run of conduit shall be assembled complete with draw in wires.

12.3 Joints and terminations

- Electrical and mechanical continuity shall be maintained throughout all conduits joints and terminations. Conduit threads shall be thoroughly cleaned and the conduits tightly screwed. The conduit system shall be watertight after installation.
- Conduits shall be connected using couplers or via boxes. With a coupler, the ends of the conduit shall butted close together and the running coupler is screwed tightly on and tightened by a locknut.
- Conduits terminating into boxes provided with spouts shall be threaded so that there are no exposed threads. For boxes with no spouts, the termination shall be made using a brass bush and a coupler. The conduit is pushed through the knockout or drilled entry and the bush is screwed tightly onto its end. The coupler is screwed to butt firmly against the exterior wall of the box.
- Where conduits are not jointed or terminated in boxes, they shall be terminated in a screwed brass bush.
- In all joints and terminations, conduits threads shall not be exposed. Where this cannot be avoided as in a running coupler, the exposed threads shall be coated with red lead paint to seal against the ingress of water.

12.4 Bends

- Conduits shall be bent cold with an approved type of bending block or bending machine, without altering the dimensions of their sections.
- All conduits bends shall be such as to permit compliance to the requirements for bends in cables to as stated in the IEE regulations
- Bends shall be made with as large a radius as the position of the conduit within the building permits. Where the bend is more than 90 degree, circular or rectangular junction boxes shall to be used for connecting conduits.

12.5 Recessed Conduiting

Conduits recessed in concrete members shall be laid before casting, in the upper portion of slabs or otherwise as may be instructed, so as to embedded the entire run of conduits and ceiling outlet boxes with a cover of minimum 12 mm concrete. Conduits shall be adequately tied to the reinforcement to prevent displacement during casting at intervals of maximum 1 meter. No reinforcement bars shall be cut to fix the conduits. Suitable flexible joints shall be provided at all locations where conduits cross expansion joints in the building.

Conduits recessed in brick work shall be laid in chases to be cut by electrical Contractor in brick work before plastering. The chases shall be cut by a chase cutting electric machine. The chases shall be of sufficient width (minimum 10 mm spacing between adjacent conduit) to accommodate the required number of conduits and of sufficient depth to permit full thickness of plaster (minimum 6 mm) over conduits. The conduits shall be secured in the chase by means of heavy duty pressed steel clamps screwed to MS flat strip saddles at intervals of maximum 1 meter. The chases shall then be filled with cement and coarse sand mortar (1:3) and properly cured by watering. For chases

more than 75 mm width, a wiremesh shall be provided for the full length and width of the chase in the plaster to prevent cracking.

Junction boxes intended for facilitating drawing of wires in conduiting system shall be located in accessible locations to permit redrawing of wires in future. Open ends of conduits laid in slabs and walls shall be suitably plugged before pouring concrete / plastering to prevent ingress of water / debris in to the conduits

Entire recessed conduit work in concrete members and in brick work shall be carried out in close coordination with progress of civil works. Conduits in concrete members shall be laid before casting and conduits in brick work shall be laid before plastering. Should it become necessary to embedd conduits in already cast concrete members, suitable chase shall be cut in concrete for the purpose. For minimising this cutting, conduits of lesser diameter than 25 mm and outlet boxes of lesser depth than 50 mm could be used by the Contractor for such extensions only after obtaining specific approval from Project Manager. For embedding conduits in finished and plastered brick work, the chase would have to be made in the finished brick work. After fixing conduit in chases, chases shall be made good in most workmanlike manner to match with the original finish.

Cutting chases in finished concrete or finished plastered brick work for recessing conduits and outlet boxes etc shall be done by the Contractors without any extra cost. In the concealed MS/PVC conduit system all boxes for accessories and draw/junction boxes shall be installed such that the outer rim is flush with the finished surface of the wall.

12.6 Surface Conduiting

Wherever so desired, conduit shall be laid in surface over finished concrete and/or plastered brickwork. Suitable spacer saddles of approved make and finish shall be fixed to the finished structural surface along the conduit route at intervals not exceeding 600 mm. Holes in concrete or brick work for fixing the saddles shall be made neatly by electric drills using masonry drill bits. Conduits shall be fixed on the saddles by means of good quality heavy duty GI clamps screwed to the saddles by counter sunk screws. Neat appearance and good workmanship of surface conduiting work is of particular importance. The entire conduit work shall be in absolute line and plumb. Conduits above false ceiling shall be fixed on suitable hangers supported from the structural ceiling. All surface conduits shall be run in a vertical or horizontal direction. Diagonal runs shall not be permitted.

12.7 Fixing of conduit fittings and accessories

For concealed conduiting work, the fittings and accessories shall be completely embedded in walls/ceilings leaving top surface flush with finished wall/ceiling surface in a workman like manner.

Loop earthing wire shall be connected to a screwed earthstead inside outlet boxes to make an effective contact with the metal body.

12.8 Protection of Conduits

To safeguard against filling up with mortar/plaster etc. all the outlet and switch boxes shall be provided with temporary covers and plugs which shall be replaced by sheet/plate covers as required. All screwed and socketed joints shall be made fully water tight with white lead paste.

12.9 Cleaning of Conduit Runs

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

12.10 Protection Against Dampness

All outlets in conduit system shall be properly drain and ventilated to minimise chances of condensation/sweating.

12.11 Expansion Joints

When crossing through expansion joints in buildings, the conduit sections across the joint shall be through approved quality heavy duty metal flexible conduits of the same size as the rigid conduit.

12.12 Loop Earthing

Loop earthing shall be provided by means of insulated stranded copper conductor wires of sizes as per Schedule of Quantity laid alongwith wiring inside conduits for all wiring outlets and sub-mains. Earthing terminals shall be provided inside all switch boxes, outlet boxes and draw boxes etc.

13. LAYING AND DRAWING OF WIRES

13.1 Bunching of Wires

Wires carrying current shall be so bunched in conduits that the outgoing and return wires are drawn into the same conduit. Wires originating from two different phases shall not be run in the same conduit. No joint shall be permitted in the run of wires.

13.2 Drawing of Wires

The drawing of wires shall be done with due regard to the following precautions: -

- No wire shall be drawn into any conduit, until all work of any nature, that may cause injury to wire is completed. Burrs in cut conduits shall be smoothened before erection of conduits. Care shall be taken in pulling the wires so that no damage occurs to the insulation of the wire. Approved type bushes shall be provided at conduit terminations.

- Before the wires are drawn into the conduits, conduits shall be thoroughly cleaned of moisture, dust, dirt or any other obstruction by forcing compressed air through the conduits if necessary.
- While drawing insulated wires into the conduits, care shall be taken to avoid scratches and kinks which cause breakage of conductors.
- There shall be no sharp bends.
- The Contractor shall, after wiring is completed, provide a blank metal/sunmica plate on all switch / outlet / junction boxes for security and to ensure that wires are not stolen till switches / outlets etc.. are fixed at no extra cost. The contractor shall be responsible to ensure that wires and loop earthing conductors are not broken and stolen. In the event of the wire being partly / fully stolen , the contractor shall replace the entire wiring alongwith loop earthing at no extra cost. No joint of any nature whatsoever shall be permitted in wiring and loop earthing.

13.3 Termination /Jointing of Wires

- Sub-circuit wiring shall be carried out in looping system. Joints shall be made only at distribution board terminals, switches/buzzers and at ceiling roses/connectors/lamp holders terminals for lights/fans/socket outlets. No joints shall be made inside conduits or junction/draw/inspection boxes.
- Switches controlling lights, fans or socket outlets shall be connected in the phase wire of the final sub circuit only. Switches shall never be connected in the neutral wire.
- Wiring conductors shall be continuous from outlet to outlet. Joints where unavoidable, due to any special reason shall be made by approved connectors. Specific prior permission from banks engineer in writing shall be obtained before making such joint.
- 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 wringing.
- Strands of wires shall not be cut for connecting terminals. All strands of wires shall be twisted round at the end before connection.
- Conductors having nominal cross sectional area exceeding 1.5 sq. mm shall always be provided with crimping sockets. Tinning of the strands shall be done wherever crimping sockets are not available as per instructions of the Project Manager
- All wiring shall be labelled with appropriate plastic ferrules for identification.
- 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.
- The pressure applied to tighten terminal screws shall be just adequate, neither too much nor too less.
- Only certified valid license holder wiremen shall be employed to do wiring/jointing work.

13.4 Load Balancing

The Contractor shall plan the load balancing of circuits in 3 phase installation and get the same approved by banks engineer before commencement of the work.

13.5 Color Code of Conductors

Color code for normal supply – Red, Yellow, Blue for three Phases, Black for Neutral and Green for Earth – shall be maintained for the electrical wiring installation

Colour code for UPS supply – Red/white, Yellow/white, Blue/white for three Phases, white for Neutral and Green for Earth

14. LIGHTING FIXTURES

The light fixtures and fittings shall be assembled and installed complete and ready for service, in accordance with details, drawings, manufacturer's instructions and to the satisfaction of the Project Manager.

Wires brought out from junction boxes shall be encased in PVC flexible pipes for connecting to fixtures concealed in suspended ceiling. The flexible pipes shall be provided with a checkout at the fixture end.

Pendant fixtures specified with overall lengths are subject to change and shall be checked with conditions of the job and installed as directed.

All suspended fixtures shall be mounted rigid and fixed in position in accordance with drawings, instructions and to the approval of the Project Manager.

Fixtures shall be suspended true to alignment, plumb, level and capable of resisting all lateral and vertical forces and shall be fixed as required.

All suspended light fixtures etc. shall be provided with concealed suspension arrangement in the concrete slab/roof members. It is the duty of the Contractor to make these provisions at the appropriate stage of construction.

All switch and outlet boxes shall be bonded to earth with insulated stranded copper wire as specified.

Wires shall be connected to all fixtures through connector blocks.

Flexible pipes, wherever used, shall be of make and quality approved by the Project Manager.

15. MEASUREMENT AND PAYMENT OF WIRING

Wiring for lights, fans and convenience socket outlets shall be measured and paid for on **Point Basis** as itemized schedule of quantities and as elaborated as below (unless otherwise stated).

15.1 Average wiring Length.

The point wiring basis for wiring for lights, fans and convenience socket outlets shall assume average wiring length and average conduiting length per point based on parameters stipulated in para 15.3 below. The average wiring length and average conduiting length forming the basis of point wiring payment, shall take the electrical layouts of the entire project into consideration. Tenderers are advised to seek clarifications, if they so desire, on this aspect before submitting their tenders. No claim for extra payment on account of electrical layouts in part or whole of the project requiring larger average wiring and conduiting length per point, whether specifically shown in tender drawings or not, shall be entertained after the award of contract.

15.2 Point wiring for Lights – Primary and Secondary Light Points.

In respect of group control of lights (more than one light controlled by one switch or MCB), wiring upto the first light in the group shall be within the primary light point. Wiring for other lights looped in one group for switch controlled as also MCB controlled lights shall be as secondary light points. Primary light points for switch controlled lights shall include the cost of control switch. The cost of MCB controlling such lights shall not be included in the primary light point rate since the MCB shall be paid for in the item of DB. Primary light points shall include the cost of circuit wiring (wiring from DB terminal to the first switch in the sub circuit)

15.3 Design Parameters: Wiring shall be carried out as per following design parameters in recessed/ surface conduit/conduit cum raceway system.

- Only looping system of wiring shall be adopted throughout. No joints excepting at wiring terminals shall be permitted.
- All accessories shall be flush type unless otherwise stated.
- For estimation of load, following loads per point shall be assumed.
  Light points 60/100 Watts.

  6 amps socket outlet points 100 Watts.

  Fan points 60 Watts.

  Exhaust fan points 100 Watts unless otherwise specified.

  16 amp socket outlet points 500/1000 Watts. unless otherwise specified
- Light and fan points shall be wired on a common final sub-circuit. Each sub circuit shall not have more than a total of 10 nos lights and fans or a load of 800 watts whichever is lesser unless specifically stipulated otherwise. Wiring shall be carried out in PVC conduiting system.

15.4 Scope of Point Wiring

15.4.1 Wiring for Lights

Primary Light Points: Wiring for Primary light points, as defined, shall commence at the DB terminals and shall terminate at the ceiling rose/connector via the control switch (for switch controlled lights). Rates for

Primary light point wiring shall be deemed to be inclusive of the cost of entire material and labour including the switch, socket and modular cover plate require for completion of Primary light point thus defined including : .

- Recessed / surface conduit system with all accessories, junction/ draw /inspection boxes, bushes, check nuts etc. complete as required,
- Wiring with multi-stranded copper conductor FRLS PVC insulated 660/1000 volt grade wires including terminations etc. complete as required.
- Loop earthing with insulated copper wires.

Secondary Light points:

Secondary light points, as defined shall cover the cost of interconnection wiring between group controlled light fittings and shall be deemed to be inclusive of the cost of entire materials and labour required for completion of the secondary light point thus defined including

- Recessed / surface conduting system with all accessories, junction/draw/inspection boxes, bushes, check nuts etc. complete as required,
- Wiring with stranded copper conductor FRLS PVC insulated 660/1000 volt grade wires including terminations etc. complete as required.
- Loop earthing with insulated copper wires.

15.4.2 Wiring for Ceiling Fans

Wiring for ceiling fan points shall be same as for Primary light points and shall, in addition, include ceiling outlet box with recessed fan hooks and installation of fan regulator.

15.4.3 Wiring for Exhaust Fans

Wiring for exhaust fan points shall be same as for Primary light points and shall in addition include ceiling rose as required.

15.4.4 Wiring for Convenience Socket Outlets

Wiring for 6 amps socket outlets on work tables shall be carried out partly in PVC conduits as indicated in electrical layout drawings.

Point wiring for 5 pin 6 amps convenience socket outlets

Point wiring for 5 pin 6 amps socket outlets on point wiring basis shall be the same as Primary light points defined in para 15.4.1. including loop earthing of the third pin complete as required and as itemised in scheduled of quantities.

Point wiring for 5 pin 6/16 amps convenience socket outlets

Point wiring for 5 pin 6/16 amps socket outlets on point wiring basis shall be the same as Primary light point defined in para 15.4.1. including loop earthing

of the third pin complete as required and as item wised in scheduled of quantities.

15.4.5 Submains wiring

Submains wiring shall be measured and paid for on linear basis as per the length of conduit actually installed between terminations. This shall include conduit system with all accessories, wires and insulated loop earthing conductors as itemised in schedule of quantities. The quoted rates shall include termination of wiring at either end. Cost of wires only without conduits at either end required for end terminations and taken inside switchboards etc. shall be deemed to be included in the liner running meter rate of Submain wiring in conduit and no extra shall be paid for such additional wiring without conduit.

16. ROUTINE AND COMPLETION TESTS

16.1 Installation Completion Tests

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

1. Wiring continuity test
2. Insulation resistance test
3. Earth continuity test
4. Earth resistivity test

Besides the above, any other test specified by the local authority shall also be carried out. All tested and calibrated instruments for testing, labour, materials and incidentals necessary to conduct the above tests shall be provided by the contractor at his own cost.

16.2 Wiring Continuity Test

All wiring systems shall be tested for continuity of circuits, short circuits, and earthing after wiring is completed and before installation is energised.

16.3 Insulation Resistance Test

The insulation resistance shall be measured between earth and the whole system conductors, or any section thereof with all protection in place and all switches closed and except in concentric wiring all lamps in position of both poles of the installation otherwise electrically connected together, a direct current pressure of not less than twice the working pressure provided that it does not exceed 1100 volts for LT circuits. Where the supply is derived from AC three phase system, the neutral pole of which is connected to earth, either direct or through added resistance, pressure shall be deemed to be that which is maintained between the phase conductor and the neutral. The insulation

resistance measured as above shall not be less than 50 megohms divided by the number of points provided on the circuit the whole installation shall not have an insulation resistance lower than one megohm.

The insulation resistance shall also be measured between all conductors connected to one phase conductor of the supply and shall be carried out after removing all metallic connections between he two poles of the installation and in those circumstances the insulation shall not be less than that specified above.

The insulation resistance between the frame work of housing of power appliances and all live parts of each appliance shall not be less than that specified in the relevant Standard specification or where there is no such specification, shall not be less than half a megohm or when PVC insulated cables are used for wiring 12.5 megohms divided by the number of outlets. Where a whole installation is being tested a lower value than that given by the above formula subject to a minimum of 1 Megohms is acceptable.

16.4 Testing Of Earth Continuity Path

The earth continuity conductor including metal conduits and metallic envelopes of cable in all cases shall be tested for electric continuity and the electrical resistance of the same alongwith the earthing lead but excluding any added resistance of earth leakage circuit breaker measured from the connection with the earth electrode to any point in the earth continuity conductor in the completed installation shall not exceed one ohm.

16.5 Testing of Polarity Of Non-Linked Single Pole Switches

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

16.6 Earth Resistivity Test

Earth resistivity test shall be carried out in accordance with IS Code of Practice for earthing.

16.7 Performance

Should the above tests not comply with the limits and requirements as above the contractor shall rectify the faults until the required results are obtained. The contractor shall be responsible for providing the necessary instruments and subsidiary earths for carrying out the tests. The above tests are to be carried out by the contractor without any extra charge.

16.8 Tests and Test Reports

The Contractor shall furnish test reports and preliminary drawings for the equipment to the Project Manager for approval before commencing supply of the equipment. The Contractor should intimate with the tender the equipment intended to be supplied with its technical particulars. Any test certificates etc., required by the local Inspectors or any other Authorities would be supplied by the Contractor without any extra charge. All test reports shall be approved by the Project Manager prior to energizing of installation.

LED Luminaire Specifications

S.No	Criteria	Specification
1	Luminaries configuration / technical requirement	As per the description mentioned in BOQ
2	Housing / body of fitting	CRCA/ Extruded Aluminium/ Pressure Die cast Aluminium/ as per oem standard
3	Cover / Diffuser	Poly carbonate/ Acrylic UV protected/ PMMA for indoor and Toughened glass / PMMA for outdoor/ as per oem standard
4	Finish	Aesthetically designed housing with corrosion resistant powder coating/ as per oem standard
5	Protection (Minimum)	IP 20 for indoor & IP 65 for outdoor
6	Operating Voltage	150V to 270V universal electronic driver with internal surge protection.
7	Frequency	50 Hz
8	Fixture Ambient	+ 40 deg. centigrade
9	Operating temperature Range	0 to +55 deg. centigrade
10	Make of LED	CREE/ Philips / Osram/ havells / jaguar / bajaj /Crompton/

C. SUBHEAD III. EARTHING AND LIGHTNING PROTECTION

EARTHING

1. DESCRIPTION OF WORK

The non-current carrying metal parts of electrical installation shall be earthed properly. All metalic structure, enclosures, junction boxes, outlet boxes, cabinets, machine frame, portable equipments, metal conduits, trunking, cable amour, switchgear and all other parts made of metal in close proximity with electrical circuits shall be bonded together and connected by means of specified earthing conductors to an efficient earthing system. Every item of equipment served by the electrical system shall be bonded to earthing system.

2. CODES AND STANDARDS

3. SUBMITTALS DRAWING DATA

a) Earthing pits layout along with earthing tape routing etc.

b) Block Diagram for earthing showing all earthing pits and their connections.

4. TESTS & TEST REPORT

Test results of all Earthing pit test carried out at site with multiple electrode testing procedure.

5. SPECIFICATION

5.1 EARTHING CONDUCTORS

G.I. earthing system shall be provided except for neutral earthing of transformers and DG sets for which Cu earthing system shall be provided. All the bus ducts/cable trays shall be provided with suitable size of 2 nos. G.I. strips in the full length. All electrical equipment shall be earthed with 2 nos. G.I. strips/wires.

The resistance to each earthing system shall not exceed 1.0 ohm.

5.2 EARTHING STATION

PLATE ELECTRODE EARTHING

Earthing electrode shall consist of a G.I. plate of dimensions 600 mm x 600 mm x 6.3 mm thick or Copper plate of 600 mm X 600 mm X 3 mm as called for in the Bill of Quantity. The plate electrode shall be buried as far as practicable below permanent moisture level but in any case not less than 3 meters below ground level. Wherever possible, earth electrode shall be located as near the water tap, water drain or a down take pipe as possible. Earth electrode shall be kept clear of the building foundations and in no case shall it be nearer than 2 meters from the outer surface of the wall.

5.3 CONNECTION OF EARTHING CONDUCTORS

5.4 EARTH CONNECTIONS

5.5 PROTECTION FROM CORROSION

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

5.6 ARTIFICIAL TREATMENT OF SOIL

If the earth resistance is too high and the multiple electrode earthing does not give adequate low resistance to earth, as specified in Clause no. 6.12.5.4 then the soil resistivity immediately surrounding the earth electrodes shall be reduced by adding sodium chloride, Calcium chloride, sodium carbonate, copper sulphate, salt and soft coke or charcoal in suitable proportions.

5.7 INSTALLATION

The earth plate shall be set vertically and surrounded with 150 mm thick layer of charcoal dust and salt mixture. A 20 mm dia GI pipe shall run from the top edge of the plate to the ground level. The top of the pipe shall be provided with a funnel and a mesh for watering the earth through the pipe. The funnel over the GI pipe shall be housed in a masonry chamber approximately 300 mm x 300 mm x 300 mm deep. The masonry chamber shall be provided with a cast iron cover resting over a RCC frame. Test facility shall be provided with test links for the earthing station.

5.8 TESTING AND COMMISSIONING

A. Test grounding and bonding system conductors and connections for tightness and proper installation.

Use suitable test instrument to measure resistance to ground of system. Perform testing in accordance with test instrument manufacture's recommendations using fall-of-potential method, with multiple electrodes.

5.8.1 Earthing

There shall be an independent earthing station. The earthing shall consist of an earth tape connected to an independent plate made of copper or G.I. having a conductivity of not less than 100% international standard. All electrical apparatus, cable boxes and sheath/armor clamps shall be connected to the main bar by means of branch earth connections of appropriate size. All joints in the main bar and between main bar and branch bars shall have the lapping surface properly tinned to prevent oxidation. The joints shall be riveted and sweated.

Earth plates shall be burried in a pit of 1.20x1.20M at minimum depth of 3M below ground. The connections between main bar shall be made by means of three 10mm brass studs and fixed at 100mm centers. The pit shall be filled with coke breeze, rock salt and loose soil. A G.I. pipe of 20mm dia with perforations on the periphery shall be placed vertically over the plate to reach ground level for watering.

A brick masonry manhole 30x30x30cm size shall be provided to surround the pipe for inspection. A bolted removable link connecting main bar outside the pit portion leading to the plates shall be accommodated in this manhole for testing.

5.8.2 Control Panels / Starters

Switch board cubicles of approved type shall be fabricated from 16-gauge M.S. sheet with dust and vermin proof construction. It shall be painted with powder-coated finish of approved make and shade. It shall be fitted with suitable etched plastic identification plates for each motor. The cubicle shall comprise of the followings:-

- Incoming main isolation MCCB of required capacity.
- Fully Aluminum taped Bus Bar of required capacity.
- Isolation MCCB one for each motor.
- Fully automatic as specified D.O.L/Star Delta starters suitable for motor H.P. with push buttons one for each motor and on/off indicating neon lamps. (DOL up to 7.5 HP and Star Delta from more than 7.5 H.P)
- Single phase preventer of appropriate rating for each motor.
- Panel type ampere meters one for each motor with selector switch.
- Panel type voltmeter on incoming main with rotary selector switch to read voltage between phase to neutral and phase-to-phase.
- Neon phase indicating lamps for incoming main and on/off indicating lamps for each motor.
- Rotary switch for manual or auto operation for each pump (manual/auto off).
- Fully taped separate aluminum bus bars of required capacity and with required outlets.
- Space for liquid level controllers as specified + 1 extra space.
- The panel shall be pre-wired with color-coded wiring. All interconnecting wiring from incoming main to switch gear, meters and accessories within the switchboard panel.
- Provision of main incoming cables from the top of the panel.

All switch gears and accessories shall be of approved make such as “Siemens, Larsen & Toubro” or equivalent.

Switchboard cubicles shall be floor or wall mounted type as recommended by manufacturers. All floor-mounted switchboards shall rest on minimum 225mm high platform. The contractor shall provide the shop drawings for base and panels.

D. **MEDIUM VOLTAGE SWITCHGEAR: -**

1. GENERAL

This section covers specification of Medium Voltage Switchboards incorporating items of switchgear like Air Circuit Breakers, MCCB, MCB, metering and protection

2. STANDARDS AND CODES

The following Indian Standard Specifications and Codes of Practice will apply to the equipment and the work covered by the scope of this contract. In addition, the relevant clauses of the Electricity Act 2003 and Indian Electricity Rules 1956 as amended up to date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable.

BIS certified equipment shall be used as a part of the Contract in line with Government regulations. Necessary test certificates in support of the certification shall be submitted prior to supply of the equipment.

It is to be noted that updated and current Standards shall be applicable irrespective of those listed below.

Low Voltage switchgear & control gear IS 60947: 1993

Part I : General rules

Part II : Circuit Breakers

Part III : Switches, disconnectors, switch disconnectors and fuse combination units

Part IV : Contactors and Motor starters

Part V : Control circuit devices and switching elements

Marking of Switchgear bus bars IS 11353: 1985

Degree of Protection of Enclosures for low voltage switchgear. IS 2147: 1962

Electrical relays for power system protection IS 3231: 1986

Code of Practice for selection, installation and Maintenance

Of switchgear & control gear IS 10118: 1982

Low voltage switchgear & control gear assemblies IS 8623: 1993

3. EARTHING

The frame of the Circuit Breaker shall be positively earthed when the Circuit Breaker is racked into the cubicle.

4. MOULDED CASE CIRCUIT BREAKERS

MCCBs should be current limiting type with trip time of less than 10 msec under short circuit conditions. The MCCB should be either 3 or 4 poles as specified in BOQ.

MCCB shall comply with the requirements of the relevant standards IS/ IEC60947 – Part 2 and should have test certificates for breaking capacities from independent test authorities CPRI / ERDA/ any NABL accredited lab.

MCCB shall comprise of Quick Make -break switching mechanism, arc extinguishing device and the tripping unit shall be contained in a compact, high strength, heat resistant, flame retardant, insulating moulded case with high withstand capability against thermal and mechanical stresses.

The breaking capacity of MCCB shall be minimum 35 KA or as specified in drawings/schedule of quantities. The rated service breaking capacity should be equal to rated ultimate breaking capacities (Ics=Icu) at 415V AC. The rated operational voltage shall be minimum 415V AC. Rated insulation voltage (Ui): 690V AC and rated Impulse voltage 8 KV.

All MCCBs in Main LT/DG panels and at incomer level of other panels shall be provided with Microprocessor based release having inbuilt adjustable protections Over Load (L), Short Circuit (S) and Ground Faults (G). MCCBs at outgoing level should be provided with Thermal Magnetic type release with adjustable settings for Overload and fixed short circuit protections.

All MCCBs should be provided with the Rotary Operating Mechanism. All rotary mechanism should be with door interlock (with defeat feature) & padlock facility.

MCCB above 63A rating should be provided with Copper spreader links and phase barriers as standard feature

MCCB should have superior quality of engineering grade plastics used for insulation purpose and conform to glow wire test (Ref: IEC60695-2-1)

MCCBs shall be provided with following accessories, if specified in drawings/schedule of quantities

Under voltage trip

Shunt trip

Auxiliary and trip alarm contact

For Motor application, motor duty MCCBs (as SCPD) to be selected with reference to Type 2 coordination chart of manufacturer.

5. POWER CONTRACTOR

The contactors shall comply with the requirements of IEC 60947-4-1/ IS13947 – Part 4-1. Contactors for motor application should be of 3 Pole AC3 duty as specified in standards.

Main contacts of contactors shall be silver plated copper. Coil insulation should be of class H to withstand the higher temperature rise. Spare contact kits & spare coils replacement should be possible for the entire range for maintenance. The maintenance

of contactors and replacement of spare kits should be possible with disturbing bus bar / cable termination.

The contactor should be having front and rear parts are in thermoplastics for rugged construction.

The contactor should confirm to glow wire tests as per IEC 60695-2-1 with superior quality of engineering grade plastic used for insulation purpose.Complete range should be suitable for AL termination.

Contactors should have the possibility of having finger proof structure safety feature.

6. THERMAL OVERLOAD RELAY

Thermal Overload Relay used in the circuit with contactor shall be in conformity with IS: 842 part 2-1966 and it shall withstand insulation test to IS: 12083 part 2. The relay shall be provided with adjustable current settings and with a provision of sealing the same to make it tamper proof.

The relay shall have built in single phasing protection and over load protection as per IEC60947- part 4. The relay shall have in built NO & NC contact. The thermal over load relay shall be suitable for Copper / Aluminum termination, with a maximum permissible temperature rise of 65°C, at the terminals, with maximum ambient temperature of 45°C.

For MCC Panels / motor feeders published Type II coordination chart of reputed manufacturers should be followed.

7. CURRENT TRANSFORMER

CTs shall confirm to IS in all respects. All CTs used for medium voltage application shall be rated for 1 kV. CTs shall have rated primary current, rated burden and class of accuracy as specified in schedule of quantities/drawings. Rated secondary current shall be 5A unless otherwise stated. Minimum acceptable class for measurement shall be class 0.5 to 1 and for protection class 10. CTs shall be capable of withstanding magnetic and thermal stresses due to short circuit faults of 31 MVA on medium voltage. Terminals of CTs shall be paired permanently for easy identification of poles. CTs shall be provided with earthing terminals for earthing chassis, frame work and fixed part of metal casing (if any). Each CT shall be provided with rating plate indicating:

Name and make

Serial number

Transformation ratio

Rated burden

Rated voltage

Accuracy class

CTs shall be mounded such that they are easily accessible for inspection, maintenance and replacement. Wiring for CT shall be with copper conductor PVC insulated wires

with proper termination works and wiring shall be bunched with cable straps and fixed to the panel structure in a neat manner.

8. POTENTIAL TRANSFORMER

PTs shall confirm to IS 3156 (Part-I, II and III) in all respects.

9. MEASURING TRANSFORMER

Direct reading electrical instruments shall conform to IS 1248 or in all respects. Accuracy of direct reading shall be 1.0 of voltmeter and 1.5 for ammeters. Other instruments shall have accuracy of 1.5. Meters shall be suitable for continuous operation between -10o C and +500C. Meters shall be flush mounting and shall be enclosed in dust tight housing. The housing shall be of steel or phenolic mould. Design and manufacture of meters shall ensure prevention of fogging of instrument glass. Pointer shall be black in colour and shall have Zero position adjustment device operable from out side. Direction of deflection shall be from left to right. Selector switches shall be provided for ammeters and volt meters used in three phase system.

10. ENERGY & REACTIVE POWER METER

Trivector meters shall be two element, integrating type, KWH, KVA, KVA hour reactive meters. Meters shall confirm to IEC 170 in all respects. Energy meters, KVA, and KVARH meters shall be provided with integrating registers. The registers shall be able to record energy conception of 500 hours corresponding to maximum current at rated voltage and unity power factor. Meters shall be suitable for operation with current and potential transformers available in the panel.

11. PROTECTION RELAYS

Protection relays shall be provided with flag type indicators to indicate cause of tripping. Flag indicators shall remain in position till they are reset by hand reset. Relays shall be designed to make or break the normal circuit current with which they are associated. Relay contacts shall be of silver or platinum alloy and shall be designed to withstand repeated operation without damage. Relays shall be of draw out type to facilitate testing and maintenance. Draw out case shall be dust tight. Relays shall be capable of disconnecting faulty section of network without causing interruption to remaining sections. Analysis of setting shall be made considering relay errors, pickup and overshoot errors and shall be submitted to Project Manager for approval.

12. OVER CURRENT & EARTH FAULT RELAYS

Three Phase Numerical 3 over Current + 1 Earth Fault relay with highest protection for both Over current and Earth Fault, Draw out type relay with internal CT shorting links and following features:

Digit seven segment LED display

Selectable Trip time characteristics like Normal Inverse (NI), Very Inverse Extremely Inverse (EI), and Definite Time (DT) etc

CT secondary 1/ 5 A site selectable through menu operations.

4. Relay Settings:

Over Current - 0.2 to 2.0 times In, in steps of 0.05In

High set Over Current [Ihs] - 0.2 to 40 times In, in steps of 0.2 In or Disable

Earth Fault - 0.05 to 0.8 times On in steps of 0.05 On

High set Earth fault - 0.1 to 20 times On in steps of 0.1 On or Disable

Time Multiplier 0.1 to 1.6 in steps of 0.05 (independent settings for O/C & E/F modes)

Separate LED indications for Power ON, Trip status for R, Y, B & E (These LEDs blink when input crosses set point and become steady on when relay has tripped. LEDs have to be manually reset)

Output contacts: 4 NO contacts for trip signal on feeder fault.

Actual Measurement and display - RYB current and zero sequence current

13. OVER/ UNDER VOLTAGE RELAY

Over Voltage/Under Voltage Relay should be microcontroller based single-phase voltage relay suitable for Over voltage/ Under voltage protection schemes in LV, MV and HV Power distribution systems, generators, Synchronous motor, Induction motors, automatic change over schemes etc.

The relay shall have the following features

Two change over contact for tripping

Less Burden at PT & Auxiliary supply

Selectable Trip time characteristics

Selectable Voltage level on site

Separate LED indications for Power On, Over Voltage, Under Voltage Trip status, Trip time current Characteristics

14. **CONTROL PANEL**

The panel shall be provided with necessary MCCB's, contactors, automatic required steps relays with associated CT's and power factor meter, indicating lamps, push buttons etc. Capacitors shall also be housed in the same panel. The panel shall be free standing type, dead front cubicle and shall be constructed from 2 mm thick sheet steel. The degree of protection shall be IP 52. This panel shall be integrated with the main L.T. panel unless specified otherwise.

E. DISTRIBUTION PANEL

1. GENERAL

Sub Distribution Board shall be metal clad totally enclosed, rigid, floor mounting, air insulated, cubicle type for use on 415 volts, 3 phase, 50 cycle system. Equipment shall be designed for operation in high ambient temperature and high humidity tropical atmospheric conditions.

2. STANDARDS

The equipment shall be designed to conform to the requirements of:

IS 8623 – Factory Built Assemblies of switchgear and control gear.

IS 4237 – General requirements for switchgear and control gear for voltages not exceeding 1000 volts.

IS 2147 – Degrees of protection provided by enclosures for low voltage switchgear and control gear.

IS 375 – Marking and arrangement of bus bars.

Individual equipment housed in the sub distribution boards shall conform to the following IS specifications:

a)	Moulded Case Circuit Breakers	-	IS: 13947-2/IEC 947-2
b)	Miniature Circuit Breaker	-	IEC - 60898
c)	Contractors	-	IEC – 947-4-1, IS 13947-4-1
d)	Current Transformers	-	IS: 2705
e)	Indicating Instruments (Analogue)	-	IS: 1248,
f)	Indicating Instruments (Digital)	-	IS: 13875
g)	Integrating Instruments (Analogue)	-	IS: 722, IS: 13779-1999
h)	Integrating Instruments (Digital)	-	IS: 13779- 1999, IS: 14697
i)	HRC fuse links	-	IS: 13703 / IEC 269

3. SUBMITTALS

Shop Drawings and Technical Data-

The tenderer shall furnish relevant technical data of switchgears and associated equipment along with the offer.

The Contractor shall furnish relevant descriptive and illustrative literature on switchgears and associated equipment and the following for approval before manufacture of the panel.

a) Complete assembly drawings of the panel showing plan, elevation and typical section views and locations of cable boxes, bus bar chamber, metering compartment and terminal blocks for external wiring connections.

b) Typical and recommended schematic diagrams and control wiring.

c) Foundation plan showing location of foundation channels, anchor bolts and anchors, floor plans and openings for cables etc.

d) All drawings and data shall be in English.

4. CONSTRUCTIONS

Distribution boards shall be metal enclosed, indoor, floor mounted free standing and/or wall mounted type made up of the required vertical section, which when coupled together shall form continuous dead front. Distribution boards shall be dust and damp protected, the degree of protection being no less than IP: 54 to IS:2147. Sub distribution boards shall be fabricated with a framed structure with rolled/folded sheet steel channel section of Sheet steel shroud and partitions shall be of minimum 2mm thickness, doors and covers shall also be of 2mm thickness. All panel doors shall be pad lockable type. All sheet steel work forming the exterior of sub distribution boards shall be smoothly finished, leveled and free from flaws. The corners to be rounded. Front and rear doors to be fitted with dust proof including neoprene gasket with fasteners designed to ensure proper compression of the gaskets. When covers are provided in place of doors, generous overlap shall be ensured between sheet steel surfaces with closely spaced fasteners to preclude the entry of dust.

Following minimum clearance to be maintained after taking into account connecting bolts, clamps etc.

i) Between Phases - 32mm

ii) Between Phases and neutral - 26mm

iii) Between Phases and earth - 26mm

iv) Between Neutral & earth - 26mm

All insulating, materials used in the construction of the equipment shall be of non hygroscopic materials, duly treated to withstand the effect of high humidity, high temperatures, tropical ambient service conditions. SMC (Sheet Moulded Compound) supports & shrouds shall be used.

Functional units such as moulded case circuit breakers shall be arranged in multi-tier formation. The design of the sub distribution boards shall be such that each MCCB unit shall be fully compartmentalized.

Insulated barriers shall be provided with vertical section and between adjacent section to ensure prevention of accidental contact with main bus bars and vertical risers during operation, inspection or maintenance of functional units. All doors/covers providing access to live power equipment/circuits shall be provided with tool operated fastness to prevent unauthorized access. Sub distribution boards shall be so constructed that the cable alley shall be sufficient enough to accommodate all the outgoing and incoming cables.

For each cable alley, there shall be separate cable gland plate of detachable type at the bottom and/or top of the panel as required. Gland plate shall be 3 mm thick.

A base frame made out of 75mm x 40mm x 5.0mm M.S. Channel to be provided.

5. METAL TREATMENT AND FINISH

All metal work used in the construction of the sub distribution boards should have under gone a rigorous metal treatment process as follows:

a) Effective cleaning by hot non alkaline degreasing solution followed by cold water rinsing to remove traces of alkaline solution

b) Picking in dilute sulphuric acid to remove oxide scales & rust formation, if any, followed by cold water rinsing to remove traces of acidic solution.

c) A recognized phosphating process to facilitate durable coating of the paint on the metal surfaces and also to prevent the spread of rusting in the event of the paint film being mechanically damaged. This again, shall be followed by hot water rinsing to remove traces of phosphate solution.

d) Passivating in de-oxalite solution to retain and augment the effects of phosphating.

e) Drying with compressed air in a dust free atmosphere.

f) A finishing coat of powder coating of Siemens grey colour and thickness of powder coating shall not be less than 50 micron.

6. BUS BARS

The bus bars shall be air insulated and made of high conductivity, high strength Aluminium complying with the requirement of grade E-91E.

The bus bars shall be suitably braced with non-hygroscopic SMC supports to provide a through fault withstand capacity of 35KA RMS symmetrical for one second or as specified in BOQ/Drawing and a peak short circuit with stand capacity of 105 KA.

The neutral as well as the earth bar should be capable of withstanding the above level. Ridges shall be provided on the SMC supports to prevent tracking between adjacent bus bars. Large clearances and creepage distance shall be provided on the bus bar system to minimize the possibility of fault. The main phase bus bars shall have continues current rating throughout the length of the panel. The cross section of neutral bus bars shall be same as that of the phase bus bar for bus bars of capacity up to 250 Amp; for higher capacities, the neutral bus bar shall not be less than half (50%) the cross section of that of the phase bus bars. Connections from the main bus bars to functional circuits shall be so arranged and supported to withstand without any damage or deformation the thermal and dynamic stresses due to short circuit currents. Bus bars shall be colour coded with PVC heat shrinkable sleeves.

The sub distribution boards shall be designed that the cables are not directly terminated on the terminals of MCCB etc. but are terminated on cable termination links. Capacity of aluminium bus bars shall be considered as 0.8 Amp per sq. mm of cross section area of the bus bars.

7. MEASURING INSTRUMENTS, FOR METERING: -

GENERAL

Direct reading electrical instruments shall be in conforming to IS 1248. The accuracy of direct reading shall be 1.0 for voltmeter and 1.5 for ammeters. Other type of instruments direct reading shall be 1.0 for voltmeter and 1.5 for ammeters. Other type of instruments shall have accuracy of 1.5. The errors due to variations in temperature shall be limited to a minimum. The meter shall be of flush mounting type of 96mm square pattern. The meter shall be enclosed in a dust tight housing. The housing shall be of steel or phenolic mould. The design and manufacture of the meters shall ensure the prevention of fogging of instruments glass. Instruments meters shall be sealed in such a way that access to the measuring element and to the accessories with in the case shall not be possible without removal of the seal. The meters shall be provided with white dials and black scale markings.

The pointer shall be black in colour and shall have zero position adjustment device which could be operated from outside. The direction of deflection shall be from left to right.

Suitable selector switches shall be provided for all ammeters and voltmeters intended to be used on three phase supply.

The specifications herein-after laid down shall also cover all the meters, instrument and protective devices required for the electrical works. The ratings, type and quantity of meters, instruments and protective devices shall be as per the bill of quantities.

8. DIGITAL AMMETERS

Digital Ammeters shall be confirmed to IS: 13875. It shall be digital type 7 segment LED display. Ammeter shall be suitable for accuracy class 1.0 and burden 0.2 VA approx. The ammeters shall be capable of carrying sustained overloads during fault conditions without damage or loss of accuracy. The meter shall be suitable for working in ambient temp 0 degree to 50 degree and 95% humidity condition.

9. DIGITAL VOLTMETERS

Digital Voltmeters shall be confirmed to IS: 13875. It shall be digital type 7 segment LED display. Voltmeter shall be suitable for accuracy class 1.0 and burden 0.2 VA approx. The range for 3 phase voltmeters shall be 0 to 500 volts. The meter shall be suitable for working in ambient temp 0 degree to 50 degree and 95% humidity condition. The voltmeter shall be provided with protection MCB of suitable capacity.

10. CURRENT TRANSFORMERS

Current transformers shall be in conformity with IS: 2705 (Part I, II & III) in all respects. All current transformers used for medium voltage applications shall be rated for 1KV Current transformers shall have rated primary current, rated burden and class of accuracy as required. However, the rated secondary current shall be 5A unless otherwise specified. The acceptable minimum class of various applications shall be as given below.

Measuring : Class 1.0

Protection : Class 5 P10

Current transformers shall be capable of withstanding without damage, magnetic and thermal stresses due to short circuit fault of 50KA on medium voltage system. Terminals

of the current transformer shall be marked permanently for easy identification of poles. Separate CT shall be provided for measuring instruments and protection relays. Each C.T. shall be provided with rating plate.

Current transformers shall be mounted such that they are easily accessible for inspection, maintenance and replacement. The wiring for CT's shall be copper conductor, PVC insulated wires with proper termination lugs and wiring shall be bunched with cable straps and fixed to the panel structure in a neat manner.

11. CONTROL SWITCHES-

Control switches shall be of the heavy duty rotary type with escutcheon plates clearly marked to show the operating position. They shall be semi-flush mounting with only the front plate and operating handle projecting.

Indicating lamps shall be of the LED type, and with translucent lamps covers. Bulbs & lenses shall be easily replaced from the front.

Push buttons shall be on the momentary contact, push to actuate type fitted with self reset contacts & provided with integral escutcheon plates marked with its functions.

12. CABLE TERMINATIONS-

Cable entries and terminals shall be provided in the sub distribution boards to suit the number, type and size of aluminium conductor power cable and copper conductor control cable specified.

Provision shall be made for top or bottom entry of cables as required. Generous size of cabling chambers shall be provided, with the position of cable gland and terminals such that cables can be easily and safely terminated. Cable glands shall be brass compression type, barriers or shrouds shall be provided to permit safe working at the terminals of one circuit without accidentally touching that of another live circuit.

Cable risers shall be adequately supported to withstand the effects of rated short circuit currents without damage and without causing secondary faults.

13. CONTROL WIRING-

All control wirings shall be carried out with 1100V grade single core FRLS cable conforming to IS 694/IS 8130 having stranded copper conductors of minimum 1.5 sq. mm for potential circuits and 2.5 sq. mm for current transformer circuits. Wiring shall be neatly bunched, adequately supported and properly routed to allow for easy access and maintenance. Wiring shall be identified by numbering ferrules at each end. All control fuses shall be mounted in front of the panel and shall be easily accessible.

14. TERMINAL BLOCK-

Terminal blocks shall be 500 Volts grade of the stud type. Insulating barriers shall be provided between adjacent terminals. Terminals block shall have a minimum current rating of 10 Amps and shall be shrouded. Provisions shall be made for label inscriptions.

15. LABELS-

Labels shall be of anodized aluminium, with white engraving on black background. They shall be properly secured with fasteners.

16. TESTING AT MANUFACTURING WORK-

All routine tests specified is IS: 8623-1977 shall be carried out and test certificates submitted to the Engineer – in –Charge.

17. TESTING AND COMMISSIONING-

Commissioning checks and tests shall be included all wiring checks and checking up of connections. Primary/secondary injection tests for the relays adjustment/setting shall be done before commissioning in addition to routine meggar test. Checks and tests shall include the following:

a) Operation checks and lubrication of all moving parts.

b) Interlocking function check

c) Insulation test: When measured with 500 V meggar, the insulation resistance shall not be less than 100 mega ohms.

d) Trip tests & protection gear test.

Note:

1. The Contractor shall make a detailed submittal with catalogues and highlighted proposed specifications, as well as full details of the works executed by the specialized agency, as specified.
2. In case of non-availability of the brand specified in the contract the Contractor shall approach Engineer-in-charge to acquiring alternate equivalent brand of the material subject to submission of documentary evidence of non-availability of the specified brand. No claim on this account shall be entertained.

1. The supplied wires/cables should comply with relevant parts of standard for dimensions, strength and thickness of wire/cables component.
2. The supplied wires/cables should comply with relevant parts of IS standard for Fire retardant properties.
3. The PVC pipes/conduits to be used in conduits for wiring may comply with relevant parts of IS
4. The plugs, sockets and switches shall comply with relevant parts of IS
5. The accessories used in switches sockets shall comply with relevant parts of IS
6. MCBDBs supplied and fixed shall comply with relevant parts of IS.
7. Any other material used must in wiring shall comply with the relevant IS Standard.

NOTE: The firm needs to submit Test Certificates as per above mentioned IS standards for wires/cables, pipes, DBs, MCBs, switch, sockets, accessories etc.

F. TECHNICAL SPECIFICATIONS for HVAC duct

7.1	The scope of work shall cover Design, supply, installation, testing and commissioning of HVAC ducting works at Ground floor Area in Bank's Main office building, Kolkata "as detailed under this specification and as provided in the bill of materials/schedule of quantities.
7.1.1	**CODES AND STANDARDS**
	The design, materials, manufacture, inspection, testing and performance of HVAC System shall comply with all currently applicable statues, regulations, codes and standards in the locality where the equipment is to be installed. Nothing in this specification shall be construed to relieve the Bidder of this responsibility. Where ever codes or standard are not mentioned, CPWD standard shall be followed. If there is any difference of code as mentioned with relating to the work, the standard applicable ISI code shall be followed.
7.1.2	**HVAC Ducting Work**
	The duct work shall be fabricated out of galvanized steel sheet (GSS), class VIII conforming to IS (revised & amended till date). The fabrication of duct shall strictly conform to IS as amended up to date. The thickness of the sheet for fabrication of rectangular duct work shall be as under:

Maximum side mm	Thickness of sheet mm	Type of transverse joint connections	Bracing (if any)	Size of supports (hanging rods)
1	2	3	4	5
Up to 400	0.63	25mm GSSflanges	None	10 mm
401 to 800	0.63	25 x 25 x 3mm MS angleflanges	25 x 25 x 3mm MS angle at 1.2m	10 mm

801 to 1500	0.8	40 x 40 x 3mm MS angleflanges	40 x 40 x 3mm MS angle at 1.2m	12 mm
1501 to 2250	1.00	50 x 50 x 6mm MS angleflanges	40 x 40 x 3mm MS angle flanges	16 mm
2251 and above	1.25	50 x 50 x 6mm MS angleflanges	40 x 40 x 3mm MS angle flanges	16 mm

2) Construction of Ducts

The following points should be also considered while fabrication of ducts.

i. All ducts shall be fabricated and installed in workman like manner, generally confirming to the relevant IS code (**revised & amended till date**).

ii. Ducts shall be straight and smooth on the inside with neatly finished joints. Joints shall be made airtight. The rubber gasket shall be installed between duct flanges in all connections and joints.

iii. Changes in dimensions and shape of ducts shall be gradual. Air turns shall be installed with vanes, arranged to permit the air to make the turn without appreciable turbulence. All branches take offs and collars shall be provided with turning vanes. All flanges and supports should be primer coated on all surfaces before erection and painted with aluminum paint thereafter.

iv. All ducts shall be supported from the ceiling/slab by means of MS rods of required dia. as per IS standard (mentioned in above table) with M.S angle at the bottom. The ducts may be suspended from the ceiling with the help of dash fasteners.

v. All ducts shall be rigid and shall be adequately supported and braced where required with standing seams, tees or angles, of ample size to keep the ducts true to shape and to prevent buckling, vibration and breaking. Ducts up to 610 mm width shall have a minimum of 40X40X3 mm angle support and ducts larger than this shall have 50X50X6mm angle support.

vi. All ducts shall be totally free from vibration under all conditions of operation. Whenever duct work is connected to AHUs that may cause vibrations in the

	ducts, ducts shall be provided with fire resistant flexible double canvas connection of minimum 150mm long securely bonded and bolted on both sides. vii) All nuts, bolts and washers shall be zinc plated steel. All rivets shall be galvanized or shall be made of magnesium - aluminum alloy. Self-tapping screws shall not be used. viii) Ducts shall be fabricated at site or factory fabricated and shall be generally as per IS code of practice "Specifications for metal air ducts", unless otherwise deviated in these General Specifications ix) The interior surfaces of the ducting shall be smooth. x) All the ducts up to 600 mm longest side shall be cross broken between flanges by a single continuous breaking. Ducts of size 600 mm and above shall be cross broken by single continuous breaking between flanges and bracings. Alternatively, beading at 300 mm centers for ducts up to 600 mm longest side, and 300 mm centers for ducts above 600 mm size shall be provided for stiffening. xi) As far as possible, long radius elbows and gradual changes in shape shall be used to maintain uniform velocity accompanied by decreased turbulence, lower resistance and minimum noise. The ratio of the size of the duct to the radius of the elbow shall be normally not less than 1:1.5. xii) Flanged joints shall be used at intervals not exceeding 2500 mm. Flanges shall be welded at corners first and then riveted to the duct. xiii) Stiffening angles shall be fixed to the sides of the ducts by riveting at 1.25 meters from joints for ducts of size 600 mm to 1500 mm, and 0.6 mm from joints for ducts of size larger than 1500 mm. Bracings for ducts larger than 1500 mm can alternatively be by diagonal angles. xiv) Plenums for filters shall be complete with suitable access door of size 450 mm x 450 mm. xv) All factory fabricated duct shall be supplied in L sections; the length of any piece shall not be more than 1800 mm for duct with longest side of cross section as 600 mm and above and 3000 mm for rest.

3) Air Outlet and Inlets (Supply and Return)

i) All air outlets and intakes shall be made of extruded aluminum sections & shall present a neat appearance and shall be rigid with mechanical joints.

ii) square and rectangular wall outlets shall have a flanged frame with the outside edges returned or curved 5 to 7 mm and fitted with a suitable flexible gasket between the concealed face of the flanges and the finished wall face. The core of supply air register shall have adjustable front louvers parallel to the longer side to give up to 22.5 degrees vertical deflection and adjustable back louvers parallel to the shorter side to achieve a horizontal spread air pattern to at least 45 degrees. Return air grilles shall have only front louvers. The outer framework of the grilles shall be made of not less than 1.0 mm thick aluminum sheet. The louvers shall be of aerofoil design of extruded aluminum section with minimum thickness of 0.8mm at front and shall be made of 0.8mm thick aluminum sheet. Louvers may be spaced 18 mm apart.

iii) Square and rectangular ceiling outlets/intakes shall have a flange flush with the ceiling into which it is fitted or shall be of anti-smudge type. The outlets shall comprise an outer shell with duct collar and removable diffusing assembly. These shall be suitable for discharge in one or more directions as required. The outer shell shall not be less than 1.0 mm thick extruded section aluminum sheet. The diffuser assembly shall not be less than 0.80 mm thick extruded aluminum section.

iv) Circular ceiling outlets/intakes shall have either flush or anti smudge outer cone as specified in the tender specifications. Flush outer cones shall have the lower edge of the cone not more than 5 mm below the underside of the finished ceiling into which it is fitted. Anti-smudge cones shall have the outer cone profile designed to reduce dirt deposit 104 on the ceiling adjacent to the air outlet. The metal sheet used for construction of these shall be minimum 1.0 mm thick extruded aluminum sheet.

v) Linear diffusers shall have a flanged frame with the outside edges returned 3.5 mm and shall have one to four slots as required. The air quantity through each slot shall be adjustable. The metal sheet used for the construction of these shall

	be minimum 1.0 mm thick extruded aluminum sheet. vi) Grilles and diffusers constructed of extruded aluminium sections shall have grille bars set straight or deflected as required. These shall be assembled by mechanical interlocking of components to prevent distortion. These grilles and diffusers shall have a rear set of adjustable blades, perpendicular to the face blades for deflection purposes. vii) All supply air outlets shall be fitted with a volume control device, made of extruded aluminum gate section. The blades of the device shall be mill finish/ block shade pivoted on nylon brushes to avoid rusting & rattling noise, which shall be located immediately behind the outlet and shall be fully adjustable from within the occupied space without removing any access panel. The volume control device for circular outlets shall be opposed blade radial /shutter type dampers, or two or more butterfly dampers in conjunction with equalizing grid. Opposed blade dampers shall be used for square and rectangular ceiling/wall outlets and intakes. viii) All the products supplied by contractor should supplement in performance by selection curves of product ratings from the manufacturer. ix) Laminar supply air diffusers shall be made of 2mm thick powder coated aluminum sheet duly insulated with 5mm thick closed cell polyethylene foam insulation having factory laminated aluminum foil and joints covered with self-adhesive aluminum tape and having holes 2/3 mm dia including framework. **4) Fresh Air Intakes** i) Fresh air intake grills shall be made of extruded aluminium sections. ii) A flanged frame using RS sections shall be provided on front face to conceal the gap between the louvers and the adjoining wall face. Corners of frame shall be welded. The frame shall be made structurally rigid. iii) Louvers made from extruded aluminum section shall be in modular panel form for ease of handling. These shall be free from waves and buckles. Vertical blades shall be truly vertical and horizontal blades shall be truly horizontal. Butt joints in blades shall not be accepted. iv) Additional intermediate equally spaced supports and stiffeners shall be provided

to prevent sagging/ vibrating of the louvers, at not more than 750mm centers where the louver's length is longer than 750mm.

v) A bird wire screen made of 12 mm mesh in 1.6 mm steel wire held in angle or channel frame shall be fixed to the rear face of the louver frame by screens.

5) Air Outlets and Inlets

i) The locations of the air outlets and intakes shall be shown in the tender drawings and necessary openings and the wooden framework for fixing the grilles shall be provided by the air conditioning contractor. The location of these outlets/ inlets is subject to change and the approval of the Engineer-in-Charge shall be obtained before finally fixing the grilles/diffusers in position.

ii) In installing fresh air intakes, no fixing device shall be visible from the face of the frame. Where louvers are to be fixed in masonry or concrete, fixing shall be with either expanding plugs or raw plugs. Where the louvers are to be fixed in steel or wood, non-ferrous screws or bolts shall be used.

iii) Supply air outlets and return air intakes shall be anodized/ powder coated aluminum to the desired colour to match the surroundings wall/ceiling. The fresh air intakes shall be anodized/ powder coated aluminum as approved by the Engineer-in-Charge. The paint colour shall be approved by the Engineer-in-Charge.

iv) All damages to the finish of the structure during the installation work shall be made good by the air-conditioning contractor before handing over the installation to the Department.

6) BALANCING

Air systems shall be balanced in a manner to minimize throttling losses. The entire air distribution system shall be balanced with the help of an anemometer. The measured air quantities at fan discharge and at the various outlets shall be within + 5 percent of those specified/quoted. For fans greater than 0.75 KW (1.0 HP), fans must then be adjusted to meet design flow conditions. Branch duct adjustments shall be permanently marked after the air balancing is completed so that these can be restored to their correct position if disturbed at any time.

7) MODE of MEASUREMENT

The following measurement code shall apply to the Contract:

A. Sheet Metal work:

i) Duct measurements (for insulated ducts) shall be taken before application of insulation. The final finished sheet area shall be measured in sq. mtrs only

ii) Duct work shall be measured section wise on the basis of external surface area by multiplying the axial length from flange face to flange face for each section by the corresponding duct perimeter in the center of that section length.

iii) Uniformly tapering straight sections shall also be measured as in (ii) above. However, for special pieces like tees, bends etc. area computations for surface areas shall be done as per the shape of such pieces.

iv) The quoted unit rate for external surfaces of ducts shall include all wastage allowances, flanges, gaskets for joints, vibration isolators, bracings, hangers and supports, inspection chambers/access panels, splitter dampers with quadrants and levers for position indication, turning vanes, straightening vanes, and all other accessories required to complete the duct installation as per the specifications. These accessories shall not be separately measured.

v) Grilles and diffusers (except linear diffusers) shall be measured by the cross-sectional areas, perpendicular to the airflow, and excluding the flanges. Volume control dampers, where provided shall not be separately accounted for.

vi) Linear diffusers shall be measured by linear measurements only, and not by cross-sectional areas, and shall exclude flanges for mounting of the linear diffusers. The supply air plenum for linear diffusers shall be measured as described above for ducting.

vii) Fire dampers shall be measured by their cross-sectional area perpendicular to the direction of the airflow. Quoted rates shall include the necessary collars and flanges for mounting, inspection pieces with access door, fusible link/solenoid with wiring, but excluding the fire detectors, etc.

viii) Vanes, splitters, flanges, access doors etc. shall not be separately measured. These shall be treated as part of duct work.

	ix) Bends, Elbows, Transformation, pieces etc. shall be measured along the centre line and measured as per duct work. x) Canvas connections, Duct Supports, stiffening members, frames etc. shall not be measured separately and shall form part of duct work. **B. GRILLS / DIFFUSERS / FIRE DAMPERS** All Grills / Diffusers / Fire Damper areas will be measured in terms of effective area (Neck Area). Any Extruded aluminium grill / diffusers having an area less than 0.1 sq.mt shall be accounted as 0.1 sq.mt. **C. BOX DAMPERS** i) No separate measurement of box dampers shall be done since they form part of duct. ii) Fresh air dampers shall be measured as effective areas only. No separate measurements for bird screen inlet / outlet louvers shall be done. **D. Insulation of Duct** i) This shall be measured on the basis of bare duct surface area i.e.; the area of duct insulation & area of duct shall be same.
7.1.3	**Thermal insulation on ducts:**
	The insulation material shall be chemically cross-linked **closed cell** polyethylene FRXPE fire retardant grade laminated with aluminum foil using Pidilite make SSR 998 adhesive liquid. The material should be free from ozone depleting substances (CFC/HCFC).
7.1.4	**Acoustic lining/insulation on duct plenum:**
	Supply and provision of internal duct acoustic lining/insulation with 25 mm thick **open cell** nitrile rubber foam of 140 to 180 kg/m^3 density, Class 1 fire rating, thermal conductivity 0.045w/m°k at 0°C fixed inside surface of ducts with necessary fixing materials i.e., adhesive etc., It should have antimicrobial properties.

1.2 MATERIAL

1.2.1 Ducts

i) All ducts shall be fabricated either from Galvanized Sheet Steel (GSS) conforming to IS.

1.3 CONSTRUCTION

1.3.1 Ducts

i) Ducts shall be fabricated at site or factory fabricated and shall be generally as per IS: 655 "Specifications for metal air ducts", unless otherwise deviated in these General Specifications.

ii) The interior surfaces of the ducting shall be smooth.

iii) All the ducts upto 600 mm longest side shall be cross broken between flanges by a single continuous breaking. Ducts of size 600 mm and above shall be cross broken by single continuous breaking between flanges and bracings. Alternatively, beading at 300 mm centres for ducts upto 600 mm longest side, and 300 mm centres for ducts above 600 mm size shall be provided for stiffening.

iv) As far as possible, long radius elbows and gradual changes in shape shall be used to maintain uniform velocity accompanied by decreased turbulence, lower resistance and minimum noise. The ratio of the size of the duct to the radius of the elbow shall be normally not less than 1:1.5.

v) Flanged joints shall be used at intervals not exceeding 2500 mm. Flanges shall be welded at corners first and then riveted to the duct.

vi) Stiffening angles shall be fixed to the sides of the ducts by riveting at 1.25 meters from joints for ducts of size 600 mm to 1500 mm, and 0.6 mm from joints for ducts of size larger than 1500 mm. Bracings for ducts larger than 1500 mm can alternatively be by diagonal angles.

i) Plenums for filters shall be complete with suitable access door of size 450 mm x 450 mm.

viii) All factory fabricated duct shall be supplied in L sections, the length of any piece shall not be more than 1800 mm for duct with longest side of cross section as 600 mm and above and 3000 mm for rest.

1.3.2 Air Outlet and Inlets (Supply and Return)

i) All air outlets and intakes shall be made of extruded aluminium sections & shall present a neat appearance and shall be rigid with mechanical joints.

ii) Square and rectangular wall outlets shall have a flanged frame with the outside edges returned or curved 5 to 7 mm and fitted with a suitable flexible gasket between the concealed face of the flanges and the finished wall face. The core of supply air register shall have adjustable front louvers parallel to the longer side to give upto 22.5 degrees vertical deflection and adjustable back louvers parallel to the shorter side to achieve a horizontal spread air pattern to at least 45 degrees. Return air grilles shall have only front louvers. The outer framework of the grilles shall be made of not less than 1.6 mm thick aluminum sheet. The louvers shall be of aerofoil design of extruded aluminum section with minimum

thickness of 0.8mm at front and shall be made of 0.8mm thick aluminum sheet. Louvers may be spaced 18 mm apart.

iii) Square and rectangular ceiling outlets/intakes shall have a flange flush with the ceiling into which it is fitted or shall be of anti smudge type. The outlets shall comprise an outer shell with duct collar and removable diffusing assembly. These shall be suitable for discharge in one or more directions as required. The outer shell shall not be less than 1.6 mm thick extruded section aluminium sheet. The diffuser assembly shall not be less than 0.80 mm thick extruded aluminium section.

iv) Circular ceiling outlets/intakes shall have either flush or anti smudge outer cone as specified in the tender specifications. Flush outer cones shall have the lower edge of the cone not more than 5 mm below the underside of the finished ceiling into which it is fitted. Anti smudge cones shall have the outer cone profile designed to reduce dirt deposit on the ceiling adjacent to the air outlet. The metal sheet used for construction of these shall be minimum 1.6 mm thick extruded aluminium sheet.

v) Linear diffusers shall have a flanged frame with the outside edges returned 3.5 mm and shall have one to four slots as required. The air quantity through each slot shall be adjustable. The metal sheet used for the construction of these shall be minimum 1.6 mm thick extruded aluminium sheet.

vi) Grilles and diffusers constructed of extruded aluminium sections shall have grille bars set straight or deflected as required. These shall be assembled by mechanical interlocking of components to prevent distortion. These grilles and diffusers shall have a rear set of adjustable blades, perpendicular to the face blades for deflection purposes.

vii) All supply air outlets shall be fitted with a volume control device, made of extruded aluminium gate section. The blades of the device shall be mill finish/ block shade pivoted on nylon brushes to avoid rusting & rattling noise, which shall be located immediately behind the outlet and shall be fully adjustable from within the occupied space without removing any access panel. The volume control device for circular outlets shall be opposed blade radial /shutter type dampers, or two or more butterfly dampers in conjunction with equalizing grid. Opposed blade dampers shall be used for square and rectangular ceiling/wall outlets and intakes.

viii) All the products supplied by contractor should supplement in performance by selection curves of product ratings from the manufacturer.

ix) Laminar supply air diffusers shall be made of 2mm thick powder coated aluminium sheet duly insulated with 5mm thick closed cell polyethylene foam insulation having factory laminated aluminium foil and joints covered with self adhesive aluminium tape and having holes 2/3 mm dia including framework.

1.3.3 Fresh Air Intakes

i) Fresh air intake grills shall be made of extruded aluminium sections.

ii) A flanged frame using RS sections shall be provided on front face to conceal the gap between the louvers and the adjoining wall face. Corners of frame shall be welded. The frame shall be made structurally rigid.

iii) Louvers made from extruded aluminium section shall be in modular panel form for ease of handling. These shall be free from waves and buckles. Vertical blades shall be truly vertical and horizontal blades shall be truly horizontal. Butt joints in blades shall not be accepted.

iv) Additional intermediate equally spaced supports and stiffeners shall be provided to prevent sagging/ vibrating of the louvers, at not more than 750mm centres where the louver's length is longer than 750mm.

v) A bird wire screen made of 12 mm mesh in 1.6 mm steel wire held in angle or channel frame shall be fixed to the rear face of the louver frame by screens.

1.5.1 **Ducting**

i) The fabrication and installation shall be in a workmanlike manner. Duct work shall be rigid and straight without kinks.

ii) All exposed ducts within the conditioned space shall have slip joints. Flanged joints shall not be used.

iii) All joints shall be airtight.

iv) Ducts shall be supported independently from the building structure and adequately, to keep the ducts true to shape. The support spacing shall be not more than 2 m. where ducts cannot be suspended from ceiling, wall brackets or other suitable arrangements, as approved by the Engineer-in-charge shall be adopted. Neoprene or other vibration isolation packing of minimum 6 mm thickness shall be provided between the ducts and the angle iron supports/brackets. Vertical duct work shall be suitably supported at each floor by steel structural members.

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

vi) Duct connections to the air-handling unit shall be made by inserting a double canvas sleeve 100 mm long. The sleeve shall be securely bonded and bolted to the duct and unit casing.

vii) Dampers shall be provided in branch duct connections for proper volume control and balancing the air quantities in the system, whether indicated in the drawings or not. Suitable links, levers and quadrants shall be

provided for proper operation, control and setting of the dampers. Every damper shall have an indicating device clearly showing the position of the dampers at all times.

viii) Where electrical heaters are mounted in the duct, these shall be of low temperature totally enclosed type fitted with radiation fins. A removable panel for access to the heaters shall be provided in the duct. Any hole in the duct for electrical wiring must be provided with suitable bushes to avoid leakage. 6 mm thick asbestos board lining shall be provided all around the inside of the duct for a distance of 30 cms. on either side of the electrical heaters. A manually reset thermostatic safety switch shall be provided near the duct section having heaters. In addition, the heaters must be interlocked with the connected fan motor of the AHU.

1.8.2 Air Outlets and Inlets

i) The locations of the air outlets and intakes shall be shown in the tender drawings and necessary openings and the wooden framework for fixing the grilles shall be provided by the air conditioning contractor. The location of these outlets/ inlets is subject to change and the approval of the Engineer-in-Charge shall be obtained before finally fixing the grilles/diffusers in position.

ii) In installing fresh air intakes, no fixing device shall be visible from the face of the frame. Where louvers are to be fixed in masonry or concrete, fixing shall be with either expanding plugs or raw plugs. Where the louvers are to be fixed in steel or wood, non-ferrous screws or bolts shall be used.

iii) Supply air outlets and return air intakes shall be anodized/ powder coated aluminium to the desired colour to match the surroundings wall/ceiling. The fresh air intakes shall be anodized/ powder coated aluminium as approved by the Engineer-in-Charge. The paint colour shall be approved by the Engineer-in-Charge.

iv) All damages to the finish of the structure during the installation work shall be made good by the air-conditioning contractor before handing over the installation to the Department.

1.9 BALANCING

Air systems shall be balanced in a manner to minimize throttling losses. The entire air distribution system shall be balanced with the help of an anemometer. The measured air quantities at fan discharge and at the various outlets shall be within + 5 percent of those specified/quoted. For fans greater than 0.75 KW (1.0 HP), fans must then be adjusted to meet design flow conditions. Branch duct adjustments shall be permanently marked after the air balancing is completed so that these can be restored to their correct position if disturbed at any time.

1.10 MEASUREMENT

i) Duct measurements (for insulated ducts) shall be taken before application of insulation.

ii) Duct work shall be measured section wise on the basis of external surface area by multiplying the axial length from flange face to flange face for each section by the corresponding duct perimeter in the centre of that section length.

iii) Uniformly tapering straight sections shall also be measured as in (ii) above. However, for special pieces like tees, bends etc. area computations for surface areas shall be done as per the shape of such pieces.

iv) The quoted unit rate for external surfaces of ducts shall include all wastage allowances, flanges, gaskets for joints, vibration isolators, bracings, hangers and supports, inspection chambers/access panels, splitter dampers with quadrants and levers for position indication, turning vanes, straightening vanes, and all other accessories required to complete the duct installation as per the specifications. These accessories shall not be separately measured.

v) Grilles and diffusers (except linear diffusers) shall be measured by the cross sectional areas, perpendicular to the airflow, and excluding the flanges. Volume control dampers, where provided shall not be separately accounted for.

vi) Linear diffusers shall be measured by linear measurements only, and not by cross-sectional areas, and shall exclude flanges for mounting of the linear diffusers. The supply air plenum for linear diffusers shall be measured as described above for ducting.

vii) Fire dampers shall be measured by their cross sectional area perpendicular to the direction of the airflow. Quoted rates shall include the necessary collars and flanges for mounting, inspection pieces with access door, fusible link/solenoid with wiring, but excluding the fire detectors, etc.

2.0 INSULATION WORK

2.1 SCOPE

This chapter covers the requirements of thermal insulation for chilled water / hot water piping, pumps and tanks, duct work ,and acoustic lining in duct work and weather maker rooms. This does not cover exposed roof insulation and under deck insulation work.

2.2 MATERIAL-TYPES

The insulation material to be used for various applications shall be any of the following, as required:

i) For insulation of water piping, pumps and tanks:

a) Expanded polystyrene (T.F.Quality)

b) Resin bonded glass wool

c) Polyvinyl Nitrile (Closed cell rubber foam)

d) XLPE (Closed cell cross linked polyolefin foam)

Expanded polystyrene (T.F.Quality) shall be used for pipe insulation like inside the A.C. plant room, exposed to outside or burried in ground. In the case of expanded polystyrene (TF quality), Resin bonded glass wool the pipe insulation should be in rigid sections in two halves and preformed to fit snugly on to pipes (upto pipe sizes for which the preformed sections are manufactured by the manufacturer of insulation). For higher pipe sizes insulation slabs shall be used.

Resin bonded glass wool is to be used for piping inside the building due to its fire retardant properties, for considerations of fire safety. Polyvinyl Nitrile (Closed cell rubber foam) available in tube shapes for sliding on to the small dia. pipes can be used if successfully tested for fire retardant properties.

However, all shall need to be covered with vapour barrier and cladding with aluminium sheet.

ii) For Insulation of duct work:

(a) Resin bonded glass wool.

(b) Polyvinyl Nitrile (Closed cell rubber foam)

iii) For acoustic lining of duct work and AHU rooms:

(a) Resin bonded glass wool.

(b) Resin bonded mineral wool.

iv) For suction line, Chilled water pipe and Chiller insulation:

(a) Expanded Polysterene (T.F.Quality)

(b) Polyvinyl Nitrile (Closed cell rubber foam)

(v) For double skin AHUs: (a) Polyurethane foam (PUF insulation)

2.3 MATERIAL SPECIFICATIONS

The insulation material shall satisfy the following requirements: -

i) For thermal application on pipes.

Material	Minimum Density (Kg/cu.m)	Maximum Thermal conductivity (K.cal/ hr. degree C/m at 10 Deg C mean temp.)
Resin bonded glass wool	32	0.031
Expanded polystyrene (TF)	20	0.035
Polyvinyl Nitrile foam	55	0.034

ii) For thermal insulation of ducts:

Material	Minimum Density (Kg / cu.m)
Resin bonded glass wool	24
Polyvinyl Nitrile foam	40

Fibre Glass Insulation used for duct insulation shall be factory faced with aluminium foil on one side reinforced with kraft paper & fused to the insulation material.

Polyvinyl Nitrile foam Insulation used for duct insulation shall be factory faced with aluminium foil on one side.

iii) For acoustic lining:

Application Thickness	Material	Minimum Density (Kg./Cu.M)
Duct 25 mm	Resin bonded glass wool	32
AHU room 50 mm	Resin bonded glass wool/ Mineral wool	32/ 48

iv) The specification for resin bonded glass wool insulation & resin bonded mineral wool insulation shall conform to IS 8183 as amended upto date. The specification for expanded polystyrene shall conform to IS-4671 as amended upto date.

v) Expansion tank Insulation Expanded polystrene insulation of density not less than 20kg per cu.m. shall be used.

2.6 APPLICATION OF INSULATION (THERMAL) ON DUCT

i) The surface of duct on which the external thermal insulation is to be provided shall be thoroughly cleaned with wire brush and rendered free from all dust and grease.

ii) Two coats of cold compound adhesive (CPRX compound) shall be applied over the duct. (Any other adhesive recommended by the manufacturers may also be used with the approval of the Engineer-incharge).

2.7 APPLICATION OF DUCT LINING (ACOUSTIC INSULATION)

Where specified in the tender specifications, ducts shall be lined internally with acoustic insulation as detailed below:

i) The Inside surface of duct on which the acoustic lining is to be provided shall be thoroughly cleaned with wire brush and rendered free from all dust and grease.

ii) Then 25 x 25 sq.mm section of minimum 1.25 mm thick G.I. sheet shall be fixed on both ends of the duct piece.

iii) The insulation slabs shall then be fixed between these section of ducts using CPRX adhesive compound and stickpins.

iv) The insulation shall then be covered with Reinforced plastic/ fibre glass tissue with proper overlap, sealing all joints so that no fibre is visible.

v) The insulation shall finally be covered with minimum 0.5 mm thick perforated aluminium sheet having perforations between 20-40%.

2.8 APPLICATION OF ACOUSTIC LINING IN AHU ROOMS

i) The wall/ roof surface should be thoroughly cleaned with wire brush.

ii) A 610x610 mm frame work of 25mm x50mm x50mm x50mm x25mm shape channel made of 0.6mm thick G.S.S. shall be fixed to walls leaving 610mm from floor by means of raw plugs in walls and dash fasteners in ceiling. Similar frame work shall also be fixed on ceiling by means of dash fasteners.

iii) Resin bonded glass wool/ mineral wool as specified cut to size will be friction fitted in the frame work and covered with tissue paper.

iv) Aluminium perforated sheet having perforation between 20-40%of thickness not less than 0.8mm shall be fixed over the entire surface neatly without causing sag/ depression in between and held with screws. Sheet joints should overlap minimum 10mm.

v) Aluminimum beading of 25mm wide and thickness not less than 1.00 mm shall be fixed on all horizontal/ vertical joints by means of screws.

2.9 MEASUREMENT OF INSULATION

a) Pipe insulation shall be measured in units of length along the centre line of the insulated pipe. The linear measurements shall be taken before the application of the insulation. For piping measurements, all valves, orifice plates and strainers shall be considered strictly by linear measurement along the centre line of the pipes, and no special rate shall be applicable for insulation of any accessories, fixtures or fittings whatsoever.

b) Duct insulation and acoustic lining shall be measured on the basis of surface area along the outer surface (ref IS14164 of 2008) of insulation thickness. Thus the surface area of externally thermal insulated or acoustically lined duct shall be based on the perimeter at the centre of thickness of insulation, multiplied by the centre-line length of ducting including tapered pieces, bends, tees, branches etc. as measured for bare ducting. In the case of tapering pieces, their average perimeter shall be considered.

3.0 TESTING REQUIREMENTS AND PROCEDURES

3.1 Balancing of all air systems and all tests as called for in the specification shall be carried out by the HVAC contractor in accordance with the specifications and relevant local codes if any. Performance tests of individual equipment and control shall be carried out as per manufacturer ‘s recommendation. All tests and balancing shall be carried out in the presence of Engineer-in-charge or his authorized representative.

3.5 Balancing Tolerance:

Systems shall be balanced within the following tolerances ;

i) Duct leakage Rates (at operating pressures) :

Low pressure ducts (0 to 0.5 kPa)	5% of full flow
Medium Pressure Ducts (0.5 to 3 kPa)	1% of full flow
High Pressure Ducts (Greater than 3 kPa)	1% of full flow

ii) Air flow rates :

Under 70 L/S	10% of flow
Over/ at 70 L/S	5% of flow

iii) Water flow rates :

Chilled Water	2% of flow
Other	5% of flow

iv) Heat flow rates:

Heat exchangers 5% of design capacity

Procedure:

Review all pertinent plans, specifications, shop drawings and other documentation to become fully familiar with the systems and their specified and intended performance.

Furnish equipment and instruct sheet metal trade on proper use for conducting duct leakage tests. Conduct first test as a way of instructing the above trades in the presence of the Department‘s representative.

Test relative barometric pressures in various building area, as deemed necessary by the Department‘s representative and at least in all areas served by different systems. Test performance and continuously record on a 24 hour basis, temperature and humidity levels where control equipment is provided for that purpose in certain critical areas.

3.6 Reports

Provide 3 copies of the complete balancing and testing reports to the department. Report shall be neatly typed and bound suitable for a permanent record. Report forms shall contain complete test data and equipment data as specified and safety measures provided as per para 1.14.3.

3.7 Final documentation

The contractor shall leave the system operating in complete balance with water and air quantities as shown on drawings. Set stops on all balancing valves and lock all damper quadrants in proper position. Secure all automatic damper and valve linkages in proper positions to provide correct operating ranges. Proper damper positions shall be marked on ducts with permanent indication. Notify the department of any areas marginal or unacceptable system performance.

The above tests and procedures are mentioned herein, for general guidance and information only, but not by way of lamination to the provisions of conditions of contract and design/ performance criteria. Upon commissioning and final handover of the installation, the HVAC contractor shall submit (within 4 weeks) to the engineer-in-charge/ department 6 (six) portfolios of the following indexed and bound together in hard cover ring binder (300 x 450 mm) in addition to the completion drawings as per para 1.18.3.

i) Comprehensive operation and maintenance manual.

ii) Test certificates, consolidated control diagram and technical literature on all controls.

iii) Equipment warranties from manufacturers.

iv) Commissioning and testing reports.

v) Rating charts for all equipment.

vi) Log books as per equipment manufacturers standard format.

vii) List of recommended spares and consumables.

viii) Any special tools required for the operation or the maintenance of the plant shall be supplied free with the plant.

At the close of the work and before issue of final certificate of completion by the Engineer-in-charge, the contractor shall furnish a written guarantee indemnifying the department against defective materials and workmanship for the Defects liability period. The contractor shall hold himself fully responsible for reinstallation or replace free of cost to the department.

i) Any defective material or equipment supplied by the contractor.

ii) Any material or equipment supplied by the department which is proved to be damaged or destroyed as a result of defective workmanship by the contractor.

G. LIST OF ELECTRICAL APPROVED MAKES OF MATERIALS

S.No.	Materials	List of Approved Make
1	Manufacturers of L.T. Panels	CPRI Approved Panels Manufacturers.
2	Power & Control Cables	RR Kabel / Finolex / RPG / Primecab / Havells / Universal / CCI / Nicco /Mescab /Capital / Incab / Polycab / RRKabel / KEI / KDK / Rajnigandha / Gloster /National.
3	Cable Sockets / Lugs & clip on terminals	Dowells / Lotus / Jainson / Elecon / Wego / Elmex / Connectwell.
4	FRLS PVC INSULATAED Copper wires/ CABLES including panel wire for wiring purpose	RR Kabel / Finolex / Havell's / Polycab / Nicco / Mescab / Capital / KDK / KEI / Gloster / RPG / ANCHOR-Panasonic, KEI
5	Telephone, CAT-6, Speaker, Fire Alarm Wires & Cables	RR Kable / Delton / Motwane / ITL / Havells / Finolex / Polycab.
6	Telephone Krone Box	Hensel/ IDIS/ Havell's./delton
8	L.T. Switchgears & Accessories	GE / Siemens/ L & T/ ABB / Schneider / Indo-Asian / Havell's.
9	HRC Fuse Base & Carriers	English Electric / Kaycee / Essen/havells /l&t .
10	Selector Switches	L&T(Salzer) / Kaycee / Siemens / Havells / Micron / GE / C&S / HPL.
11	L.T. on load/ off load Change Over Switches	HH Elecon / C&S / L&T / HPL / Havellsn / Socomec / Standard / Siemens.
12	SFUs / FSUs / Fuse-Gear (HRC) /HRC fuses	L & T / Siemens / GE / EE.
13	MCB DBs / MCCBs / MCBs / ELCBs / RCCBs	Siemens / Schneider / MDS (Lexic) / Legrand / ABB / L&T (Hager) / Indo-Asian / Havell's / C&S.
14	Ammeter/Voltmeter/P.F. Meter (Analog)Digital / Electronic Type	Automatic Electric / Rishabh / MECO /IMP L&T / SIEMENS / ENERECON / Neptune / HPL.
15	LED Indicating Lamps / Push Buttons	Kaycee / Teknic / Siemens / L & T(ESBEE) / BCH / Binay / Essen Deinki / C&S / HPL / VASHINO / RISHABH.
16	L.T. Power Capacitors & APFC Panel	Universal / Siemens / L&T / Crompton Greaves / Voltas / Ducati / Asian.
17	APFC Panel & Relays	ABB / GE / Siemens / Enercon / L&T / Neptune-DUCATI / AVOMEC.
18	Connectors/ Terminal Blocks	Elmex / Essen / APP.
19	Molded Case Circuit Breakers (MCCBs)	ABB / L & T / Siemens / Schneider / GE / Legrand / C&S /Havell's./ABB / siemens
21	PVC conduit and accessories	Precision / Circle Arc / AKG / Garware / Shakti / CPL / Polyplast / Universal / ANCHOR.
22	PVC casing-capping(Trunking)	Precision / Presto-Plast / Kalinga / MK / ANCHOR/ AKG.
23	PVC Pipes for U/G laying for road crossings	Precision/ Kisan / Supreme / Prince/ AKG./kalinga

24	Modular Switches / Sockets / Ceiling Roses / Batten Holders / other accessories	L&T / Siemens / MK / Anchor-Panasonic / LK India / North West / Crabtree / Legrand / Precision / Schneider / GE / HPL / C&S.
25	Industrial Sockets with MCBs	Siemens / Schneider / MDS (Lexic) / Legrand / ABB / L&T (Hager) / Indo-Asian / Havell's / C&S./havells
26	Intelligent Digital Panel Meters	L&T / Rishabh/ AE / Enercon / Secure / Krykard / Neptune Ducati / HPL.
27	Hot Dip G.I. Conduit	BEC / VIMCO / AKG.
28	Steel Structureal Membars	Jindal / Tata / Sail.
29	G. I. Pipes	Jindal / Tata / Zeneith.
30	Light fittings & fixture incl. LED type	Philips / Crompton / Havell's / Wipro / GE / Bajaj / SYSKA.
31	Lamps, Tube lights & CFLs	Philips / Crompton / GE / Bajaj / Havell's / Osram / Surya.
32	EXIT Signage	Prolite / Legrand.
33	Ceiling/Bracket/Exhaust Fan	Crompton Greaves / Bajaj / GEC / Polar / Usha / Havell's /REMI.
34	Air Circulators & Exhaust Fans	Crompton / Almonard / ACO / Alfa / Havell's / REMI / Usha.
35	Black Enameled M.S. Conduit	BEC / NIC/ VIMCO / AKG / BENCO / Supreme.
36	Isolators	Siemens / Schneider / MDS (Lexic) / Legrand / ABB / L&T (Hager) / Indo-Asian / Havell's / C&S.
37	Current Transformers & Potential Transformers	A.E./ Indcoil / Kappa / Power Pack / Perfect / Kapco /L&T / Premier / Advance / Pragati / Nippen / Cuppa.
38	Cable Glands	Comet / Braco/ Jainco.
39	Cable Tray	Profab / Indiana / Check storage / CITY STEELEDGE/ CABLOFIL(LEGRAND)/HAVELLS .
41	Hylam sheets	Hylam.
42	Speaker	Honeywell/ Bosch / Toa / Ahuja.
44	Telephone System / EPABX	TATA TELECOM / SIEMENS / LUCENT.
45	Window / Split / Cassette Air-Conditioners	Daikin / Hitachi / Voltas / Carrier / Blue-Star / TOSHIBA / LG / O-General / Panasonic / Samsung.

H. LIST OF HVAC APPROVED MAKES OF MATERIALS

S.No.	Materials	List of Approved Make
2.	Chilled Water Pipe	Tata / Zindal / Sail
3.	Pipe Insulation	UP Twiga /K-flex/Armacell
4.	Butterfly Valve	Advance / Honeywell / L & T / Zoloto
5.	Balancing Valve	Advance / Honeywell / Zoloto
6.	Y Strainer	Emerald / Advance / Zoloto
8.	Thermometer / Pressure Guage	H. Guru / Warree
9.	G. I. Sheets(ISI)	Sail / Tata / Jindal / Essar
10.	Pre-Fabricated Ducts	Radiant / Zeco / Camduct / Ductofab
11.	Diffuser / Grill /Dampers	Ravister / Air Master / Air Flow / Systemair
12.	Fire Damper	Ravister / Air Master / Air Flow
13.	Duct Insulation	UP Twiga /Supreme/K-flex/Armacell
14.	Pipe Fittings	Heavy / Local Repute make
15.	Vibration Isolators	Dunlop / Resistoflex / Fenner
16.	Paints	ICI / Asian / Berger
17.	PVC/UPVC pipes	Oriplast / Supreme
18.	Electrical Panel	EAP/Gen Power / System Syndicate
19.	Power Cables/Control Cables	Incab /Gloste / Finolex/POLY CAB/HAVELLS /KEI

Section VII

Schedule A -
Notes for Schedule of Quantities

1	The Schedule of Quantities shall be read in conjunction with the specifications, Tender drawings and bid documents. CONTRACTOR shall not rely merely on the description given in the Schedule of Quantities.
2	Quantities of work indicated in the Schedule of Quantities are only approximate and are given to provide a common basis for bidding. The actual quantities of work shall be ordered by Employer as shown on the final drawings released for Renovation. No claim shall be entertained from CONTRACTOR if the actual quantities or items of work differ from those indicated herein, except where stated otherwise. The Engineer-in-charge reserves the right to modify any aspect of the scope of Tender at any time during the course of work.
3	The contractor shall fill his rates and amounts for all the items for the specified quantities indicated in Schedule of Quantity issued by the Employer.
4	Quoted Prices shall be in Indian Rupees only.
5	Rates and amounts shall be entered in both figures and words. Non-compliance of these conditions may render the Bid invalid at the discretion of the Employer.
6	Unit Rates shall be submitted for all Items and they shall be firm for the entire duration of the contract and any approved extended period.
7	The quantities of work actually carried out against each item shall be measured and paid at the rates quoted in the Schedule of Quantities where applicable or otherwise at such rates and prices as may be fixed within the terms of the Contract.
8	BIDDER shall be deemed to have allowed in his rates the provision, maintenance and final removal of all temporary works of whatsoever nature required for the proper execution of the works, except for those temporary works for which specific items have been provided in Schedule of Quantities.
9	Abbreviations used are as under :

i)	No.	Number
ii)	Cu m	Cubic metre
iii)	Sq m	Square metre
iv)	M	Metre
v)	LS	Lump sum
vi)	MT	Metric Tonne
vii)	Kg	Kilogram

Schedule B:

Material Testing and Quality Assurance Plan:

i) The contractor shall, at his own expense, provide all materials, required for the works.

ii) The contractor shall, at his own expense and without delay, supply to the Engineer-in-Charge samples of materials to be used on the work and shall get these approved in advance. All such materials to be provided by the Contractor shall be in conformity with the specifications laid down or referred to in the contract. The materials shall be selected from the make/brand specified in the list of approved makes of materials .The contractor shall, if requested by the Engineer-in- Charge furnish proof along with Material Test Certificates (MTC) of manufacturer, to the satisfaction of the Engineer-in-Charge that the materials so comply .The Engineer-in-Charge shall within thirty days of supply of samples or within such further period as he may require intimate to the Contractor in writing whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the Engineer-in-Charge for his approval, fresh samples complying with the specifications and make/brand in the list of approved make / materials laid down in the contract**. In case of non availability of make/brand specified in the list of approved makes of material the Contractor submit the documentary evidence for the same to the satisfaction of Engineer-in-Charge,** proposed materials shall be tested in accordance with specifications following the Indian Standard Codes of Bureau of Indian Standard and / or applicable code of material testing and specifications, and approval of the Engineer-in-Charge in such case shall be issued after receipt of satisfactory test results of materials satisfying the specifications and standards.

iii) The Contractor shall at his risk and cost submit the samples of materials to be tested or analysed, if required for approval of material and shall not make use of or incorporate in the work any materials represented by the samples until the required tests or analysis have been made and materials finally accepted by the Engineer-in-Charge. The Contractor shall not be eligible for any claim or compensation either

arising out of any delay in the work or due to any corrective measures required to be taken on account of and as a result of testing of materials.

iv) The contractor shall, at his risk and cost, make all arrangements and shall provide all facilities as the Engineer-in-Charge may require for collecting, and preparing the required number of samples for such tests at such time and to such place or places as may be directed by the Engineer-in-Charge and bear all charges and cost of testing unless specifically provided for otherwise elsewhere in the contract or specifications. The Engineer-in- Charge or his authorized representative shall at all times have access to the works and to all workshops, factories or/ and other places where work is being prepared or from where materials, manufactured articles or machinery are being obtained for the works and the contractor shall afford every facility and every assistance in obtaining the right to such access for inspections and examination and test of the materials and workmanship. No person not authorized by the employer except the representatives of public authorities shall be allowed on the works at any time.

v) The Engineer-in-Charge shall have full powers to require the removal from the premises of all materials which in his opinion are not in accordance with the specifications and in case of default, the Engineer-in-Charge shall be at liberty to employ at the expense of the contractor, other persons to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials. The Engineer-in-Charge shall also have full powers to require other proper materials to be substituted thereof and in case of default, the Engineer-in-Charge may cause the same to be supplied and all costs which may attend such removal and substitution shall be borne by the Contractor.

The work shall be executed at the highest level of quality complying with the specifications, method of execution / work, workmanship and quality standards specified in the latest IS Codes (BIS codes).

The Material Testing and Quality Assurance Plan as suggested / approved by Bank will be binding to the contractor.

The contractor shall follow the instructions of the said auditor and execute / rectify the work as per advice of the auditor / ensure compliance to his/her/their observations.

Schedule C

SAFETY CODE

1. First aid appliances including adequate supply of sterilized dressing and cotton wool shall be kept in a readily accessible place.
2. An injured person shall be taken to a public hospital without loss of time, in cases where the injury necessitates hospitalization.
3. Suitable and strong scaffolds should be provided for workmen for all works that cannot safely be done from the ground/floor.
4. No portable single ladder shall be over 8m in length. The width between the side rails shall not be less than 30cm (clear) and the distance between two adjacent rungs shall not be more than 30cm. When a ladder is used, an extra mazdoor shall be engaged for holding ladder.
5. The excavated material shall not be placed within 1.5m of the edge of the trench or half of the depth of trench whichever is more. All trenches and excavations shall be provided with necessary fencing and lighting.
6. Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be one metre.
7. No floor, roof or other part of the structure shall be so overloaded with debris or materials as to render it unsafe.
8. Workers employed on mixing and handling materials such as asphalt, cement mortar or concrete and lime mortar shall be provided with protective footwear and rubber hand-gloves.
9. Those engaged in welding works shall be provided with welder's protective eye shields and gloves.
10. No paint containing lead or lead products shall be used except in the form of paste or readymade paint.
11. Suitable facemasks should be supplied for use by the workers when the paint is applied in the form of spray or surface having lead paint dry rubbed or scrapped.
12. Overalls shall be supplied by the Contractor to the painters and adequate facilities shall be provided to enable the working painters to wash during the periods of cessation of work.
13. Hoisting machines and tackle used in the works, including their attachments, anchorage and supports shall be in perfect condition.
14. The ropes used in hoisting or lowering material or as a means of suspension shall be of durable quality and adequate strength and free from defects.

FIRE SAFETY CODE

1. Cutting / drilling machine and other electrically operated equipment used at site shall be plugged into correctly rated electrical outlets.
2. Only ISI marked 3 pin plug and other appliances and equipment shall be used.
3. Electrical power cables/wires used shall not have any joints and shall be properly rated.
4. All electrical appliances i.e. welding, drilling, cutting machine etc. shall be safely and securely earthed to prevent leakage current while in operation.
5. Before commencing the welding work for the first time on any day, fire section shall be informed and only after the site inspection by the Fire officers/Personnel, work shall be started.
6. Two buckets of water and sand shall be kept in an easily accessible area on the site.
7. Fire extinguishers recommended and issued by fire officers shall be kept on the site.
8. Used paint drums shall be stored in specified store only after closing them properly.
9. Personal protective equipment such as safety shoes, hand gloves, welder's mask, ear plug, etc., depending upon the requirement of the work shall be provided by the Contractor to the workmen to prevent occupational health hazards.
10. The safety belt shall be provided by the Contractor and used by the workmen while working from height for more than 10' from Ground level.
11. None of the passages near lift lobby and staircases shall be used for stacking / dumping any kind of materials/waste.
12. Both the staircase doors shall be normally kept closed.
13. None of the fire extinguishers shall be removed/shifted from its designated location.
14. Power supply shall be switched off from the mains when equipment is not in use.
15. Wood-shavings and saw-dust generated from the work shall be collected on daily basis, removed from site and stored at the designated place in proper manner.
16. Any debris generated from the work shall be collected on daily basis, removed from site and stored at the designated place in proper manner.
17. Battery operated emergency light/torches shall be provided by the Contractor to the workmen while working beyond office hours.

Schedule D

LIST OF DOCUMENTS TO BE MAINTAINED AT SITE

S. No.	Description of the Document	Remarks
1	Contract Agreement.	Certified true copies of the contracts
2	Drawings	One set of all Architectural Interior layout plan, Electrical, AC and other drawings issued for the work shall well preserved by covering transparent polythene paper
3	Work Programme Chart	Showing latest item wise progress plan
4	Work instruction / Site order Book	For issue of instructions by Engineer-in-charge or his representative at site in the course of day-to-day supervision. This book shall be in the form of Triplicate book with machine numbered pages. After recording the instructions, one copy shall be taken by Engineer-in-Charge or his representative, another by the contractor and the third copy shall remain in the book on which the compliance shall be recorded by Contractor after taking required action.
5	Material at site Register	To record the material received i/c copy of delievery challans and issued by on daily basis by the contractor.
6	Labor Report and Daily Progress Report (DPR)	To record the labour and DPR by the contractor
7	Test Reports/ certificates for Materials/ equipment	To maintain record of test reports/ certificates received from manufacturers.
8	Measurement Book	To record measurements of works
9	Progress Review reports along with progress photographs	To maintain record of progress
10	File and Register for Extra/Variation Order	To maintain record of extra/ variation items
11	Hindrance register	For recording the details of hindrances, reasons & its clearance with time period jointly signed by the Site Engineer/ Engineer-in-charge representative and the contractor's representative.

12	Logbook of defects	To record defects noticed during inspection.
13	Ponding Test Register	To record dates of waterproofing test
14	Pipeline Test Register	To record dates of tests/leakage checks (any) carried out prior to concealing work of pipelines
13	Electrical Wiring System (including Earth Test Results) Testing Register	
14	Equipment Test Certificate Register For Major Equipment	

These registers shall be kept in the safe custody of AM/MGR. (Tech).

Proper records of consumption of materials shall be maintained and comparisons may be made about theoretical and actual consumption and that of available stocks in respect of project at site. Such records may be periodically checked by Engineer-in-Charge of the project.

Schedule E General Rules and Instructions to Bidders – Information

Bids in Two Bids System	**Tender Inviting Authority** Regional Director Reserve Bank of India Estate Department, 15 N S Road, Kolkata Tel No.: 03322301214 Email id: estatekolkata@rbi.org.in
	Name of the Work- Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)
	Office-Reserve Bank of India, Kolkata
	Due Date and Time for submission of e-Tender/Bid (Bid close date)- 07.07.2025 up to 11:00 Hrs.
	Tender submission mode: e-Tender
Earnest Money Deposit (EMD)	**EMD** of **Rs.7.98 lakh /-** in the form of Demand Draft drawn in favour of Reserve Bank of India, of a Scheduled Bank or Bank Guarantee as per proforma annexed hereto shall be deposited in original at the office of tender inviting authority on or before the due date 07.07.2025. EMD can also be remitted to Reserve Bank of India Account of on or before 06.07.2025. The account details for NEFT transactions are as under: **Beneficiary Name- Reserve Bank of India** **A/c No – 186003001** **IFSC CODE – RBIS0KLPA01** Proof of remittance indicating transaction number and other details shall be uploaded on Bank's approved e-tender portal along with other tender documents.
Clarifications and pre-Bid Meeting	**Date and Time of Pre-Bid Meeting** - Offline on 23.06.2025 at 11.00 AM Venue - Estate Department, Reserve Bank of India, Kolkata Regional Office, Kolkata-700001.
Opening of Bids	**Date of opening of tenders/bids (Part-I)** – 07.07.2025 at 11:30 hrs on e-Tender mode.
Bid validity	**Bid validity** –Three months since date of opening of Part I
Time for Completion of work	**Time allowed to complete the work**: 9 months from the date of commencement. Date of commencement will be 14th day from the date of issue of the work order.

Schedule F

General Conditions of the Contract – Information

Definitions			
		i)	**Name of the Work** – Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)
		ii)	**The Site** – RBI,Kolkata,3rd Floor, Main Office Premises
		iii)	**Employer** – Reserve Bank of India represented by Regional Director, Reserve Bank of India, Kolkata
		xiii)	The Engineer-in-charge:
		xxii)	The percentage mentioned to cover all overheads and profits – 15%
Discrepancies and Adjustment of Errors (order of preference)	8.2	The Competent Authority – Regional Director, Reserve Bank of India, Kolkata	

CLAUSES OF CONTRACT

Performance Guarantee	CLAUSE 1	
	(i)	Time allowed for submission of Performance Guarantee from the date of award of work – 14 days
	(ii)	Maximum allowable extension of time for submission of Performance Guarantee beyond the period specified in (i) above without penalty – 7 days
	(iii)	Maximum allowable extension of time for submission of Performance Guarantee beyond the period specified in (ii) above with late fee @ at Bank Rate.
Recovery of Security Deposit	CLAUSE 1 A	
	Retention percentage – 5% from every bill subject to 5% of the contract price	
Compensation for Delay	CLAUSE 2	
	Authority for fixing compensation under clause 2: The Regional Director, Reserve Bank of India,Kolkata	

	Compensation for Delay (i) The work shall throughout the stipulated period of the contract be proceeded with all due diligence and if the Contractor fails to complete the work within the specified period he/they shall be liable to pay compensation for delay at the rate of 0.25% of the estimated cost / tendered cost per week (to be computed on per day basis) subject to a maximum amount of 10% of the tendered cost. (ii) The compensation for delay will be levied in following manner: “If the Contractor fails to maintain the required progress of the works by the completion time stipulated in the Contract or within any extended time under time extension Clause and the employer certifies in writing that in her/ his opinion the same ought reasonably to have been completed, the Contractor shall pay the Employer the sum named as “Liquidated Damages” for the period during which the said works shall so remain incomplete and the Employer may deduct such damages from any moneys due to the Contractor. The projects milestones clearly indicating time and amount for achieving each milestone as indicated below. In case, the contractor does not achieve a particular milestone(s), if any, mentioned in the Contract or rescheduled milestone(s) in terms of time extension clause, the amount to be calculated based on the targeted financial progress for the milestone and the delay upto the Running Account bill under processing shall be withheld (as per the method given below) to be adjusted against the liquidated damages levied at the time of completion of contract. Withholding of payments on failure to achieve a milestone shall be automatic and without any notice to the Contractor. However, if the Contractor catches up with the progress of work on the subsequent milestone(s), the withheld amount shall be released. In case the contractor fails to make-up for the delay before

the subsequent milestone(s), the amount mentioned against each missed milestone shall also be withheld. No interest whatsoever shall be paid by the Bank on such withheld amount/s. The delay period shall be calculated from the stipulated date of occurrence of a milestone until the date when the milestone is actually achieved, however, the amount to be withhold from a R.A. bill before reaching to a particular milestone(s) shall be calculated for the delay until the date of R.A. bill. The application of liquidated damages shall not effect a change in the milestone or release the Contractor of her/ his obligation to improve the progress of work. The contractor hereby specifically agrees and authorizes the Employer to deduct such liquidated damages, if any, from any instalment of payment becoming due and payable to the contractor in terms of this contract or from the retention money.

Specimen Milestones Chart

Milestone	**Due date**	**Milestone Target amount**
Project Start	D_0	0
1^{st}	D_1	T1
2^{nd}	D_2	T2
$(N-X)^{th}$	$D_{(N-X)}$	$T_{(N-X)}$
$(N-X+1)^{th}$	$D_{(N-X+1)}$	$T_{(N-X+1)}$
$(N-X+2)^{th}$	$D_{(N-X+2)}$	$T_{(N-X+2)}$
$(N-1)^{th}$	$D_{(N-1)}$	$T_{(N-1)}$
N^{th}	$D_{(N)}$	$T_{(N)}$

Say a RA bill received on $D_{(R)}$ is certified for gross amount of R where:

i. $T_{(N-X)} \leq R < T_{(N-X+1)}$ i.e. Progress reached upto $(N-X)^{th}$ milestone
ii. RA Bill date $D_{(R)}$ is after $D_{(N)}$ i.e. N^{th} milestone has become due as on RA bill date
iii. Say, the liquidated damages is 0.25% per week of delay.
iv. Withhold amount for not achieving N^{th} milestone

$A_{(N)} = (0.0025/7)*(D_R-D_N)*(T_N-T_{(N-1)})$ where $T_{(N-1)}$ will be zero if N_{th} milestone is the first in the series of delayed milestones.

Note: in case the rate of recovery of LD is different than the 0.25% per week, the multiplying factor in the first term of the above formula will change accordingly.

v. **Gross Withhold amount for current RA bill:** The withhold amount shall be calculated as follows:

(a) Withhold amount for milestones achieved with delay till previous RA Bill = P

(b) withhold amount for milestones achieved with delay during current RA bill = Q

(c) withhold amount for milestone due but not achieved till current RA bill. = R

$P = A_{(1)}+A_{(2)}+.....+A_{(N-X-1)}$

$Q = A_{(N-X)}$

$R=(0.0025/7)*((D_R-D_{(N-X+1)})*(T_{(N-X+1)}-T_{(N-X)})+(D_R-D_{(N-X+2)})*(T_{(N-X+2)}-T_{(N-X+1)})+.....+(D_R-D_N)*(T_{(N)}- T_{(N-1)})$

vi. The value of $A_{(N-X)}$ will freeze for all subsequent bills till the Nth milestone is achieved.

Note:

(i) The withhold amount against not achieving milestone would remain withhold unless a milestone due on the RA bill date is achieved.

(ii) The withhold amount would be released in case of achieving all due milestones on the RA bill date

&Sample Calculation to arrive at Compensation for Delay (CLAUSE 2)

Say Project Cost Rs. 3.99 Crores

Milestones – 3

Project commencement date: march01, 2025

Mile ston e	Milestone Amount (Rs. In Crores)	Schedule date of achieving
1	0.50	**2025-06-01**
2	2.00	**2025-09-01**
3	3.99	**2025-12-01**

The RA Bills received as follows:

RA Bill	RA bill Date	Gross Bill Amount (Crores)
1st	**2025-05-01**	0.50
2nd	**2025-06-01**	1.0
3rd	**2025-07-01**	**1.5**
4th	**2025-08-01**	2.0
5th	**2025-09-01**	2.5
6th	**2025-10-01**	**3.0**
7th	**2025-11-01**	3.5
8th	**2025-12-01**	3.9

			Milestone due as on bill date			Withhold amount for not achieving milestone (Rs. In laks)								
RA Bill	RA bill Date	Gross Bill Amount (Crores)	Target milestone amount (Rs. in crores)	due date	Delay (in days)	1st	2nd	3rd	4th	5th	6th	Gross Withheld	Achieved	As per the formula payable amount** after withheld (Rs. In crores)
1st		0.50	2	2024-03-31							0.00	2.14		0.48
2nd		1.0	4	2025-05-01							0.00	9.43		0.93
3rd		1.5	4	2025-06-01							0.00	17.14	1st m/s	0.42
4th		2.0	4	2025-07-01							0.00	18.36		0.79
5th		2.5	6	2025-08-01							0.00	20.93		0.37

			Milestone due as on bill date			Withhold amount for not achieving milestone (Rs. In laks)								
RA Bill	RA bill Date	Gross Bill Amount (Crores)	Target milestone amount (Rs. in crores)	due date	Delay (in days)	1st	2nd	3rd	4th	5th	6th	Gross Withheld	Achieved	As per the formula payable amount** after withheld (Rs. In crores)
6th		3.0	6	2025-09-01							0.00	25.93		0.35
7th		3.5	6	2025-09-01							0.00	29.64	2nd m/s	0.56
8th		4.0	8	2024-11-01							0.00	37.28		0.52

Payment on Interim Certificate to be Regarded as Advances	CLAUSE 3 • Gross value of work done together with net payment/ adjustment of advances for material collected, if any, since the last such payment eligible for raising Running Account bill (Interim payment) - ₹ …….. Lakh • Retention percentage for Interim Certificates – 5% from every bill • Total Retention Money – 5% of the Contract Price plus 5% Performance Bank Guarantee.

	• Retention period for the Retention Money – up to successful completion of Defects Liability Period (DLP) • Installment due after Completion – Performance Bank Guarantee submitted by contractor towards Performance • Period of honouring interim certificates-1 month from the date of receipt of complete bill along with all the documents as specified in Special Conditions of Contract
Action in case Work not done as per Specifications	CLAUSE 4 Authority for accepting reduced rate – Regional Director, Reserve Bank of India, Kolkata
	CLAUSE 5
Deviations/ Variations Extent and Pricing Deviation - Deviated Quantities and Pricing	Deviation limit beyond which clause 12.2 C shall apply - 25% beyond the tender item quantity specified in the Schedule of Quantity
Contractor Liable for Damages, defects during defect liability period	CLAUSE 6 Defects Liability Period – 12 months from the date of completion and handing over the Completion Certificate to the Employer Competent Authority for deciding reduced rates – Regional Director, Reserve Bank of India, Kolkata
Settlement of Disputes & Arbitration	CLAUSE 7 Dispute resolution committee Competent Authority for referring the dispute. Place of Arbitration – Reserve Bank of India, Kolkata RO,
Water and Electric power supply for work Alternate water supply arrangements	CLAUSE 8 Bank will made available water and electricity power supply required at one point @ 1 % of the contract amount. Contractor shall arrange to make arrangements for connection with safety fixtures.

Insurance in respect of damages to Persons and Property	CLAUSE 9
	Contractor shall take following Insurance Policies: **1)** Contractor's All Risk Policy for the full Contract Value for entire Contract Period **2)** Workmen Compensation Policy for all workmen deployed at site **3)** Third Party Liability Policy as per following details: a) For injury to persons – Rs 2 Lakh per person per accident b) For damage to property – Rs 5 Lakh per accident Subject to overall ceiling as per extant Insurance guidelines
Employment of Technical Staff and employees	CLAUSE 10
	Minimum required Personnel at site shall be as below, failing which recovery at the specified rates as below shall be effected from the contractor:

Milestones approving authority – Engineer-in-charge

(i)	Authority for granting Extension of Time –Regional Director, RBI Kolkata RO
(ii)	Rescheduling of Milestones –Engineer-in-charge
(iii)	Shifting of date of commencement in case of delay in handing over of site – Engineer-in-charge

Sr. No.	**Designation**	**Minimum No. of personnel**	**Minimum Professional/ Technical Qualification**	**Minimum years of Relevant Experience**	**Rate of recovery per head per day for noncompliance**
1	Site supervisor (Civil) (Full time)	1	B.E./ B.Tech./ Diploma	5	₹1000/-
2	Site supervisor * (Electrical/AC etc.)	1	B.E./ B.Tech./ Diploma	5	₹1000/-

Note - * Project Manager/Site Supervisor shall be posted to site during the progress of work as and when required.

ANNEXURES TO VARIOUS SECTIONS AND SCHEDULES

Shortlisting/Eligibility Criteria forms
(Ref: Clause 2A of Section IV)

Format 1 : Basic Information (To be read with Item 2 / Section I\V)

1(a)	Name of the Tenderer/firm	
2.	Details of registration of the firm: whether Sole Proprietorship/ Partnership firm /Private Limited/ Limited or Co-operative Body etc.	
2(a)	Name of the proprietor or Partners./ directors :	
3(a)	Registered Address:	
3(b)	Address for correspondence	
4(a)	Contact Person	
4(b)	Designation	
4I	Telephone :	
4(d)	Mobile no.	
4I	FAX/Tele-fax:	
4(f)	e-mail id	
5	GST Registration details and no.	
5(a)	Details of registration of labour, ESI, EPF if any	

6	Number of years of experience of Tenderer / Firm of Tenderer in the field.	
7	In case the company is subsidiary, the involvement, if any, of the Parent Company in the Bank's proposed work :	
8	Was the applicant ever required to suspend the eligible works for a period of more than six months continuously after commencement? If yes, then furnish the reasons thereof.	
9	Has the agency or any constituent partner in case of partnership firm, ever abandoned the awarded works before their completion? If so, give name of the project and reasons for abandonment.	
10	Has the agency or any constituent partner in case of partnership firm, ever been debarred /black-listed for competing in any organization at any time? If so, give details	
11	Has the agency or any constituent partner in case of partnership firm, ever been convicted?	
12.	Whether the agency is involved in frequent civil suit /litigations in the contracts/being executed now. If	Yes / No

	yes please furnish the details in proforma given below.	

Sl no	Name of the project and Employer	Nature of work	Work order No and Date	Present stage of work	Value of contract	Brief details of litigation
1.	2.	3.	4.	5.	6.	7.

Signature of Tenderer with seal

Place

Date

Format 2 PREVIOUS WORK EXPERIENCE
(To be read with Item 2 / Section IV)

List of important similar works executed by the Tenderer/firm

(work order issued on or before …….. …… and work has since been completed**)**

Sl no	Name of similar work and location	Nature of work / items of work involved in the contract	Name of the owner/ client and Architect. Also indicate whether Government or Semi-Government or Private Body with full postal address.	Cost of work		Period of completion			Reason for delay, if any	Whether work was left in complete or contract was terminated from either side?	Litigation/Arbitration, if any with details.	Any other relevant information.
				Contract Amount (₹ lakh)	Actual value of work done (in ₹ lakh)	Date of commencement of work	Scheduled date of completion	Actual date of completion				
1.	2.	3.	4.	5 a	5 b	6a	6b	6c	7	8	9	10

Attach supporting documents

Signature of the Tenderer with seal

Format 2A List of important similar works 'On Hand' (To be read with Item 2 / Section IV)

Sl no	Name of the wok and location	Nature of work / items of work involved in the contract	Name of the owner and Architect Whether Government or Semi- Government or Private Body with full postal address.	Contract Amount in ₹	Completion Period		Present stage of work with reasons if the work is getting delayed	Any other relevant information
					Stipulated	Expected		
1	2	3	4	5	6(a)	6(b)	7	8

Signature of the Tenderer with seal

Format 3 Works qualifying Eligibility

(To be read with Item 2 / Section IV)

Details of similar work/s (qualifying) completed during last five years during the period ……., …. to ……, ….

(The work/s costing equal or above the minimum value specified in eligibility criteria)

Sl no	Name of similar work and location	Nature of work / items (brief description) of work involved in the contract.	Name of the owner/ client and Architect. Also indicate whether Government or Semi-Government or Private Body with full postal address.	Name, e-mail ID, telephone (land line and mobile) nos., Fax no. of the contact executive (the person of Tenderer's client who can be contacted by the Bank in case it is so needed).	Cost of work		Period of completion			Reason for delay, if any	Whether work was left incomplete or contract was terminated from either side?	Litigation/ Arbitration, if any with details.	Any other relevant information.	Green building certification category, if available
					Contract Amount (₹ lakh)	Actual value of work done (in ₹ lakh)	Date of commencement of work	Scheduled date of completion	Actual date of completion					
1.	2.	3.	4.	5.	6 a	6b	7a	7b	7c	8	9	10	11	12

Signature of the Tenderer with seal

Format 3A CLIENT's CERTIFICATE REGARDING PERFORMANCE OF THEIR CONTRACTOR

(On Client's Letter Head) (To be read with item 2 / Section IV)

Name & address of the Client :

Details of Works executed by Shri /M/s :

1. Name of work with brief particulars of items involved (as per schedule of quantities):

2. Whether the framework (i.e. inner metal skeleton) is designed (in-house or get designed from professional/s) or proprietary for its structural fitment, sturdiness, stability, self-supportiveness and safety of the system by the Contractor as per requirement of system : Yes / No

3. **Whether items were fabricated at factory, ready to install components delivered at site and then assembled / installed at site Or fabrication and installation both the operations were done at site:**
4. Agreement No. and date :
5. Agreement amount :
6. Date of commencement of work:
7. Stipulated date of completion:
8. Actual date of completion: :
9. Details of compensation levied for delay (indicate amount) if any:
10. Gross amount of the work completed and paid :
11. Name and address of the authority under whom works executed:
12. Whether the contractor employed qualified Supervisor during execution of work:
13. i) Quality of work (indicate grading): Outstanding/Very Good/ Good/Satisfactory/poor

    ii) Amt. of work paid on reduced rates, if any.
14. **i) Did the contractor go for arbitration?**

    ii) If yes, total amount of claim

    iii) Total amount awarded

15. Comments on the capabilities of the contractor.

a) Technical proficiency: Outstanding/Very Good/ Good/Satisfactory/poor

a) Financial soundness : Outstanding/Very Good/Good/Satisfactory/poor

b) Mobilization of adequate T&P: Outstanding/Very Good/Good/Satisfactory/poor

c) Mobilization of manpower: Outstanding/Very Good/Good/Satisfactory/poor

d) General behavior: Outstanding/Very Good/Good/Satisfactory/poor

Signature of the Reporting Officer* with Office seal

Note: (i) All columns should be filled in properly

(ii) * Clients Report/certificate (a) for each of qualifying similar completed works carried out for Government/ public sector companies, the certificate should be signed by the concerned Executive Engineer or an officer in an equivalent or higher rank (b) for each of the qualifying similar completed works carried out for Private companies shall accompany Tax deduction at source, TDS certificate has to be submitted for proving the credentials/contract amount.

Format 4: FINANCIAL STATUS
(To be read with item 2 / Section IV)

Sr.no.	Details	Financial Year		
		April 1, …..to March 31, ….. **₹ in lakh**	April 1, ….. to March 31, ….. **₹ in lakh**	April 1, ….. to March 31, ….. **₹ in lakh**
1	Annual financial turn over certified by Charted Accountant.			
2	Income Tax returns for the year			

Note:

i. Statement shall be supported by copies of audited financial statements/ accounts of the business of the Tenderer duly certified by a Charted Accountant. The Income Tax Clearance Certificates / Income Tax Assessment orders along with the latest final accounts of the business of the Tenderer duly certified by a Chartered Accountant, copied of the Income Tax clearance Certificate/ Income Tax assessment orders along with the latest final accounts of business of the Tenderer duly certified by a Charted Accountant as a proof creditworthiness.

Signature of the Tenderer with seal

Format 5:FORM OF BANKERS' CERTIFICATE FROM A SCHEDULED BANK
(On Bankers' Letter Head) (To be read with Item 2 / Section IV)

To
Regional Director
Estate department
Reserve Bank of India
……

This is to certify that to the best of our knowledge and information M/s. /Shri..... a customer of our bank having marginally noted address, are/is respectable and can be treated as good for any engagement up to a limit of ₹.....(Rupees .....). This certificate is issued without any guarantee or responsibility on the bank or any of its officers.

For the Bank with Name, Designation & Seal

Note:- (i) Bankers' certificates should be on letter head of the Bank

(a) **In case of partnership firm, certificate to include names of all partners as recorded with the Bank.**

Format 5A: Details of Tenderer's Banker (To be read with Item 2 / Section IV)

1	Name and full Address of the Banker	
2	Name of contact executives, Email ID, contact numbers (land line and mobile), Fax number etc. (The person can be contacted at the office of their banker by the Bank in case it is needed.)	

Signature of the Tenderer with seal

Format 6 List of your technical personnel , giving details about their technical qualifications and experience including that in your establishment
(Ref: Clause 3.1 of Section IV)

Sl. No.	Name	Age	Qualifi-cations	Construction experience	Nature of works handled	Name of major projects handled (value atleast 40% of estimated cost put to tender)	Date from which employed in your organisation	Indicate special experience such as Advanced Construction Management techniques like CPM/PERT and indicate projects in which such techniques were employed.

Indicate other points, if any, to show your technical and managerial competency to indicate any important point in your favour.

Signature of the Tenderer with seal

Annex 1

Draft Articles of Agreement

(On Non Judicial Stamp Paper of appropriate value)

ARTICLES OF AGREEMENT made the _____ day of _____ between the Reserve Bank of India, Regional office at Kolkata - 700001 (hereinafter called "the Employer") of the one part and _____
_____
(hereinafter called "the Contractor") of the other part.

WHEREAS the Employer is desirous of carrying out the work of **Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)** and has caused drawings and specifications describing the works to be done.

AND WHEREAS the said drawings, the Specifications and the Schedule of Quantities have been signed by or on behalf of the parties hereto.

AND WHEREAS the Contractor has agreed to execute upon and subject to the Conditions set forth herein and to the Conditions set forth in the Special Conditions and in the Schedule of Quantities and Conditions of Contract (all of which are collectively hereinafter referred to as "the said Conditions") the works shown upon the said Drawings and/or described in the said Specification and included in the Schedule of Quantities at the Respective rate therein set forth amounting to the sum as therein arrived at or such other sum as shall become payable there under (hereinafter referred to as "the said Contract Amount").

NOW IT IS HEREBY AGREED AS FOLLOWS:

1. In considerations of the said Contract Amount to be paid at the times and in the manner set forth in the said Conditions, the Contractor shall upon and subject to the said Conditions execute and complete the work shown upon the said Drawings and described in the said Specifications and the Schedule of Quantities.
2. The Employer shall pay the Contractor the said Contract Amount or such other sum as shall become payable, at the times and in the manner specified in the said Conditions.

3. The term “Architect” in the said conditions shall mean ‘ in house Architect ’ for the purpose of architectural planning & designing etc. of the Renovation works under this contract.

4. The Reserve Bank of India shall administer and directly arrange for supervision of works, certification of bills, making payments and implementation of various terms, conditions and stipulations of the contract.

5. The said conditions and various schedules shall be read and construed as forming part of this agreement, and the parties hereto shall respectively abide by, submit themselves to the said Conditions and perform the agreements on their part respectively in the said Conditions contained. The agreement and documents mentioned herein shall form the basis of this Contract.

6. This Contract is neither a fixed Lump sum contract nor a Piece Work Contract but is a Contract to carry out the work in respect to**.** to be paid for according to actual measured quantities at the rate contained in the Schedule of rates and Probable Quantities or as provided in the said Conditions.

7. The Contractor shall afford every reasonable facility for the carrying out of all works relating to civil works, installation of sanitary work and fittings, permanent water supply, electrical installations, fittings, air conditioning and other ancillary works in the manner laid down in the said conditions and shall make good any damages done to walls, floors etc. after the completion of such works.

8. The Employer reserves to itself the right of altering the Drawings and nature of the work by adding to or omitting any items of work or having portions of the same carried out without prejudice to this contract.

9. Time shall be considered as the essence of this Contract and the Contractor hereby agrees to commence the work soon after the site is handed over to him or from the scheduled date of commencement as provided for in the said Conditions whichever is later and to complete the entire work within **9 calendar months** subject nevertheless to the provisions for extension of time in writing by such form (i.e. by way of a deed of agreement or by exchange of letters / emails) as may be mutually decided by the parties, failing which the employer shall be entitled to recover liquidated damages as per the said conditions.

10. All payments by the Employer under this Contract will be made only at Kolkata.

11. All disputes arising out of or in any way connected with this agreement shall be deemed to have arisen at Kolkata and only Courts in Kolkata shall have jurisdiction to determine the same.

12. That the several parts of this Contract have been read by the Contractor and fully understood by the Contractor. The Contractor shall not be entitled for the payment for the quantities beyond the tendered quantities unless ordered for by specific written instructions from the Bank's Engineer-in-Charge.

13. The Contractor shall not disclose directly or indirectly any information, materials and details of the Bank's infrastructure/systems/equipment etc., which may come to the possession or knowledge of the Contractor during the course of discharging its contractual obligations in connection with this agreement, to any third party and shall at all times hold the same in strictest confidence. The Contractor shall treat the details of the contract as private and confidential, except to the extent necessary to carry out the obligations under it or to comply with applicable laws. The Contractor shall not publish, permit to be published, or disclose any particulars of the works in any trade or technical paper or elsewhere without the previous written consent of the Employer. The Contractor shall indemnify the Employer for any loss suffered by the Employer as a result of disclosure of any confidential information. Failure to observe the above shall be treated as breach of contract on the part of the Contractor and the Employer shall be entitled to claim damages and pursue legal remedies.

    The Contractor shall take all appropriate actions with respect to its employees to ensure that the obligations of non-disclosure of confidential information under this agreement are fully satisfied.

14. We agree to take steps to prevent sexual harassment of any of our lady employees as per the Provisions of 'The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act 2013.'

15. The Contractor's obligations with respect to non-disclosure and confidentiality will survive the expiry or termination of this agreement for whatever reason.

IN WITNESS WHEREOF the Employer and the Contractor have set their respective hands to these presents the day and year first hereinabove written.

If the contractor is a partnership or an individual.

IN WITNESS WHEREOF the Employer has set its hands to these presents through its duly authorized official and the Contractor has caused its common seal to be affixed hereunto and has caused these presents to be executed on its behalf, the day and year first hereinabove written.

If the contractor is a company.

Signature Clause

SIGNED AND DELIVERED by the Reserve bank of
India by the hand of
Shri

(Name and designation)
In the presence of
(1)
Address
(2)
Address
Witness

SIGNED AND DELIVERED by
In the presence of
(1)
Address
(2)

Address

If the party is partnership firm or an individual should be signed by all or on behalf of all the partners.

Witness
THE COMMON SEAL OF
Was hereunto affixed pursuant to the resolutions passed by its Board of Directors at the meeting held on _____
in the presence of

(1)
(2)

Directors who have signed these presents in token thereof in the presence of (1) (2)	If the Contractor signs under its common seal, the signature clause should tally with the sealing clause in the Articles of Association.
SIGNED AND DELIVERED BY the Contractor by the hand of Shri _____ and duly constituted attorney.	If the Contractor is signing by hand of power of Attorney, whether a company or individual.

Annex 2

PROFORMA OF BANK GUARANTEE FOR EARNEST MONEY DEPOSIT/ BID SECURITY

(On Non-Judicial Stamp Paper of appropriate value)

Place:_____

Date:_____

Regional Director
Reserve Bank of India
Kolkata- 700001

Dear Sir,

Name of Work: Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)

Ref.: NIT/Advt.No. date

WHEREAS

The Reserve Bank of India, having its Regional Office at Kolkata (hereinafter called the 'RBI') has invited tenders for the captioned work (hereinafter called "the said tender") on the terms and conditions mentioned in the said tender documents.

It is one of the terms of invitation of tenders that the tenderer shall furnish a Bank Guarantee for a sum of Rs. _ (Rupees _____ only) as Earnest Money Deposit (EMD).

M/s. (Name of the Tenderer/Bidder) _____, (hereinafter called as "the Tenderer/ Bidder"), who are our Clients/Constituents intend to submit their tender/ Bid for the said work and have requested us to furnish Bank Guarantee to RBI in respect of the said sum ~~of Rs.~~ (Rupees _____ only) in respect of EMD.

NOW THIS GUARANTEE WITNESSETH

1. We __ (Name of the Bank) do hereby agree with and undertake to RBI, their Successors, Assigns that in the event of the RBI coming to the conclusion that the Tenderer have not performed their obligations under the said conditions of the tender or have committed a

breach thereof, which conclusion shall be binding on us as well as the said Tenderer; we shall on demand by the RBI, pay without demur to the RBI, a sum of Rs. _____ (Rupees _____ only) or any lower amount that may be demanded by the RBI. Our guarantee shall be treated as equivalent to the Earnest Money Deposit for the due performance of the obligations of the Tenderer under the said Conditions, provided, however, that our liability against such sum shall not exceed the sum of Rs. _ (Rupees _____ only).

2. We also agree to undertake to and confirm that the sum not exceeding Rs. _ (Rupees _____ only) as aforesaid shall be paid by us without any demur or protest, merely on demand from the RBI on receipt of a notice in writing stating that the amount is due to them and we shall not ask for any further proof or evidence and the notice from the RBI shall be conclusive and binding on us and shall not be questioned by us in any respect or manner whatsoever. We undertake to pay the amount claimed by the RBI within a period of one week from the date of receipt of the notice as aforesaid.
3. We confirm that our obligation to the RBI under this guarantee shall be independent of the agreement or agreements or other understandings between the RBI and the Tenderer.

This guarantee shall not be revoked by us without prior consent in writing of the RBI.

We hereby further agree that –

a) Any forbearance or commission on the part of the RBI in enforcing the conditions of the said agreement or in compliance with any of the terms and conditions stipulated in the said tender and/or hereunder or granting of any time or showing of any indulgence by the RBI to the Tenderer or any other matters in connection therewith shall not discharge us in any way and our obligation under this guarantee. This guarantee shall be discharged only by the performance by the Tenderers of their obligations and in the event of their failure to do so, by payment by us of the sum not exceeding Rs. _____ (Rupees _____ _____ only).
b) Our liability under these presents shall not exceed the sum of Rs. (Rupees ___ _____ only).

c) Our liability under this agreement shall not be affected by any infirmity or irregularity on the part of our said constituents/clients in tendering for the said work or their obligations there under or by dissolution or change in the constitution of our said constituents.

d) This guarantee shall remain in force up to _____ (four months from the last date of submission of tender) provided that if so desired by the RBI, this guarantee shall be renewed for a further period as may be indicated by them on the same terms and conditions as contained herein.

e) Our liability under these presents will terminate unless these presents are renewed as provided hereinabove on the _____ or on the day when our said constituents comply with their obligations, as to which a certificate in writing by the RBI alone is the conclusive proof whichever date is later. Unless a claim or suit or action is filed against us within _____ or any extended period, all the rights of the RBI against us under this guarantee shall be forfeited and we shall be released and discharged from all our obligations and liabilities hereunder.

Yours faithfully,

For and on behalf of _____ Bank.

Authorized Official (with seal)

(NB: This guarantee will require stamp duty as applicable in the state, where it is executed and shall be signed by the official whose signature and authority shall be verified).

Annex 3

PROFORMA OF BANK GUARANTEE for PERFORMANCE SECURITY DEPOSIT

(On Non-Judicial Stamp Paper of appropriate value)

Place:_____

Date:_____

Regional Director
Reserve Bank of India
Kolkata- 700001

Dear Sir,

Name of Work : Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)

Whereas Reserve Bank of India, having its Regional Office at Kolkata (hereinafter called "the RBI") has awarded the Contract for the captioned project (hereinafter called the "Contract") to M/s _____ (Name of the Contractor) (hereinafter called " the said Contractor" which expression shall include its successors and assigns).

AND Whereas the Contractor is bound by the said Contract to submit to RBI a Performance Security for a total amount of ₹._____ (Rupees___ _____ only) (Amount in figures and words) for the due fulfilment by the said contractor of the terms and conditions contained in the contract. We,_____(Name of the Bank), (hereinafter called "the Bank"), at the request of M/s _____, the contractor, do hereby undertake to pay to the RBI an amount not exceeding Rs _____ as Performance Guarantee for due fulfilment of the terms and conditions of the contract.

NOW THIS GUARANTEE WITNESSETH

1. We __ (Name of the Bank) do hereby agree with and undertake to RBI, their Successors, Assigns that in the event of the RBI coming to the conclusion that the Contractor has not performed his obligations under the said conditions of the contract or have committed a breach thereof, which conclusion shall be binding on us as well as the said contractor; we shall on demand by the RBI, pay without demur to the RBI, a sum of Rs. _ (Rupees __ only) or any lower amount that may be demanded by the RBI. Our guarantee shall be treated as equivalent to the Performance Guarantee Amount for the due performance of the obligations of the Contractor under the said Contract, provided,

however, that our liability against such sum shall not exceed the sum of Rs. _ (Rupees _____ only).

2. We also agree to undertake to and confirm that the sum not exceeding Rs. _ (Rupees _____ only) as aforesaid shall be paid by us without any demur or protest, merely on demand from the RBI on receipt of a notice in writing stating that the amount is due to them and we shall not ask for any further proof or evidence and the notice from the RBI shall be conclusive and binding on us and shall not be questioned by us in any respect or manner whatsoever. The Bank shall pay to RBI any money so demanded notwithstanding any dispute/disputes raised by the Contractor in any suit or proceedings pending before any Court, Tribunal or Arbitrator/s relating thereto and the liability under this guarantee shall be absolute and unequivocal. We undertake to pay the amount claimed by the RBI within a period of one week from the date of receipt of the notice as aforesaid.
3. We confirm that our obligation to the RBI under this guarantee shall be independent of the agreement or agreements or other understandings between the RBI and the Contractor.
4. This guarantee shall not be revoked by us without prior consent in writing of the RBI.

We hereby further agree that –

f) Any forbearance or commission on the part of the RBI in enforcing the conditions of the said agreement or in compliance with any of the terms and conditions stipulated in the said Contract and/or hereunder or granting of any time or showing of any indulgence by the RBI to the Contractor or any other matters in connection therewith shall not discharge us in any way and our obligation under this guarantee. This guarantee shall be discharged only by the performance by the Contractor of their obligations and in the event of their failure to do so, by payment by us of the sum not exceeding Rs. _____ (Rupees _____ only).

g) Our liability under these presents shall not exceed the sum of Rs. (Rupees _____ only) .

h) Our liability under this agreement shall not be affected by any infirmity or irregularity on the part of our said constituents/clients or their obligations thereunder or by dissolution or change in the constitution of our said constituents.

i) This guarantee shall remain in force up to (30 days beyond the work completion period) provided that if so desired by the RBI, this guarantee shall be renewed for a further period as may be indicated by them on the same terms and conditions as contained herein.

j) Our liability under these presents will terminate unless these presents are renewed as provided hereinabove on the _____ or on the day when our said constituents comply with their obligations, as to which a certificate in writing by the RBI alone is the conclusive proof whichever date is later. Unless a claim or suit or action is filed against us within _____ or any extended period, all the rights of the RBI against us under this guarantee shall be forfeited and we shall be released and discharged from all our obligations and liabilities hereunder.

In witness whereof I/We of the Bank have signed and sealed this guarantee on the ---------- day of ---------- (Month) **……** being herewith duly authorized.

For and on behalf of _____ (Name of the Bank)

Signature of authorized Bank official Name:
Designation
Stamp/ Seal of the Bank
Signed, sealed and delivered for and on behalf of the Bank by the above named in the presence of :

Witness 1	Witness 2
Signature ……	Signature ……
Name ……	Name ……
Address ……	Address
……..	

Annex 4

FORMAT FOR POWER OF ATTORNEY FOR AUTHORIZED SIGNATORY

(On Non-Judicial Stamp Paper of appropriate value)

To,

Regional Director
Reserve Bank of India
Kolkata- 700001

Dear Sir

Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)

We……..…….(Name of the Bidder and address of their registered office) do hereby constitute, appoint and authorise Mr. / Ms. …… ……..…… ……(Name and residential address of Power of Attorney holder) who is presently employed with us and holding the position of ……..…… as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our bid for the captioned Project, including signing and submission of all documents and providing information / responses to the Reserve Bank of India (RBI), representing us in all matters before RBI, and generally dealing with RBI in all matters in connection with our proposal for the said Project.

We hereby agree to ratify all acts, deeds and things lawfully done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us.

Signature/(s) of the Bidder
Name/(s)
Stamp/Seal of the Bidder
Note:
Power of Attorney should be properly stamped and notarized
Power of Attorney furnished by Contractor shall be irrevocable.

Annex 5

Proforma for providing input for NEFT Payment

RTGS/NEFT/ECS – MANDATE AUTHORISATION FORM

1. **Supplier's / Vendor's Name:**

2. **Supplier's / Vendor's Name as per Bank Records:**

3A. Supplier's Code **3B. Supplier's PAN Number: #**

Quoting PAN No. in all the e-returns has become 100% mandatory w.e.f. 14-02-2008, hence ensure to fill- up this and also send a photocopy of PAN duly self-attested. If there is any difference between the name given in the supplier's name and name given in the PAN card, then a note to explain the reason for the difference and the correlation between both.

4. **Supplier's / Vendor's Complete Postal Address:**

Door No.								Street:													
Location:								District:													
City:								State					PIN								

5. **Supplier's / Vendor's E-mail ID:**

6. **Supplier's / Vendor's Telephone Number & Mobile Phone Number:**

										M											

7. **Name of the Bank:**

8. Bank (Branch) Postal Address:

9. RTGS*/NEFT /MICR- Code of the Branch:**

RTGS:																			
NEFT:																			
MICR:																			

RTGS* - “Real Time Gross Settlement”, NEFT** - “National Electronic Fund Transfer”. MICRMagnetic Ink Recognition Character These “IFSC” Codes are unique numbers of each Branch – “ Indian Financial Services Code”. For some Branches boththe codes are the same and some Banks, may maintain one Code No. for RTGS and another Code No. for NEFT. Hence, please fill-up both the rows, even if it is the same.

10. Nature of the Account: (Tick whichever is applicable & put ‘x’ mark for the balance **two accounts)**

Saving Bank Account:		Cash Credit Account:		Current Account:	

11. Bank Account Number of the Supplier: ©

© Fill up from the 1st column. For the balance left out blank columns, please mention ‘x’ mark.
We hereby declare that the particulars given above are correct and complete. If the transaction is delayed for reasons of incomplete or incorrect information, we would not hold MDL responsible.

Date: Supplier’s Seal: Authorized Signature of the Supplier:
Certified that the particulars as per Serial Numbers 2, 7 to 11 are correct as per our records.

Date: Bank’s Stamp Authorized Signature of the Officer of the Bank.

Annex 6

Proforma for Indemnifying the Employer against Contract labour Rules/regulations

(On Non-Judicial Stamp Paper of appropriate value)

To,

Regional Director
Reserve Bank of India
Kolkata- 700001

Dear Sir

Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata - Phase I (ZTC)

We, M/s …… (Name of contractor), hereby undertake that we shall comply with all the statutory rules/ regulations with regard to the employment of contract labour and their payment. We also hereby fully indemnify and keep indemnified the Employer, i.e. Reserve Bank of India, against payments to be made to the contract labour and for the observance of the laws in this regard without prejudice to our right to claim indemnity from our sub-contractors.

Yours faithfully,

For _____

Authorised signatory

Annex 7

Proforma for Indemnifying the Employer against Patent Rights

(On Non-Judicial Stamp Paper of appropriate value)

To,

Regional Director
Reserve Bank of India
Kolkata- 700001

Dear Sir

Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)

We, M/s _____ (Name of Contractor) hereby undertake to fully indemnify and keep indemnified the Employer i.e. Reserve Bank of India against any action, claim or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall ourselves pay any royalties, licence fees etc. which may be payable in respect of any article or part thereof included in the contract or damages, cost and charges of all and every sort that may be legally incurred in respect thereof.

In the event of any claims made under or action brought against Employer in respect of any such matters as aforesaid, we shall, on being notified thereof, at our own expense, settle any dispute or conduct any litigation that may arise therefrom, provided that we shall not be liable to indemnify the Employer if the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the Engineer-in-Charge in this behalf.

Yours faithfully,

For _____

Authorised signatory

NAME AND ADDRESS OF THE CONTRACTOR:
SIGN & SEAL OF THE CONTRACTOR:
Date:
Place:

Annex 8

FORMAT OF MEASUREMENT BOOK

M. B.No._____ Page No._____

Tender Item No./ Tender Page No.	Full Description of item of work	Measurements				Quantity
		No.	L	B	D/H	

Abstract of cost for Running/Final Bill

Running Bill no: …….

M.B. No. _____ Page No. _____

Serial No.	Tender Item No.	Description	Quantity	Rate ₹	Unit	Amount ₹
1	2	3	4	5	6	7

Annex 9 Undertaking regarding declaration of debarment by public institution(s)

(Clause 9 of Section IV)

(To be submitted by the tenderer on their letterhead)

Name of Work: Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)

1. I/We …….. (Name of the bidder) declares that

a) I/we or any of our allied firm* is/ are not debarred / suspended / blacklisted by any public institution / entity in India or any other country as on ……..(last date of submission of bid).

b) I/ We or any of our allied firm* have not made any transgression in respect of the code of integrity (as mentioned in the tender) with any public institution / entity in India or any other country in last three years as on ……...(last date of submission of bid).

c) we will inform the Bank in writing, in case, I/we or any of our allied firm* is/are debarred / suspended / blacklisted by any public institution / entity in India or any other country on or before award of work for the captioned work.

2. I/We ……..(Name of the bidder) declare that I/we or our allied firm* ……(Name of the allied firm(s)) is/ are debarred / suspended / blacklisted by ……..(Name and address of public institution in India or any other country) and the same effective upto ……(date). A copy of such letter is attached for your information and record.

(seal and signature of the bidder)

Date

Place

(Note: strike out one of the above two declarations which is not applicable)

*Allied firm: A firm would be termed as "allied firm" if the management is common, or substantial or majority shares are owned by the banned/ suspended firm and by virtue of this it has a controlling voice. Further all successor firms will also be considered as allied firms.

Annex 10 Proforma for Undertaking / Declaration / Certificate by the Bidder

regarding country sharing land border with India
(clause 30 (ii) of Section IV)

To

The Regional Director
Estate Department
Reserve Bank of India
kolkata

Name of Work: Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)

I / We ... ... (Name and address, including Country of location of bidder) have read and understood the contents of the Office Memorandum (OM) F. No. 6/18/2019-PPD dated July 23, 2020 and its subsequent orders / revision issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, Government of India regarding the restrictions on procurement from a bidder of a country which shares a land border with India.

2. I / We certify that (Name of the bidder)

i. is not from a country sharing land border with India, or
ii. is from a country sharing land border with India and has been registered with the Competent Authority, the certificate of which is enclosed, or
iii. is from a country sharing land border with India where Government of India has extended lines of credit, or
iv. is from a country sharing land border with India where Government of India is engaged in development projects.

(Strikeout whichever of the above is not applicable).

3. I /We further certify that ..... (Name of bidder) fulfils all requirements in this regard and is eligible to be considered under the provision of the above referred Office Memorandum and its subsequent orders / revision. I/We also undertake that even in case of contracts where we are permitted by the Bank/RBI to sub- contract I/we (Name of bidder) will not sub-contract any work to a contractor from country(ies) sharing land border with India, unless such contractor fulfils all the requirements contained in the above referred office memorandum / order.

4. I/We know and understand that, if this Undertaking / Declaration / Certificate submitted by us is found to be false, the Bank shall be free to reject / terminate our tender / Work Order and that the Bank shall also be free to initiate any legal action in accordance with law including forfeiting of Earnest Money Deposit / Performance Bank Guarantee / Security Deposit and / or debarring us from participating in tenders invited by the Bank in future.

Signature and name of the authorized signatory of the Bidder with Stamp

Date:
Place:

11 CHECK LIST

A. **List of Documents duly signed and certified and to be submitted to the Reserve Bank of India on or before last date and time of submission and uploaded within the period of bid submission**:

Sl.No.	Description of Documents	Submitted (Yes / No)
i	Form of tender	
ii	UTR No. of NEFT Transaction for submission / Bank Guarantee (BG) as per prescribed format for EMD.	
iii	Composition of the firm/organization:	
	(i)Format 1 (duly signed)	
	(ii) Copy of registration certificate.	
	(iii)Copy of the Articles of Association/ Power of Attorney (Annex 5)/other relevant document	
	(iv)copy of Goods and Service Tax registration certificate	
	(v) Details of registration of labour along with EPF and ESI documents.	
iv.	Experience:	
	Proof of past experience of 7 years (Format 2)	
	Format 2A (works on hand)	
	List of eligible similar nature of works completed during the last Seven Years ending …… (work completed on or after ……, 20…) in Format 3	
	(i) Proof of eligible works (value wise – past 5 years) (a) Works executed for Government / Public sector companies: Copies of detailed work order/s for eligible works indicating date of award, contract amount, time given for completing the work, etc. and the corresponding completion certificate(s) indicating actual date of completion and actual value of executed similar work/s issued by the client(s)	
	(b) Work executed for Private Companies: Copies of work	

	order, work completion certificate along with Tax Deducted at Source (TDS) certificate(s) issued by the client(s) and Form 26AS for works executed for private companies.	
	(c)Client's certificate in Form 3A in the letterhead of the client and should be signed by the concerned Executive Engineer or an officer in an equivalent or higher rank.	
v.	Annual Financial Turn Over:	
	Format 4 duly signed by the bidder and certified by Chartered Accountant	
	Income Tax Assessment Orders along with the latest final accounts of the business of the contractor duly certified by a Chartered Accountant	
vi.	Solvency:	
	(a) Format 5 in the letterhead of the bidder's bank	
	(b) Details of Tenderer's bank in Format 5A	
vii.	Format 6 along with CVs of staff	
x.	Annex 6	
xi.	Annex 7	
xii	Annex 9	
xiii	Annex 10	
xiv	Annex 11	
xv.	Any other document as specified in the NIT and tender.	
B.	Original documents in physical form and duly signed to be submitted before scheduled date	
i.	Bank Guarantee / DD for EMD if BG/DD has been provided against EMD.	
ii.	All documents as above	

Reserve Bank of India

Estate Department, Kolkata

e-TENDER FOR

Renovation of Bank's Main Office Building 3rd floor, Reserve Bank of India, Kolkata- Phase I (ZTC)

Part II (Unpriced Bid)

PREAMBLE TO SCHEDULE OF QUANTITY

1. The work is to be carried out at 3rd floor, Main Office Building of the Bank, which is an occupied premise and hence said renovation work shall be executed with least disturbance to the office working and employees with all safety precautions. All necessary measures shall be taken for keeping the work area & surroundings in hygienic and safe condition all the time.

2. Tenderers, before filling the tender, shall inspect the site and place of work to understand the nature and scope of the work, working space available and any other related constraints and get acquaintance of the site including obtaining permissions from local authorities as if required. The fees required for taking any statutory approvals related to this work shall be reimbursed on submission of the original receipt to the Bank.

3. Contractor shall plan the schedule and submit to the Bank, a detailed work Schedule Dor completion in all respect in a stipulated time frame and as per the Contract Milestones.

4. The rates quoted below is inclusive of GST

5. The rates shall also include double scaffolding (mild steel) for false ceiling work and as required for other areas.

6. Wherever the items are provided with the Basic Rates / Prime Cost (PC) rates, the Basic rates / Prime costs rates are **ex-godown and are inclusive of all applicable taxes and duties levied by Local authority / Government and excluding transportation to site, loading, unloading, storing and handling etc.** The gross rate quoted by the intended bidder for the tender items provided with Basic rates / Prime Cost rates shall include transportation of materials to the site, transit insurance, loading & unloading of the materials, wastage, storing and handling etc. and nothing extra shall be paid. The contrctor shall produce original GST invoices for verification of the Basic rates / Prime cost rates.

7. All safety measures while working at site shall be followed and all workmen shall be provided like safety belts, hand glows, helmets.

8. Materials should be properly and carefully stacked and secured to avoid any accident / untoward incident at site as directed by the Banks' Engineer.

9. No debris shall be kept on the adjoining municipal foot path or within the premises of the office and same shall be removed frequently as per instructions of the Banks' Engineer. Debris formed in the work shall be brought down, stacked suitably only at location specified by the Banks' Engineer.

10. All the materials to be used in the work shall be got approved in advance from the Bank. The copies of delivery memos / invoices of the materials delivered / brought to the site shall be regularly submitted to the Bank's Engineer.

11. Contractors shall submit at least three samples of any approved make for the approval shades by the Bank. Final selection of the make and shades of the materials shall be done exclusively by the Bank.

12. During execution of the work, if any damages occurred to the Bank's property same shall be repaired satisfactorily without any extra charges to the Bank. Failing to comply with this condition, same will be got done by the Bank at the risk and cost of the successful contractors.

13. After completion of the work, the entire area shall be cleaned / cleared properly to the satisfaction of the Bank by the successful contractor and no debris, etc. shall be left behind. If, not done properly, then Bank will get it done through any of the agency at the risk and cost of the contractor.

14. The tenderer shall abide by all the rules and regulations of the State Government/ Central Government/ Local Authorities and the quoted rates shall be included for such expenses and Bank will not entertain any claim whatsoever on this account.

Place: Signature and seal of the Tenderer

Date: Name and Address :

E-mail id:

Name of the work "PH-I (ZTC) Renovation of 3rd floor", Main Office Building, RBI Kolkata			
Part I A Civil Work			
SL NO:	**Description**	**Unit**	**Qty**
1	**<u>DISMANTLING & DISPOSAL</u>** **Demolishing brick work in cement mortar including RCC lintel, cutting R/F steel, etc. (Qty. - 5 Cu.M. approx.)** manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material as per direction of Bank Engineer-in-charge. **Dismantling old plaster/skirting/mosaic & tile wall dado, etc. (Qty. - 1000 Sq.M. approx.)** raking out joints and cleaning the surface for plaster including disposal of rubbish to the dumping ground as per direction of Bank Engineer - in- charge/ **Dismantling floor tile work (Qty. - 1100 Sq.M. approx.)** in floors laid in cement mortar, etc. including bed mortar/PCC upto top surface of floor slab, stacking material as per direction of Bank Engineer - in- charge. **Disposal of building rubbish (Qty. - 100 Cu.M. approx.)** / malba / similar unserviceable, dismantled or waste materials by mechanical means, including loading, transporting, unloading to approved municipal dumping ground or as approved by Bank Engineer-in-charge, for all leads including all lifts involved.		

	Dismantling of all types toilet fittings & fixtures, pipe lines including stacking of useful materials as per direction of Bank Engineer - in- charge/ **Taking out existing doors, ms windows, wooden partition including holdfasts & repairing the damaged wall surface with PCC & covering window opening with ply board, etc. (Qty. - existing all windows & doors of ZTC hall & toilet areas)** including stacking, repairing wall as per direction of Bank Engineer - in- charge.	L.S	1.00
2	**Dismantling of Central AC Duct Branches** (Qty. - 50 R.M. approx.), existing electrical/data wiring, pipes, conduits cable trunkings, light fittings, etc. including stacking as per direction of Bank Engineer - in- charge.	L.S	1.00
3	**RCC Lintel :** Providing and placing Centering and shuttering for RCC lintel including strutting, propping etc. and removal of form work.Providing & placing **Steel reinforcement for R.C.C. lintel** including straightening, cutting, bending, placing in position and binding all complete above plinth level. (Mild steel and Medium Tensile steel bars).Providing & laying **Reinforced cement concrete work** in lintel , etc., above plinth level up to floor five level, in proportion 1:1.5:3 (1 cement : 1.5 coarse sand (zone-III) derived from natural sources : 3 graded stone aggregate 20 mm nominal size derived from naturel sources) , curing, cleaning, scaffolding, etc. all complete as directed by Bank's engineer.Size of RCC lintel **- 100mm x 150mmDetails of R/F steel - 4 Nos. 10mmTor (main bar)Stirrups - 8mm dia spacing @150mm C/C**	Rmt	15.00
4	**Providing and laying autoclaved aerated cement** blocks masonry with100 mm thick AAC blocks in super structure above plinth level up to floor V level in cement mortar 1:4 (1 cement : 4 coarse sand). The rate includes providing and placing in position 2 Nos 6 mm dia M.S. bars at every third course of masonry work, scaffolding, curing, cleaning, etc. all complete as directed by Bank's engineer.	Cu.m	6.00

5	**Providing & Applying 15 mm cement plaster** on the rough side of single or half brick wall of mix : 1:4 (1 cement: 4 fine sand), curing, scaffolding, cleaning etc. all complete as directed by Bank's engineer.	Sq.M	1100.00
6	**<u>Solid Flush door:</u> Providing Sal wood work in frames** of doors wrought framed and fixed in position with flat iron hold fast of required dia & length, as approved by Bank.**Providing 40 x 5 mm flat iron hold fast** 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embedding in cement concrete block 30x10x15cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20mm nominal size)**Providing and fixing 35mm thick** factory made ISI marked bank approved quality, brand flush door shutters Stainless Steel **4 set butt Hinges** with necessary screws,**Providing & fixing decorative 1mm thick laminated sheet** on both side approved colour shade, design, pattern including cost of adhesive.Providing and fixing Godrej or any approved eqquivalent make **handles/ locks, 2nos tower bolts** with necessary screws etc. complete.Providing and fixing Godrej or any approved eqquivalent make **universal hydraulic door closer** approved brand with necessary accessories and screws etc. complete/Providing and fixing bright finished brass hanging type **floor door stopper** with necessary screws, etc. complete/		
i	DOOR SIZE (0.90m x 2.10m) (FOR TOILET MAIN ENTRY EXCLUDING LOCK)	NOS	3.00
ii	DOOR SIZE (1.20m x 2.10m) (FOR PANEL ROOM INCLUDING LOCK)	NOS	1.00

7	**Aluminum System Windows** Providing and fixing white/diamond grey finish/ or any approved make size & colour factory make **Aluminum System Windows** (Type- Fix/Casement/Fix- Design window, Open Out, double unit window shutters having no separate unit for fix portions) of approved make, the supplier must have own fabrication facilities & control the entire cycle from fabrication to Installation. The weight of the fixed portion of window frame along with frame of the openable window shutters excluding nut bolts, nails, glass etc. to be minimum of 77.43 Kgs. Anchorages and supports shall be designed, fabricated and installed to comply with all performance criteria specified for the system, including the accommodation of thermal and building movements, dead, imposed and wind loadings and all other building dynamics, without having a detrimental effect on any other component of the system. Aluminium profile should be polyester powder coated of minimum 60 micron. Windows profile must be of high grade 6063 T6 Al alloy, as per the requirement & approved shop drawing, and gauge should be of minimum 1.5mm or as per the design & system requirement. Windows should have a glazing bead of appropriate dimension for hermitically sealed DGU glass (6mm Toughened + 12mm Air gap + 6mm Toughened), outer glass shall be 6mm thick tempered & low-E reflective glass and inside glass shall be 6mm thick clear toughened glass of approved make, with an aluminum spacer of 12mm (having desiccants to prevent condensation) & gasket shall be EPDM All hardware fittings must be of SS 304 grade, except handles to be of zinc/Al. alloy casted with powder coated. Hardware such as handle & friction hinge stay shall be endurance tested for at least 20,000 cycles/3 years. There would be Warranty of 10 years on Profile & two years on hardware from virtual completion of the work.The window should withstand cyclonic wind speed as per IS 875 (Part III), in this regard a design calculation from the manufacturer (in open, closed) need to be submitted for whole window, glass, hinge etc.	Nos	26

	. Installation shall be done by manufacturer with skilled labours. Installation must carry a manufacturing warranty for a period of 10 years against manufacturing defects and 10 years for leak proof installation. Installations shall also include cutting and any such miscellaneous work related to the installation of the window as necessary on site as per direction of Bank's engineer. The frame shall be fixed into position, true line & level using expansion number bolts, anchor fasteners of required size and of approved manufacturers. The holes in masonry/concrete works for housing anchor bolts shall be drilled with an electrical drill. The outer frame of window and sills/jambs must be sealed with silicone-based sealants or equivalent as per manufacturer's specification from outside and from inside and test certificate from the supplier /contractor need to be obtained certifying that there will be no leakage and air passing through the windows for a period of 10 years.Other Arrangements: The frame must have provision of drainage and should include all necessary hardware fittings such as high-quality locks with key, stay etc. all complete in the pattern as per architectural drawings and as per direction of bank. There will be opening/s in shutter/fixed portion of window for installation of exhaust fan in washroom areas.The product should be free from all sharp edges and blurs. Water drainage is made in the profile to ensure that if any water comes due to an open window then it is immediately drained out. All hardware including its fixings is of materials resistant to or protected against atmospheric corrosion. And the rate is inclusive of covering of window openings with plywood after removal of old ms window, cleaning, etc. all complete as directed by Bank's engineer.Window Size – appr 1.75 x 3.32 m and indicative drawing of the window is enclosed.		
8	**Toilet Flooring** Providing and laying approved make, size, finish and shade ceramic /**vitrified non-skid, non-slip tiles** of approved manufacturer in flooring, laid to required level, slope and pattern on 20mm thick cement mortar 1:4 (1 cement: 4 sand) bedding set in cement slurry, jointing neatly with white cement mixed with matching pigment, cleaning, curing etc complete as directed by the Bank's engineer. **(Note - Basic cost of tiles: Rs.620/- per sqm excluding GST)**	sqm	25.00

9	**Toilet Dado** Providing and fixing approved size,make, finish and shade **ceramic /vitrified** glossy/matt finish tiles of approved manufacturer in Dado laid on average 12mm thick cement mortar (1:3) bedding set in cement slurry including jointing with polymer cement grout of matching shade or white cement slurry mixed with polymer and matching pigment, cleaning, curing, making good the damages, cleaning etc. all complete as directed by Bank's engineer. **(Note - Basic cost of tiles Rs. 620/- per sqm excluding GST)**	sqm	130.00
10	Providing and laying approved quality **vitrified tiles of size 600x 1200** mm or any approved size of approved manufacturer and shade on existing floor in required design and pattern providing 3mm thick spacer over 20 mm thick bed of cement mortar 1:4 (1 cement : 4 coarse sand) jointing with tile jointing compound of approved manufacturer/epoxy grout including filling of joints using pigment to match with the colour of tiles, cleaning, maintaining proper line & level, slope etc. all complete. The rate shall also include additional cost for extra thickness for maintaining proper floor level with required PCC and the cost of removing of debris and disposing it away from the Bank's Premises, cleaning the site, making good the damages, if any, etc. all complete as per the directions of Bank's Engineer. The rate includes for making inlays, cutouts for electrical junction boxes if any etc complete.**(Note - Basic Rate of Vitrified tiles Rs.850/- per sqm excluding GST)**	sqm	1063.00
11	Providing and fixing approximately **150 mm high skirting with vitrified tiles** of approved make, size and design (150 mm size to be cut from 600mm X 1200mm size tiles) wherever required in approved shade, design and pattern, laid on 12mm thick average cement mortar 1:3 (1 cement : 3 coarse sand) bedding tiles in cement slurry , backing grouting joints with polymer cement grout or white cement slurry mixed with polymer and matching pigment, cleaning, curing, etc. The rates shall include for dismantling carefully the existing marble mosaic skirting (approximately 130 mm. high), making good the damages with cement mortar, cleaning, disposal of debris out of Bank premises etc. complete as directed by Bank's engineer in charge. **(Note - Basic rate of Vitrified tiles 600mm x 1200 mm is Rs850/- per sqm excluding GST**	RM	150.00

12	**Window sill** Providing, laying and fixing in position approved colur & size minimum 18 mm thick machine cut mirror polished granite stone slab at window and door sill, facia etc of approved quality, colour and shade, complete including making required shape and size for fixing, finishing the edges with grinding to Bull nose shape, polishing the cut edges as specified etc, cutting chases in walls & fixing with cement mortar (1:3), etc all complete as per direction of Bank's Engineer. **(Note - Basic Rate of Granite slab Z Black - Rs.2300/- per Sqm excluding GST)**	sqm	22.00
13	Providing and applying **white cement based putty** of average thickness 1 mm, of approved brand and manufacturer, over the plastered wall surface to prepare the surface even and smooth complete including necessary scaffolding at all height, etc. all complete as directed by Bank's engineer.	sqm	1100.00
14	Providing and applying two or more coats of **Acrylic emulsion paint** of approved make and shade to walls, ceilings and other surfaces to give an even shade over a coat of internal primer as per manufactures specifications, including necessary scaffolding, preparation of surface etc., complete including all leads and lifts as per the directions of the Bank's Engineer. **Preparation of surface as per Bank's specification:** During the repainting works proper surface preparation/ through scrapping of old paint by quality workmanship must be ensured, 1st coat of approved paint & primer shall be applied only after site inspection and approval of surface preparation by Bank's engineer supervising the works & there is no unevenness/undulation/ and the surface is smooth and ready to receive prime coat/1st coat of paint.	sqm	1100.00
15	Providing and applying two or more coats of 1st quality **synthetic enamel paint** of approved make and shade to wooden windows and steel frames, grills etc over surfaces to give an even shade over a coat of wooden/metal primer as per manufactures specifications, including necessary scaffolding, preparation of surface etc., complete including all leads and lifts as per the directions of the Bank's Engineer.	sqm	3.47

16	**Counter Sunk wash basin** Providing and fixing approved size & colour in position machine cut **20mm thick one side polished kadappa slab** 850mm x 650mm approximately below the acrylic sheet solid surface slab for wash basin with cut out of required size to accommodate oval shaped basin, supported on 20mm dia "A" class GI. pipe bracket (horizontal support), including cost of cutting chases in walls fixing with cement mortar (1:3). The rate should also include cost of supplying and fixing one side polished 25mm thick vertical support of kadappa stone, etc all complete as per the directions of the Bank's Engineer. **Note - (Basic Rate of kadappa stone: Rs.500/- per Sqm)**	sqm	7.00
17	Providing, laying and fixing approved make, size & colour in position minimum **6 mm thick acrylic sheet solid surface of approved make, size and colour** counter slab and vertical slab, facia etc on the kadappa stone slab of approved quality, colour and shade, complete including making cut-out of required shape and size for fixing oval shape wash basin, finishing the edges with grinding to Bull nose shape, polishing the cut edges as specified etc, cutting chases in walls & fixing with company specified additive, etc all complete as per direction of Bank's Engineer.**Note - (Basic Rate of 6 mm thick acrylic sheet solid surface: Rs.10225.80/- per Sqm)**	sqm	7.00
18	Supplying and fixing new wash basin **glazed vitreous china oval shaped under counter hand wash basin** of approved brand & approved size 605X430X200 mm approximately including supply & fixing all type of fittings e.g 32mm dia CP waste coupling, approved make bottle trap, 15mm dia.wire netted PVC connector pipe 600mm long, approved make pillar cock (long body) etc. all complete as per direction of Bank's Engineer. **Note - Basic cost of wash basin Rs.2542.37/-each excluding GST.**	Nos	6.00
19	Providing and fixing **6 mm thick mirror** of requisite size fixed with manufacturers specified studs as per the site of approved make by Bank complete with 6mm thick water proof masonite/cement particle board. complete as per the directions of the Bank's Engineer.	Sqm	5.00

20	Supplying & installing approved make & model white colour **wallhung European commode with hydraulic seat cover** etc. of approved make, complete set including all necessary fittings accesories & hardwares including making leakproof connection with flushing cistern, cutting & chasing brick /RCC memebers/ walls, floors, removing old P/S traps complete as directed by Bank's engineer. **Note - White colour, wall hung commode with seat cover (Basic rate is Rs. 7330.51/- excluding GST).**	each	3.00
21	Supplying and fixing approved make & model **concealed flushing cistern dual type** of approved make with flush control plate of approved make, including all neesary hardware acceesories, connectors etc. so as to make leakprooof connection from the designated water inlet point to EWC outlet for smooth flushing all complete as directed by Bank's Engineer.**Note - Concealed cistern including flush control plate (Basic Rate Rs.5338.99/- (4194.92+1144.07) each set excluding GST)**	each	3.00
22	Providing, fixing and testing approved make & model following **C.P. brass toilet plumbing, sanitary fittings & accessories** with flange wherever applicable, etc complete all as directed by Bank's engineer.15mm CP Brass fittings:		
22 i	**2 way Bib Cock with nozzle (quarter turn)** - of approved make **Note - (Basic rate of Bib cock Rs.1864.41/- each excluding GST)**	Nos	3.00
22 ii	**Health faucet** with 8mm diameter, 1.20 mt long flexible tube & wall hook of approved make, **Note - (Basic rate Rs. 974.58/- each excluding GST)**	Nos	3.00
22 iii	**Angular Stop cock** - of approved make, **Note - (Basic rate of Bib cock Rs. 805.08/- each excluding GST)**	Nos	9.00

22 iv	**Concealed Stop Cock Regular** -of approved make, **Note - (Basic rate of Bib cock Rs. 572.03/- each excluding GST)**	Nos	7.00
22 v	**Single towel rail** 600mm long of approved make, **Note - (Basic rate of Single towel rail 600mm long is Rs. 1207.63/- each excluding GST)**	Nos	3.00
22 vi	**Towel ring square** with round flange of approved make, **Note - (Basic rate of Towel ring square with round flange is Rs. 1144.07/- each excluding GST)**	Nos	7.00
22 vii	**Glass shelf** 600mm long of apprved make, Note: **Basic rate of Glass shelf 600mm. long is Rs. 1144.07/- each excluding GST**	Nos	3.00
22 viii	**Soap Dispenser with Glass Bottle of approved make,Note - (Basic rate of Soap Dispenser is Rs.656.78/- each excluding GST)**	Nos	9.00
22 ix	**Double Coat hook** of approved make, **Note - (Basic rate of Double Coat hook is Rs. 508.47 each excluding GST)**	Nos	3.00
22 x	Providing and fixing Stainless steel **drain Jali of approved make,** grating of approved make or similar approved by Bank over the trap mouth including fixing it white cement and seal the gap peroperly. **Note - (Basic rate Rs. 250/- each excluding GST)**	Nos	6.00

23 i	Providing and fixing **white vitreous urinal** of approved make & size by bank, with fittings, standard size C.P. brass flush pipe, spreaders with unions and clamps (all in C.P. brass) with waste fitting as per C.I. trap with outlet grating and other couplings in C.P. brass, including painting of fittings and cutting and making good the walls and floors wherever required. **Note - (Basic rate Rs.3474.58/- each excluding GST)**	each	3.00
23 ii	Providing and fixing **Urinal Valve** Auto Closing Built-in Control Cock & Wall Flange of approved make, & size by bank, with fittings, standard size C.P. brass flush pipe, including painting of fittings and cutting and making good the walls and floors wherever required. **Note - (Basic rate Rs.2161.02/- each excluding GST)**	each	3.00
23 iii	Providing and fixing **Urinal Partitions** of approved make, & size by bank, with fittings, including cutting and making good the walls and floors wherever required. **Note - (Basic rate Rs.5381.36/- each excluding GST)**	each	2.00

24	**<u>Providing and Installation of approved make,colour and design COMPACT LAMINATE TOILET PARTITION WITH DOOR :</u>** CUBICLE SS 1980MM. Thickness of Compact Laminate : 12mmColor of HPL Boards: Single Standard Compact ColorSize of Cubicle : 900mm (W) X 1550mm (D) X 1980mm (H)Door Size : 1765mm (H) X 600mm (W)Divider Size : 1775mm (H)Overall Height Of Cubicle :1980mm (Including bottom Gap of 150mm. Accessories: Standard of Approved Make by Bank Stainless Steel - 304 Grade accessories)a) SS "U" Channelb) SS "F" Channel (Only Corner Unit)c) SS Door Stopper Channeld) SS Top Raile) SS Coat Hookf) SS Privacy Thumb turn c/w Occupancy Indicatorg) SS Door Knobh)SS Spring Loaded Butt Hinges with Cover i) SS Adjustable Foot - 316 Gradej) Rubber Lining for Door Stopperk) S.S.Screws 304 G & P.V.C Wall PlugsSPECIAL NOTE - Warpage Criteria is 3.0 mm/1000mm for MRS panels as per EN standard- 438.Basic rate Rs.30329.08	Pcs	2.00
25	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply, including all CPVC plain & brass threaded fittings, including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and testing of joints complete as per direction of Bank Engineer in Charge**.Internal work - Exposed on wall. 25 mm nominal outer dia Pipes.**	metre	20.00
26	32 mm nominal outer dia Pipes	metre	20.00
27	40 mm nominal outer dia Pipes	metre	40.00

28	Providing and fixing SDR 11 grade Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply, including all CPVC plain & brass threaded fittings, i/c fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Bank Engineer in Charge. **Concealed work, including cutting chases and making good the walls etc. 15 mm nominal outer dia Pipes.**	metre	10.00
29	20 mm nominal outer dia Pipes	metre	30.00
30	25 mm nominal outer dia Pipes	metre	25.00
31	32 mm nominal outer dia Pipes	metre	10.00
32	Providing and fixing SDR 11 grade Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Bank Engineer in Charge. **External work 50 mm nominal outer dia Pipes**	metre	50.00

33	**Providing and applying polymer based two compound water proofing treatment** to the sunken portion, slab and raised platform of the toilets, baths and kitchen etc. by using products of approved make in the following steps: a) Thoroughly cleaning of all surfaces to be treated. b) Providing and applying 20 mm thick water proofing cement plaster 1:4 (I cement: 4 coarse sand) mixed with water proofing compound as per manufacturer's specifications to the sunken floor and sides including rounding off junctions / corners with water proofing cement mortar, etc. all complete. c) Providing & applying a coat of polymer water proofing primer and two coats of two compound based water proofing polymer/chemical of approved make as per manufacturer's specifications to the sunken floor/floor, sides, etc.; testing the treated surface by ponding method for 72 hours. d) Repeat the treatment till no seepage is observed on the treated surface.		
	e) Providing and laying 15mm thick protective layer of plain cement plaster in cement mortar 1:4 (1 cement: 4 coarse sand) over the treated surface. Note: The entire area of waterproofing treatment shall be completely leakproof as observed during DLP period (five years for this item and for). If, any leakage/seepage observed during five year (DLP) the firm is liable/ responsible & accountable to rectify the defects on immediate basis, or redo the entire waterproofing / brick bat coba work for the same. At this juncture contractor must submit undertaking for warranty & guarantee for above said purpose on non-judicial stamp paper of appropriate value. The cost stamp paper shall be borne by the contractor. Note: - Plan area of the sunken floor/floor shall only be considered for payment.	sqm	33.00

	Civil Works -SUB TOTAL	**A**	
	Interior Furnishing		
1	**LOW HEIGHT PARTLY GLAZED PARTITION** a. Supply , fabricating & fixing low height solid partition with Aluminium hollow section 50 X 50 X 1.18 mm framing of 600 X 600 mm c/c both ways horizontally and vertically leaving space for opening of glazed portions and suitable supporting members beside opening to be provided with necessary cleat joint at junctions and fixing the frame to wall/ceiling/floor with steel dash fasteners of 8 mm dia, 75 mm long bolt. The framing shall be covered both side using 9 mm thick ply of approved make conforming to IS:710 and providing & applying of one coat of anti-termite chemical painting on inside surface of ply board. b. The exposed surface of the plywood at both the side of partition wall shall be finished with 1mm thick laminate of approved make and shade, fixing as per design and direction of Bank's Engineer. c. 6 mm thick toughened glass glazed of approved make panels of suitable design of frosted films as per approved design, with necessary Melamine polished teak wood beading. The rate shall be inclusive of all materials like aluminium hollow section, ply board, laminate, toughened glass, teak wood beading, etc.		
	Note: Basic Rate is exclusive of GSTi) Measurement shall be made on the exposed surface onlyii) Basic rate of 1.00mm Laminate is Rs.508/- per sqm excluding GST.iii) Basic rate of 9mm ply is Rs 586/- per sqm excluding GST.iv) Basic rate of 6 mm thick Toughened Glass with frosted films is Rs.1776/- per sqm excluding GST.**(FOR SIDE & INTERMEDIATE OF AM1, 2, 3 GUARD & C-IV) (Drawing No. - AR/DET/01a & AR/DET/01b)**	**Sq.m**	20

2	**FULL HEIGHT PARTLY GLAZED PARTITION** a. Providing, fabricating & fixing full height solid partition with Aluminium hollow section 50 x 50 x 1.18 mm framing of 600 X 600 mm c/c both ways horizontally and vertically leaving space for opening of glazed portions and suitable supporting members beside opening to be provided with necessary cleat joint at junctions and fixing the frame to wall/ceiling/floor with steel dash fasteners of 8 mm dia, 75 mm long bolt and the alternate vertical members to be extended up to the original ceiling/ RCC roof. The framing shall be covered both side using 9 mm thick ply of approved make conforming to IS:710 and providing & applying one coat of anti-termite chemical painting on inside surface of ply board before its fixing on aluminum framework. b. The exposed surface of the plywood at both the side of partition wall shall be finished with 1mm thick laminate of approved make and shade, fixing as per design and direction of Bank's Engineer. c. 6 mm thick Toughened Glass glazed of approved make, panels of suitable design of frosted films as per approved design, with necessary Melamine polished teak wood beading.		
	d. Extra wood frame to be provided around openings for door: provding & fixing 1st class hard wooden frame of size 70mmx50mm on Aluminium frame where doors will be installed. The rate shall be inclusive of all materials like aluminium hollow section, ply board, laminate, toughened glass, frosted film, hard wood, teak wood beading, etc. Note: Basic Rate is exclusive of GST i) Measurement shall be made on the exposed surface only ii) Basic rate of 1.00mm Laminate is Rs.508/- per sqm excluding GST. iii) Basic rate of 9mm ply is Rs 586/- per sqm excluding GST. iv) Basic rate of 6 mm thick Toughened Glass with frosted film Rs.1776/ per sqm. excluding GST. **(FOR MSOF-1, 2, 3, 4 & MOF-I-C) (Drawing No. - AR/DET/02a & AR/DET/02b)**	**Sq.m.**	140

3	**PARTLY GLAZED DOOR**Supply , fabrication & fixing of Solid flush doors 30 mm thick factory-made solid core hot pressed single leaf flush door shutter of approved make, bonded with phenol formaldehyde synthetic resins (conforming to IS 2202) including teak wood lipping with Melamine polished on all exposed edges with water resistant adhesives - finished with 1 mm thick laminate on both side exposed surfaces, and suitable design of glazing panel of 5 mm thick. The rate to include all hardware etc. all complete.i) Hydraulic door closer (Make- Godrej / Dorma)- 1 no. for each shutter,ii) Mortise lock with handle of approved make,iii) Door stopper of approved size, design and make,iv) Heavy quality brass hinges of approved make - 4 nos. for each door,v) Brass oxidised fittings, fixtures like aldrop, tower bolt as approved and as necessary, etc.		
	vi) 6 mm thick toughened Glass glazed panels of suitable design with necessary Melamine polished teak wood beading of approved design of of approved make Basic Rate is exclusive of GST (Flush Door Shutter Rs.1621/- per Sq.M, 1mm thk. laminate Rs.508/- per Sq.M, 5mm thk. clear glass with frosted Rs 1130/ Sq.M, , Hydraulic Door Closer Rs 1787, Mortise Lock with handle Rs 1820, Door stopper Rs 417, Brass Hinges Rs 367 & Brass Tower Bolt Rs 299) **(MSOF - 1, 2, 3, 4, MOF-I-C, WAITING ROOM, PANEL ROOM1, SUB PANEL & LAN SERVER RM) (Drawing No. - AR/DET/06)**	Sq.m	25.00

4	**FULL HEIGHT SOLID PARTITION**a. Supply, fabricating & fixing full height solid partition with Aluminium hollow section 50 x 50 x 1.18 mm framing of 600 X 600 mm c/c both ways horizontally and vertically leaving space for opening of glazed portions and suitable supporting members beside opening to be provided with necessary cleat joint at junctions and fixing the frame to wall/ceiling/floor with steel dash fasteners of 8 mm dia, 75 mm long bolt and the alternate vertical members to be extended up to the original ceiling/ RCC roof. The framing shall be covered both side using 9 mm thick ply of approved make conforming to IS:710 and providing & applying one coat of anti-termite chemical painting on inside surface of ply board before its fixing on aluminium framework.b. The exposed surface of the plywood at both the side of partition wall shall be finished with 1mm thick laminate of approved make and shade, fixing as per design and direction of Bank's Engineer.c. Extra wood frame to be provided around openings of doors: Providing and fixing teak wooden frame of size 70mmx50mm on Aluminium frame where doors will be installed. The rate shall be inclusive of all materials like aluminium hollow section, ply board, laminate, toughened glass, hard wood, teak wood beading, etc.		
	Note: Basic Rate is exclusive of GST i) Measurement shall be made on the exposed surface only ii) Basic rate of 1.00mm Laminate is Rs.508/- per sqm excluding GST. (iii) Basic rate of 9mm ply is Rs 586/- per sqm excluding GST. **(FOR YOGA RM, WAITING RM, RECORD RM, STORE RM, PANTRY, SUB PANEL & LAN SERVER RM, PHOTO/SHEILD GALLERY, CHANGING RM, OUTER SIDE) (Drawing No. - AR/DET/03a)**	Sq.m	417

5	**SOLID LAMINETED DOOR**Supply , fabrication & fixing of Solid flush doors 30 mm thick factory-made solid core hot pressed single leaf flush door shutter of approved make, bonded with phenol formaldehyde synthetic resins (conforming to IS 2202- part I & II) including teak wood lipping with Melamine polished on all exposed edges with water resistant adhesives - finished with 1 mm thick laminate on bothside exposed surfaces. Rate to include all hardware etc. all complete.i) Hydraulic door closer 1 no. for each shutter,of approved makeii) Mortise lock with handleof approved makeiii) Door stopper of approved size, design and of approved makeiv) Heavy quality brass hinges of approved make amd size 4 nos. for each door,v) Brass oxidised fittings, fixtures like aldrop, tower bolt as approved and as necessary, etc.		
	Basic Rate is exclusive of GST (Flush Door Shutter Rs.1621/- per Sq.M, 1mm thk. laminate Rs.508/- per Sq.M, Hydraulic Door Closer Rs 1787/- per pc., Mortise Lock with handle Rs.1820 per pc, Door stopper Rs.417 per pc, Brass Hinges Rs.367 per pc & Brass Tower Bolt Rs.299 per pc) **(FOR RECORD RM, 2 NOS STORE RM, PANTRY, CHANGING RM)**	Sq.m	12

6	**GLASS DOOR** Providing and fixing frameless fully glazed **12mm thick toughened float glass door (as per detail drawing)** fixed with partiton, necessary patch fittings of approved make including cutting, making holes, cutouts in the glass of required shape and size to accommodate fittings and fixing the fittings in floors, soffits, jambs including necessary fixtures, screws, sealent wherever required and SS cover over patch fittings. Bank approved patch fitting locking systems, 1 pair of 24" long S. S. (H Shape) Handles of approved make, floor springs, and any necessary hardware items per unit of door like Top Pivot ,Top Patch Fittings, Bottom Patch fittings, Floor Spring , Bottom lock with strike plate and Euro Profile Cylinder, H Shape Handle 25mm dia X 600mm length including all the necessary fittings, labour, materials. Basic Rate is exclusive of GST (12mm thk toughened float glass door Rs 1680/ Sq.M, Heavy Duty Floor Spring Rs 8569.00 per pc, Top and Bottom Pivot Rs 426.40 per each, Patch fitting Rs.1672.80 per set, Bottom Lock Patch Rs.2796.20 per each, H Shape Handle Rs.5646 per set) **(ZTC ENTRY 1 & 2) (Drawing No. - AR/DET/08)**	Sq.m	12
7	**ACOUSTICAL COLUMN & WALL PANELLING:** Providing, fabricating & fixing appproved make, colour and size of a) Fibre Wrapped Soak Cord board from 1200 above floor level to false ceiling bottom level on wall/ RCC Column to be fixed with framing of 22mm thick CC GI Section (approved make) & H spline section, etc. b) providing & fixing approved make & coloured 16mm thick wooden Slats HDF plank upto ht. of 1200mm from floor finished level on wall/ RCC Column with framing of GI CC10 Channel and Aluminium (CC18) with clip . All joint to be sealed with silicone Sealent, etc. all complete as directed by Bank's engineer.Note: Basic Rate is exclusive of GSTMeasurement shall be made on the exposed surface only(Wood Wool Board with fabric Rs 3150/- Sq.M, wooden Slat HDF plank Rs.3200/ Sq.M, **(COMPUTER LAB 1, 2, CLASS RM 1, 2, 3 & WINDOW COBLA)**	Sq.m	200

8 a)	**PARTITION WITH TWO SIDES ACCOUSTICAL MATERIAL** **A)BASE DRY WALL : Full height from floor finished level to roof level:** Providing, fabricating & fixing of drywall partition with acoustic factors as below:- Framing : MS square hollow section (SHS) 50 X 50 X 2 mm welded framing of 600 X 600 mm c/c both ways horizontally and vertically, leaving space for opening of glazed portions and suitable supporting extra members beside opening to be provided, with necessary welding at junctions & joints, fixing the frame to wall/ceiling/floor with steel dash fasteners of 8 mm dia, 75 mm long bolt. Next one layer of 50mm thick approved make mineral wool of density 48Kg/Cum to be inserted inside inner gaps of the framework. Then (6mm cement partical boards + 1.7mm thick sound proof membrane of approved make + 8mm cement partical boards one side and 12mm cement partical boards on other side of approved make to be fixed on the Mineral Wool filled MS framework upto RCC ceiling/ beam bottom.	Sq.m	145.02
	B) Supply fabrication and installation of approved make and colour **FIBER WRAPPED SOAK CORD PANELS (NRC 0.95,FR) FIXED VERTICALLY on both side of partition - from 1200mm of finished floor level to false ceiling ht on both side:** Supply and installation of Soak cord fiber wrapped pinewwod square edged fiber panel of size 600x 1200 x 20mm . The framework for soak cord panel includes CC22 cross Channel fixed horizontally @600 c/c over cement board, then strut H spiline is fixed vertically @ 600 c/c to hold the fabric wrapped soak cord panels. C) Supply fabrication and installation of approved make and colour perforated **SLATS PANELS (NRC 0.77,FR) FIXED VERTICALLY on both side** - from Floor finished level to +1200mm above floor finished level: Supply and Installation of slats made from E1 grade fiber board, melamine laminated groove perforated L16-2 mm Slats. The Frame work for slats includes Aluminium cross channel (CC18) for slats@ 450 horizontally with clips over 10mm thick CC10 GI Section @600 c/c to be fixed vertically over cement board.		

	Extra wood frame to be provided at openings (doors). Apply 1st class hard wooden frame of size 70mmx50mm is to inserted inside MS frame where doors will be installed. Basic Rate is exclusive of GST (6mm cement partical boards Rs 256/Sq.M, 8mm cement partical boards Rs.341/Sq.M, 12mm cement partical boards Rs.512/Sq.M, sound proof membrane Rs.1250/Sq.M, Mineral Wool Rs.146/- per Sq.M, Wooden Slats HDF Plank Rs.3200/Sq.M, Soak cord fibre Board panel Rs.3150/ Sq.M) (FOR COMPUTER LAB 1, 2, CLASS RM 1, 2, 3 & CONFERENCE RM) (Drawing No. - AR/DET/04 & AR/DET/03b)		
8 b)	**PARTITION WITH ONE SIDES ACCOUSTICAL MATERIAL AND OTHER SIDE LAMINATED A)BASE DRY WALL : Full height from floor finish to roof :** Providing, fabricating & fixing of drywall partition with acoustic factor: Framing : MS square hollow section (SHS) 50 X 50 X 2 mm welded framing of 600 X 600 mm c/c both ways horizontally and vertically. Leaving space for opening of glazed portions and suitable supporting extra members beside opening to be provided with necessary welding at junctions & joints. Fixing the frame to wall/ceiling/floor with steel dash fasteners of 8 mm dia, 75 mm long bolt. Next one layer of 50mm thick approved make mineral wool of density 48 Kg/Cum to be inserted in the framework. Then (6mm cement partical boards + 1.7mm thick sound proof membrane of approved make + 8mm cement partical boards one side and 12mm plywood of IS:710 with 1 mm laminate as per design on other side of approved make to be fixed on the Mineral Wool filled MS framework upto RCC ceiling/ beam bottom.	Sq.m	480

	B) Supply and installation of approved make **FIBER WRAPPED SOAK CORD PANELS (NRC 0.75)FIXED VERTICALLY on one side of partition -from 1200mm of finished floor level to false ceiling level:** Supply and installation of Soak cord fiber wrapped pinewwod square edged fiber panel of size 600x 1200 x 20mm. The framework for soak cord panel includes CC22 cross Channel to be fixed horizontally @600 c/c over cement board, then strut H spiline to be fixed vertically @ 600 c/c to hold the fabric wrapped soak cord panels. C) Supply and instalation of approved make Perforated **SLATS PANELS (NRC 0.70)FIXED VERTICALLY on one side of partition** - from floor finished level to +1200mm above floor finished level: Supply and Installation of slats made from E1 grade fiber board, melamine laminated grove perforated L16-2 mm Slats. The Frame work for slats includes Aluminium cross channel (CC18) for slats@ 450 horizontally with clips over 10mm thick CC10 GI Section @600 c/c fixed vertically over cement board.		
	Extra wood frame to be provided around openings of door: providing & fixing 1st class hard wooden frame of size 70mmx50mm on MS frame where doors will be installed.Basic Rate is exclusive of GST(6mm cement partical boards Rs.256/Sq.M, 8mm cement partical boards Rs.341/Sq.M, 12mm cement partical boards Rs.512/Sq.M, sound proof membrane Rs.1250/Sq.M, Mineral Wool Rs.146/- per Sq.M, Wooden Slats HDF Plank Rs.3200/Sq.M, Soak cord fibre Board panel Rs.3150/ Sq.M, 12mm BWP ply Rs.737/- per sqm, 1mm thk laminate Rs.508/- per sqm)(FOR COMPUTER LAB 1, 2, CLASS RM 1, 2, 3 & CONFERENCE RM) (Drawing No. - AR/DET/04 & AR/DET/03b)		

9	**LAMINATED PANELLING OF COLUMN/ WALL** Providing, fabricating and fixing 35mm thick plain/curved panelling on masonary plastered surface using standard Aluminium hollow sections of approved quality and make, fixed firmly to the floor at base and adjacent wall/partition/ceiling as indicated in the following specifications a. Vertical Members- Aluminium hollow sections 50x25x1.2 mm of maximum spacing at 600mm c/c, fixing firmly on floor at base and ceiling/beam at top with additional aluminium angle/cleat. b. Horizontal members - Aluminium hollow sections 50x25x1.2 mm spaced at approximately 600mm c/c fixied with screw including additional members for raceways opening etc. c. The framing shall be covered top side using 9 mm thick approved make ply conforming to IS-710 and finish with laminate of 1.00 mm thick in decorative pattern outside of panelling as per design / direction of Bank's Engineer. Note: Basic Rate is exclusive of GST i) Measurement shall be made on the exposed surface only ii) Basic rate of 1.00mm Laminate is Rs.508/- per sqm. iii) Basic rate of 9mm ply is Rs 586 per sqm.	Sq.m	242
10	**FALSE CEILING WORK**		

a)	**Plain False Ceilling** - Providing and fixing multi layered suspended type (Rawl Plug, M6X12 mm Hex Bolt & Hex Nut 27X37x25X1.6 mm Soffit Cleat Saint Gobin make or othr approved by bank for suspended from RCC ceiling) 12.5 mm thk. **moisture resistant Glasroc H board** or other approved equivalent make by Bank, coving and for column capitals in different levels firmly fixed on GI frame work section of M/s Saint Gobain or other approved equivalent make as per manufacturer's specifications all as required and directed by Bank's engineer finally boards are to jointed and finished so as to have flush look and leveling the board so as to be in one single plane which includes filling and finishing the board edges with jointing compound, paper tape etc. The rate shall also include painting the false ceiling surface with two or more coats of first quality 100% acrylic emulsion paint of approved make and shade over a coat of oil bound cement primer after adequate surface preparation, 1 or 2 coats of putty work over the entire Glasroc H board surface to get premium finish, etc. all complete as directed by Bank's engineer. Note: Rate shall include making cut out/ openings for fixing light fittings with necessary additional frame work, wastages, finishing etc. all complete.		
	No deduction in area measurement will be made for openings not exceeding 0.4 sqm and no extra measurement will be made for forming such opening. Horizontal plan area and Side Elevation area for vertical drops will be measured for payment. [Basic rate of 12.5 mm thk. moisture resistant Glasroc H board (Gyproc Saint - Gobain) is Rs. 591.73/ Sq.M excl. GST]. **(Drawing no. - AR/DET/05).**	Sq.m	800

b)	**Grid false ceiling -** Providing and fixing soft fiber ceiling solution of approved make with Silhouette frame work to form a module of 600 mm X 600 mm. The tiles shall be of 600mm X600mmX15mm like Armstrong Classic RH95 Microlook tiles mineral fiber board NRC 0.55 or approved equivalent by Bank with fine fissured texture finish. The suspension system shall be as per the manufacturer (Armstrong or any other approved by Bank) specification. Installation consists of main runners securely fixed to structural soffit approved hanger at 1200 mm c/c (max), long cross 'T's inter locked between main runner at 600 mm c/c to form grid of 600 X 600 mm etc. complete all as per manufacturers' specification and as directed by Bank's Engineer.Note:- Rate shall include providing and erecting the necessary scaffolding at any level and height required during executing the work, cutout /opening to be made for light fittings etc. No deduction in area measurement will be madefor openings not exceeding 0.4 sq m and no extra measurement will be made for forming such opening. Exposed area shall only be measured and paid for.[Basic rate of mineral fibre grid (tile) ceiling with Silhouette frame work is Rs. 1191.75/ Sq.M excl. GST.]**(AS PER DRAWING) (Drawing no. - AR/DET/05)**	Sq.m	135

c)	**Acoustical False Ceiling -** Providing and fixing soft fiber ceiling solution of approved make with Silhouette frame work to form a module of 600 mm X 600 mm. The tiles shall be of 600mm X600mmX15mm like Acoustic Board (Mineral Fiber Acoustic Ceiling Tiles Armstrong/ Anutone make) board NRC 0.9 or approved equivalent by Bank with fine fissured texture finish. The suspension system shall be as per the manufacturer specification. Installation consists of main runners securely fixed to structural soffit approved hanger at 1200 mm c/c (max), long cross 'T's inter locked between main runner at 600 mm c/c to form grid of 600 X 600 mm etc. complete all as per manufacturers' specification and as directed by Bank's Engineer. Note:- Rate shall include providing and erecting the necessary scaffolding at any level and height required during executing the work, cutout /opening to be made for light fittings etc. No deduction in area measurement will be made for openings not exceeding 0.4 sq m and no extra measurement will be made for forming such opening. Exposed area shall only be measured and paid for. [Basic rate of Acoustic Board is Rs. 1803.11/ Sq.M excl. GST.] **(AS PER DRAWING) (Drawing no. - AR/DET/05)**	Sq.m	450

11	**M.S FRAMING**Providing, fabricating and fixing MS Square Hollow Sections (SHS) frame made of 40mm X 40mmX3.2mm thick MS SHS frame work at as per Drawing on floor and at top using 40mm X 40mm X3.2mm MS SHS maintaining proper line, levels as directed and as specified as per requirement , cutting to required size and shape, fixing the MS SHS to the floor and adjacent walls using dash fastner of approved quality, make and size and fixing the intersection, junctions of MS SHS with approved quality fittings, fixtures and hardware, including Cross diagonal bracings so as to provide lateral movement & vertical movement free structure. Following minimum bracings are to be provide.i. Diagonal double cross bracings along the line of MS SHS (width of the Class room Gallery & Stage) wherever there is change of floor levels as indicated in the drawing (between +0.00 to 150mm, +150mm to +300mm, + 300mm to + 450mm, +450mm to +600mm, +600mm to +750mm).ii. Diagonal Double cross bracings as per drawing. Including painting the MS SHS with 2 coats of approved quality synthetic enamel paint over a coat of approved quality Zinc rich primer etc. all complete as per the directions of the Banks Engineer (additional member may be provided as directed for Class room Gallery & Stage at no extra cost) (welding in approved manner)		
11a	Do.. as above for height of framing upto +150mm level (Plan area only will be measured and paid for) **(For Classroom & Computer lab Stage)**	**Sqm.**	**70**
11b	Do.. as above for height of framing upto +150mm level (Plan area only will be measured and paid for) **(For Classroom Gallery)**	**Sqm.**	**30**
11c	Do.. as above for height of framing upto +300mm level (Plan area only will be measured and paid for) **(For Classroom Gallery)**	**Sqm.**	**30**
11d	Do.. as above for height of framing upto +450mm level (Plan area only will be measured and paid for) **(For Classroom Gallery)**	**Sqm.**	**30**
11e	Do.. as above for height of framing upto +600mm level (Plan area only will be measured and paid for) **(For Classroom Gallery)**	**Sqm.**	**30**

11f	Do.. as above for height of framing upto +750mm level (Plan area only will be measured and paid for) **(For Classroom Gallery)**	**Sqm.**	35
11g	**Cement Board**Providing and fixing 18mm thick Cement fiber board of approved quality and make including fixing to the MS angle base frame work using necessary fittings, fixtures & hardware of approved quality maintaining proper line, level e.t.c. finishing the exposed edges as directed as per drawing all complete as per the directions of the Bank's Engineer. **(For Classroom Gallery & Stage, Computer lab Stage)**Basic Rate is exclusive of GST(18mm thick Cement fiber board Rs 871.88/Sq.M)	**Sqm.**	280
11h	**LAMINATE FLOORING WITH SKIRTING (62.5 MM High)** Supplying, fitting and fixing approved make & shade 8mm thick AC5 Laminated wooden Flooring Work including necessary door joint, corner, skirting, steps, risers joints etc profile all accessories complete as per manufacture specfication conforming to EN13329:2006 with plank size not less than 1200mmX192mm (with unilin/tongue-groove locking arrangement) having 0.2mm thk top abrasive layer over a decorative layer followed by a High-density fibreboard (HDF) having density > 940 kg/m3 substrate core over a rasin saturated backing layer and installing through unilin or tongue- groove system (having locking strength not less than 1000 kg/m) over a 2 mm thk underlayer polyurethene foam on polythene sheet 250 micron, over a smooth, flat, hard subfloor free from moisture (< 8%), grease etc. complete in all respect with supplying, fitting and fixing requisite accessories like skirting, door profile, end profile, transition profile, reducer 'T' profile etc.		
	wherever required and preparation of base including all other incidental works as per direction & satisfaction of Bank. Spec : (Class 23; Abrasion resistance:-AC5, Impact resistance - IC 2) (Basic Rate excl. GST - Laminates Wooden Flooring 8mm Rs 1585/Sq.M. **(For 3 Classroom, Gallery & Stage, Computer lab 2 Stage)** **(ALL AS PER APPROVED MAKE)**	**Sqm.**	332.67

12	**Acoustical Door**Supply fitting & fixing 75 mm thick Acoustic door shutter - 75 mm thick wooden door shutter periphery framework 75x50 mm wooden structure & internal frame work of size 50x25 mm made of hard wood. Now, door shutter will be maintaning peeping hole with double glass of size 203 x203 x5mm at center of door. The doors complying with 6 mm thick BWP (IS 710) Ply of Century Club Prime make or any other approved by Bank on both side of center frame preloaded with approved make mineral wool of 50 mm thick density 48Kg/Cum, laid with 1.7 mm thick sound proof membrane of approved make on both side of over the plywood. Now cover complete set with 12 mm BWP (IS 710) Ply of approved make of IS:710 on both side & paste with 1 mm thick laminate of approved make. The periphery covered with teak wood lipping with hardwood beading as per Bank Engineer in charge complete in all respect.Rate to include all hardware etc. all complete.i) Hydraulic door closer (Make- Godrej / Dorma)- 1 no. for each shutter,ii) Mortise lock with handle (Make- Dorma, Hettich, Godrej)iii) Door stopper of approved size, design and make,iv) Heavy quality brass hinges of Godrej or approved equivalent quality and size- 4 nos. for each door,v) Brass oxidised fittings, fixtures like aldrop, tower bolt as approved and as necessary, etc.		
	Basic Rate is exclusive of GST (Mineral wool Rs.146/- per Sq.M, sound proof membrane Rs.1250/- per Sq.M, 6mm BWP Ply Rs.477/- per Sq.M, 12mm BWP Ply Rs.737/- per Sq.M, 1mm thk. laminate Rs.508/- per Sq.M, Hydraulic Door Closer Rs.1788/- per pc, Mortise Lock with handle Rs.1820/- per pc, Door stopper Rs 417/- per pc, Brass Hinges Rs.367/- per pc & Brass Tower Bolt Rs.299/- per pc) (**FOR COMPUTER LAB 1, 2, CLASS RM 1, 2, 3 & CONFERENCE RM)**	**Sqm.**	30
	SUB TOTAL (B)		
C	**Fire Fighting Works**		

1	Providing, laying, testing & commissioning of 'C' class heavy duty MS pipe conforming to IS 3589/IS 1239 including Welding, fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. and fixing the pipe on the wall/ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required :		
1.1	25 mm dia	metre	240
1.2	32 mm dia	metre	20
1.3	40 mm dia	metre	20
1.4	50 mm dia	metre	330
1.5	100 mm dia	metre	125
2	Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/ gunmetal seat duly ISI marked complete with nuts, bolts, washers, gaskets confirming IS 13095 of following Sizes as required:		
	100 mm dia	set	2.00
3	Providing, fixing, testing & commissioning of 15mm dia quartzoid bulb type sprinklers of rating 68 degree centigrade with required accessories :		
3.1	Pendent Sprinkler	Each	140.00

		Sub-total (C)	
	Total Civil Work (A + B + C)		
Electricat Works (D)			
1.	**Main MCB Distribution Board (for Light Fan, Power & AC Points)**Supply, Installation, Testing and Commissioning of **8-way Double-Door company fabricated TPN MCB DB Horizontal type (4 + 24)** with loose wire box in surface mounting / concealed manner with all internal connections & loops by providing of all hard-wares as per site requirements complete comprising of the followings:**INCOMER**(a) 63- A, FP MCB 'Ç' series 10-KA 1 No.(b) 63- A, FP ELCB (300mA) - 1 No.**OUTGOING**(b) 6-32 A SP 'Ç' series 10KA MCB 20 NosThe above work will be carried out as per IE rule.	Sets	9.00
2.	**Sub Distribution Board (Light & Fan, Power & UPS separately)** Supply, Installation, Testing and Commissioning of **6-way Double-Door** company fabricated **TPN MCB DB Horizontal type (4 + 18)** with single phase outgoings and loose wire box in surface mounting / concealed manner with all internal connections & loops by providing of all hard-wares as per site requirements complete comprising of the followings **INCOMER** (a) 63- A, FP MCB 'Ç' series 10-KA 1 No. (b) 63- A, FP ELCB (300mA) - 1 No. **OUTGOING** (b) 6-32 A SP 'Ç' series 10KA MCB 8 Nos The above work will be carried out as per IE rule.	Sets	9.00
3.	**INCOMER CABLE FOR LIGHT & FAN, POWER, UPS SUB MCB DB :** Supply, Installation, Testing and Commissioning of **4-core CU conductor Armored FRLS cable** with PVC sheathed, 1100-V grade of **10-sqmm size** with all accessories over main ceiling /wall in		

	surface/ as per site condition **from existing UPS/ Lighting Main MCB DB individually for Light & Fan, UPS DB to respective Light & Fan, Powers, UPS power Distribution Board** including all accessories complete as per site requirement & if required partially laying over concrete surface by providing & laying of the same. The above 8-ways/ 6-ways sub MCB DB to be installed in various locations of RBI III-rd floor. The both end termination of the cable to be made with copper pin type lugs and brass compression gland etc. complete as per site requirement. The above cable to be laid proparly hanged by providing & fixing of required support from main ceiling of neatly fabricated M.S angle channel/ Cable tray etc. over false ceiling, wall/ partition in concealed manner all hard- wares, fast-nut etc. as per site requirement complete. The above work will be carried out as per IE rule	Rmt	1200.00
4.	**LIGHT / BUZZER POINTS**Supply, Installation, Testing & Commissioning (SITC) of **(3x1.5) sqmm** multi-stranded Copper conductor FRLS wires of 1100 V grade with pvc sheathed in a suitable size ISI make medium class PVC Conduit (20mm minimum size) including supply and laying of the same with all accessories to be proparly hanged by providing & fixing of required support from main ceiling of neatly fabricated M.S angle channel/ Cable tray etc over false ceiling, wall/ partition in concealed manner **from Switch Board to individual light fittings/ buzzer fitting** for light/buzzer points. The rate shall also include the cost of ckt. wiring with **(3x2.5) sqmm** multi- stranded copper conductor FRLS wire in a suitable size ISI make medium class PVC Conduit (20mm minimum size) on concrete surface/ concealed manner on wall **from MCB DB to individual Switch Board** including		
	supply and installation of 10-A modular type switches on suitable size company fabricated G.I modular box with modular plate & its cover complete set as per site requirement to be installed in concealed manner/over concrete surface, if required including all hard-wares complete. The above rate shall also include both end terminations & interconnections by providing of suitable size wires, lugs, washers etc. complete as per site requirement complete. The above work will be carried out as per IE rule.		
4(a)	One light fitting controlled by one switch	Point	100.00
4(b)	Two Light Fittings Controlled by one Switch	Point	120.00
4(c)	Three light fittings Controlled by one Switch	Point	50.00

5	Supply, Installation, Testing & Commissioning (SITC) of 10-A modular type switch & 3-pin socket **on above lighting switch board** by providing & fixing of the same, including its interconnection by providing & fixing of suitable size wire etc complete as per site requirement. For above lighting switch board & any other switch board as per direction of Bank Engineer-in-Charge	Sets	190.00
6	**10-A POWER POINTS WALL/ EXHAUST FAN POINT** Supply, Installation, Testing & Commissioning (SITC) of **(3x2.5) sq mm** multi-stranded Copper conductor FRLS wires of 1100 V grade with pvc sheathed in a suitable size (20mm minimum size) ISI make medium class PVC Conduit including supply and laying of the same with all accessories over false ceiling to be proparly hanged by providing & fixing of required support from main ceiling of neatly fabricated M.S angle channel, Cable tray etc./ wall/ partition over surface/ in concealed manner/in raceway/in work station partition wall **from MCB DB to Switch Board** including supply and installation of 10-A modular type switches & 10-A modular 5 pin socket/3 pin ceiling rose on suitable		
	size company fabricated G.I modular box with modular plate & its cover complete set as per site requirement to be installed in concealed manner/over concrete surface, if required, including all hard-wares complete. Above wiring may be partially laying over concrete beam/roof surface, if required, by providing and laying of the same as per site requirement complete. The above rate shall also include both end terminations & interconnections in switch board by providing of suitable size wires, lugs, washers etc. complete as per site requirement. The above work will be carried out as per IE rule.	Nos	130.00

7	**Power points for AC** Supply, Installation, Testing & Commissioning (SITC) of **(2x4+1x2.5) sq mm** multi-stranded Copper conductor FRLS wires of 1100 V grade with pvc sheathed in a suitable size ISI make medium class PVC Conduit (20mm minimum size) including supply and laying of the same with all accessories over false ceiling to be proparly hanged by providing & fixing of required support from main ceiling of neatly fabricated M.S angle channel, Cable tray etc./ wall/ partition over surface / in concealed manner **from MCB DB to Switch Board** including supply and installation of 16-A modular type switches & 16-A 3-pin modular socket on suitable size company fabricated G.I modular box with modular plate & its cover complete set as per site requirement to be installed in concealed manner/over concrete surface, if required, including all hard-wares complete. Above wiring may be partially laying over concrete beam/roof surface, if required, by providing and laying of the same as per site requirement complete. The above rate shall also include both end terminations & interconnections in switch board by providing of suitable size wires etc. complete as per site requirement. The above work will be carried out as per IE rule	Nos	70.00
8	**TV points (UPS)** Supply, Installation, Testing & Commissioning (SITC) of **(3x2.5) SQ. mm**. multi-stranded Copper conductor FRLS wire of 1100- V grade with PVC sheathed in a suitable size ISI Make medium class PVC Conduit (20mm minimum size) or in work station race ways including supply & laying the same with all accessories over ceiling to be proparly hanged by providing & fixing of required support from main ceiling or neatly fabricated M.S angle channel/ Cable tray etc./ wall in partly concealed/ partially over concert surface/ partially		
	in raceway/partially in work station partition wall **from UPS sub MCB DB to concern switch board** comprising of 3 nos 6 AMP 3- pin modular socket & 3-nos of 10- A modular switch for UPS power points and 1-no of TV socket in a suitable size company fabricated GI modular box, modular plate & it's cover etc. complete to be installed in concealed manner complete as per site requirement and as directed including all hard-wares complete.The above work will be carried out as per IE rule.	Nos	15.00

9	**Computer points (UPS)** Supply, Installation, Testing & Commissioning (SITC) of **(3x2.5) SQ. mm**. multi-stranded Copper conductor FRLS wire of 1100- V grade with PVC sheathed in a suitable size ISI Make medium class PVC Conduit (20mm minimum size) or in work station race ways including supply & laying the same with all accessories over ceiling to be properly hanged by providing & fixing of required support from main ceiling or neatly fabricated M.S angle channel/ Cable tray etc./ wall in partly concealed/ partially over concert surface/ partially		
	in raceway/partially in work station partition wall **from UPS sub MCB DB to concern switch board** comprising of 3 nos 6 AMP 3- pin modular socket & 3-nos of 10- A modular switch for UPS power points & 1 no Indicator lamp in a suitable size company fabricated GI modular box, modular plate & it's cover etc. complete to be installed in concealed manner complete as per site requirement and as directed including all hard-wares complete.The above work will be carried out as per IE rule.	Nos	60.00
10	**Computer points (Loop) (UPS)** Supply, Installation, Testing & Commissioning (SITC) of **(3x2.5) SQ. mm**. multi-stranded Copper conductor FRLS wire of 1100- V grade with PVC sheathed in a suitable size ISI Make medium class PVC Conduit (20mm minimum size) or in work station race ways including supply & laying the same with all accessories over ceiling to be properly hanged by providing & fixing of required support from main ceiling or neatly fabricated M.S angle channel/ Cable tray etc./ wall in partly concealed/ partially over concert surface/ partially		
	in raceway/partially in work station partition wall **from near by workstation to another workstation on Computre Power Point to Computre Point** comprising of 3 nos 6 AMP 3- pin modular socket & 3-nos of 10- A modular switch for UPS power points & 1 no Indicator lamp in a suitable size company fabricated GI modular box, modular plate & it's cover etc. complete to be installed in concealed manner complete as per site requirement and as directed including all hard-wares complete.The above work will be carried out as per IE rule.	Nos	120.00

11a	Supplying and laying of following pair 0.5 mm dia FRLS PVC insulated annealed copper conductor, armored Jellyed Filled **telephone cable** in the PVC conduit as required (Suitable size).The above cable to be laid over false ceiling to be properly hanged by providing & fixing of required support from main ceiling of neatly fabricated M.S angle channel/ Cable tray etc./ wall/ partition over cocrete surface / in concealed manner.		
	0.5 sq.mm. 50 pair jelly filled telephone cable(armoured) (EPBX room to 3rd Fl ZTC Sub Panel room 50 Pair MDF Box)	Rmt	110.00
11b	Supplying and laying of following pair 0.5 mm dia FRLS PVC insulated annealed copper conductor, unarmored **telephone cable** in the PVC conduit as required (20mm minimum size). The above cable to be laid over false ceiling to be properly hanged by providing & fixing of required support from main ceiling of neatly fabricated M.S angle channel/ Cable tray etc./ wall/ partition over cocrete surface / in concealed manner.		
	0.5 sq.mm. 2 pair telephone cable (unarmoured) (50 Pair MDF Box to Work Stations)	Rmt	250.00
12	Supply, Installation, Testing and Commissioning of following capacity MDF in a suitable size MS box neatly fabricated & duly painted with 1-coat of red-oxide & two coats of synthetic enamelled paint properly fixed over wall on suitable size tray/ MS angle frame by providing & fixing of all hard-wares complete as per site requirement. The above work will be carried out as per IE rule. **50 Pair MDF Box.**	Set	1.00
13	Supplying and laying co-axial **TV cable RG-6 grade**, 0.7 mm solid copper conductor PE insulated, shielded with fine tinned copper braid and protected with PVC sheath in the ISI make medium class PVC Conduit (20mm minimum size) as required. The above cable to be laid over false ceiling to be properly hanged by providing & fixing of required support from main ceiling of neatly fabricated M.S angle channel, Cable tray etc./ wall/ partition over surface / in concealed manner.	Rmt	285.00

14	Supplying and laying of **UTP 4 pair CAT 6 LAN Cable** in the ISI make medium class PVC Conduit (20mm minimum size) as required. The above cable to be laid floor raceway/ over false ceiling to be proparly hanged by providing & fixing of required support from main ceiling of neatly fabricated M.S angle channel, Cable tray etc./ wall/ partition over surface / in concealed manner. **(For Lan Cable) 1 run of cable.**	Rmt	1300.00
15	Supply & Fixing Modular type **Lan Socket** (RJ45) suitable for CAT6 cable (Brand approved by EIC) on PVC board and top cover plate on wall and making necessary connections as required.	Each	180.00
16	Supplying and fixing **call bell/ buzzer** suitable for single phase, 230 V, complete as required.	Each	10.00
17	Earthing with **G.I. earth plate** 600 mm X 600 mm X 6 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 metre long etc. with charcoal/ coke and salt as required. **(FOR MAIN LT PANEL)**	Sets	2.00
18	Earthing with **copper earth plate** 600 mm X 600 mm X 3 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 metre long etc. with charcoal/ coke and salt as required. **(FOR EXISTING UPS PANEL)**	Sets	2.00
19	Providing and fixing 25 mm X 5 mm copper strip in **40 mm dia G.I. pipe** from earth electrode including connection with brass nut, bolt, spring, washer excavation and re-filling etc. as required. **(FOR COPPER STRIP UNDER GR.)**	Metre	3.00
20	Providing and fixing 25 mm X 5 mm **copper strip** on surface or in recess for connections etc. as required. **(FOR UPS PANEL & CABLE TRAY)**	Metre	200.00
21	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing along with existing surface/ recessed cable as required. **(FOR ALONG WITH MAIN POWER CABLE)**	Metre	100.00
22	Providing and fixing 25 mm X 5 mm G.I. strip in **40 mm dia G.I. pipe** from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required. **(FOR G.I. STRIP UNDER GR.)**	Metre	3.00

23	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required. **(FOR MAIN LT PANEL)**	Metre	200.00
24	Providing and fixing 4.00 mm dia copper wire on surface or in recess for loop earthing along with surface/ recessed cable as required at per Site. **(FOR ALONG WITH DB POWER CABLE)**	Metre	2400.00
25	Supplying and installing following size of perforated painted with powder coating **M.S. cable trays** with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with M.S. suspenders including bolts & nuts, painting suspenders etc as required. **100 mm width X 50 mm depth X 1.6 mm thickness. (For cable, point wiring, TV cable, Lan wiring, Telephone wiring etc.)**	Metre	1100.00
26	Supplying and installing following size of perforated painted with powder coating **M.S. cable trays** with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with M.S. suspenders including bolts & nuts, painting suspenders etc as required. **200 mm width X 50 mm depth X 1.6 mm thickness. (For cable, point wiring, TV cable, Lan wiring, Telephone wiring etc.)**	Metre	150.00
27	**Modification of existing UPS panel board** by replacing the existing **63 A DP Isolater with 9 nos of 63 A four pole Isolater** of approved make by Bank including fabrication of the front palte of the panel. The existing panel to be consisting of suitable size 4 nos of copper bus bar, neutral bar, Earth bar, Din plates, cable alley including making connection & interconnection with suitable size copper wire etc. The existing panel to be spary painted as per direction of Bank.	Job	1.00

28	Fabrication, supply, installation, testing and commissioning of **MV Distribution Panel (CPRI Approved) (Minimum Size - 1950HX1200LX350D),** 415V/240V, 3-phase and neutral, 50HZ, cubicle type, dust and vermin proof with rubber gaskets, wall/ floor mounted (on ISMC), LT Electrical Panel fabricated out of **14SWG CRCA sheet** and powder coated to **Siemens gray** shade after undergoing **7-tank process,** provisions for cable entry at bottom for incomer and at bottom & top for outgoings, hinged lockable doors with interlock switchgear interlock with each I/C & O/G feeder, cable alleys with hinged lockable doors, interconnections, small wiring, name plates, DANGER plates, earth bus, etc. The bus bar chamber shall be fitted with **400A rated TPN Copper bus (Minimum Size - 400HX1200LX190D)** having colour coded sleeves, supported with SMC (Sheet Moulded Compound) supports and comprising of the followings:-		
	Incoming: 1 No. of incomer feeders, each with 315A, 4Pole, MCCB, 50 kA with built in thermal, magnetic and earth fault releases, each with trip free feature, ON/OFF/TRIP indications, 2NO+2NC Aux. contacts, terminal shrouds, adjustable OL & SC protection, etc. **L&T make d-sine, Type DN3-400N, Cat No.CM94103OOQ1OG or equivalent** of other approved by Bank. (For EB Raw) with 2 C/O AUX. contacts. 1 Set of 3 Phase-4 Wire, 50Hz., 415V, 400A, Busbars 1 Set of 3 Nos. of Copper wound resin cast CTs of ratio 400/5A, class-1, 10 VA burdon for metering. 1 No. of Digital Multifunction meter capable of reading, phace & line Voltages & Currents, PF, Frequency, kVA, kWh, etc. CL-1.0, flush mounting with RS 485 communication port.LED type RYB indication lamps controlled by Fuse/MCB 1 Set of ON, OFF, TRIP Indications.		
	Outgoing feeders: 9 Nos. of 63A, 4 Pole MCCB, 25 kA, **L&T make type DN0-100C, Cat. No. CM91712OOHOOG** or Equivalent of other approved by Bank. (For DBs) Panel lengthwise continuous GI earth bus, etc. complete. All incoming & outgoing MCCBs/Feeders will have front operating handles, door interlocks, R,Y,B, On, Off, Trip Indication Lamps (LED Type), Control fuses/MCBs, name plates, etc.	Set	1.00

29	Supplying, installing, testing and commissioning of following capacity **TPN tap off box** made of 1.6mm thick sheet steel enclosure duly painted with powder coating on existing rising mains complete with TPN disconnector FSU and HRC fuses, connections, earthing etc. as required.**315 A TPN (Size - 320HX150LX120D).**	Set	1.00
30	Supply, Laying & Fixing of **4 Core 240 Sqmm Aluminum armoured Cable**. For tap off box to main panel	mtr.	50.00
31	Supplying and making end termination with brass compression **gland and aluminium lugs** for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required. **3.5 X 240 sq. mm (62mm)**	each	2.00
32	Supplying & Installation of **floor - raceways** consisting of 6" W x 1.5" D x 3mm thick rectangular aluminium anodized box sections including chasing and refilling as per the route shown in the drawing and as approved by Bank at site including clamping at every open pipe ends by suitable plastic end covers against entry of dust or anyother foreign material.	mtr.	700.00
33	Supplying & Installation of galvanised **floor junction boxes** with SS brushed finish 14 SWG (2mm Thick) cover properly fixed with screws, for above mentioned raceways, of size 200L x 200W x 90D x 3 mm thick, fabricated out of 3 mm thick G.I. sheet with proper cutouts on the sides for pipe entry & screwed top cover with rubber gasket and suitable knockouts for flexible conduit outlets as per site.	Set	320.00
34	Supply and Fixing **Recess mounted 12 watt** slim LED downlight with aesthetic finish powder coated in white housing luminaire (Round) to be fixed on false ceiling as per dwg. with all arrangement and necessary connection **(Philips make GreenPerform Cat no. - DN296B LED12S-6500 PSU WH/ Crompton/ Havells/ Wipro or similar approved by Bank)**. LED chip make - Philips/ Crompton/ Havells/ Wipro & Driver make - Philips/ Crompton/ Havells/ Wipro or similar approved by Bank.	Nos.	280.00

35	Supply and Fixing **Surface mounted 12 watt** slim LED downlight with aesthetic finish powder coated in white housing luminaire (Round) to be fixed on existing rcc ceiling as per dwg. with all arrangement and necessary connection **(Philips make Sleek Surface Downlight Cat no. - SM250C LED12S-6500 PSU WH/ Crompton/ Havells/ Wipro or similar approved by Bank).** LED chip make - Philips/ Crompton/ Havells/ Wipro & Driver make - Philips/ Crompton/ Havells/ Wipro or similar approved by Bank.	Nos.	5.00
36	Supply & fixing LED 4000K **Tube light 4' (Philips make cat no. - BN021C LED22S PSU CW GR/ Crompton/ Havells/ Wipro or similar approved by Bank)** has an anti-glare diffuser,energy efficient driver & superior lighting quality.Complete with all necessary fittings,tube lamp directly on wall/celing with ceiling plate, nipples as requird. LED chip make - Philips/ Crompton/ Havells/ Wipro &Driver make - Philips/ Crompton/ Havells/ Wipro or similar approved by Bank.	Nos.	15.00
37	Supply & fixing LED 4000K **Tube light 2' (Philips make cat no. - BN 021 LED12S 6500 PSU GR/ Crompton/ Havells/ Wipro or similar approved by Bank)** has an anti-glare diffuser,energy efficient driver & superior lighting quality.Complete with all necessary fittings,tube lamp directly on wall/celing with ceiling plate, nipples as required. LED chip make - Philips/ Crompton/ Havells/ Wipro & Driver make - Philips/ Crompton/ Havells/ Wipro or similar approved by Bank.	Nos.	17.00
38	Supply & fixing **Recess mounted 2'x2' panel LED light of 36W (Philips make FullGlow G6 cat no. - RC380B LED36S - 6500 G6L60W60 PSU OD/ Crompton/ Havells/ Wipro or similar approved by Bank)** with high transmittance,micro linear frosted (MLF) PMMA curved diffuser provides glare free light. LED chip make - Philips/ Crompton/ Havells/ Wipro & Driver make - Philips/ Crompton/ Havells/ Wipro or similar approved by Bank.	Nos.	167.00

39	Supply & fixing attractive colour combination 400 mm sweep **wall mounting bracket fan (USHA make STRIKER HI SPEED/ Crompton/ Havells/ Bajaj or similar approved by Bank)** having fixed with close mesh guard, pull chain arrangement for speed control and sturd and heavy duty blades for higher displacement of air.	Set	135.00
40	Supply, Installation, testing and commissioning of 1200 mm sweep **ceiling fan (USHA make STRIKER** (Safty Wire & S3 Capacitor)/ **Crompton/ Havells/ Bajaj or Similar approved by Bank)** with regulator, including all fittings as required.	Nos.	2.00
41	Supply & fixing 300 mm. sweep **Exhaust fan (USHA make AEROCLEAN LD GBD/ Crompton/ Havells/ Bajaj or Similar approved by Bank)** made of elegant in built shutter, silicon steel laminated for energy saving and durability including cutting of wall mending all damages ISI approved.	Nos.	6.00
42	Providing and fixing **earth bus of 50 mm X 5 mm copper strip** on surface for connections etc. as required. **(FOR CABLE TRAY EARTHING)**	mtr.	2.00
43	Supplying and making end termination with brass compression **gland and copper pin type lugs** for following size of PVC insulated and PVC sheathed / XLPE copper conductor cable of 1.1 KV grade as required.**4 X 10 sq. mm (25mm)**	each	36.00
	GROSS TOTAL (D)		
HVAC Work			
1	Supply, installation, balancing and commissioning of factory fabricated GSS sheet metal rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports etc. as per approved drawings and specifications of following sheet thickness complete as required.		
1.1	Thickness 0.63 mm sheet (24 gauge) [Duct width 0-750mm]	sq m	400.00
1.2	Thickness 0.8 mm sheet (22 gauge) [Duct width 751-1500mm]	sq m	120.00
1.3	Thickness 1.0 mm sheet (20 gauge) [Duct width 1501-2250mm]	sq m	30.00
1.4	Cleaning of existing duct from AHU plenum by robot or machine cleaning, reparing and refitting for new use.	sq m	140.00

2	Supply, installation, testing and commissioning of GI volume control duct damper complete with neoprene rubber gaskets, nuts, bolts, screws linkages, flanges etc, as per specifications.	sq m	2.00
3	Supplying & fixing of powder coated extruded aluminium Supply Air Grills with aluminium volume control dampers.	sq m	1.00
4	Supplying & fixing of powder coated extruded aluminium Return Air Grills (continuous) with louvers but without volume control dampers complete as required.	sq m	2.50
5	Supplying, fixing testing commissioning of supply air diffusers of powder coated aluminium with aluminium volume control dampers with anti smudge ring & removable core.	sq m	10.00
6	Supplying, fixing testing commissioning of Return air diffusers of powder coated aluminium without volume control dampers with anti smudge ring & removable core.	sq m	10.00
7	Supplying, Fixing,testing and commissioning of fire dampers in supply air duct/main branch and return air path as and where required of required sizes i/c control wiring,the damper shall be motorized and spring return so as to close the damper in the event of power failure automatically and open the same in case of power being restored. The spring return action shall be inbuilt mechanism and not externally mounted. The damper shall also be closed in the event of fire signal complete as required.		
7.1	Damper	sq m	1.50
7.2	Actuator	Each	1.00
8	Supply and fixing of acoustic lining of supply air duct with 25 mm thick resin bonded glass wool having density of 32 kg/m³, with 25 mm X 25 mm GI section of 1.25 mm thick, at 600 mm centre to centre covered with Reinforced Plastic tissue paper and 0.5 mm thick perforated aluminum sheet fixed to inside surface of ducts with cadmium plated nuts, bolts, stick pins, CPRX compound etc. complete as required.	sq m	50.00

9	Supply and fixing of acoustic lining of on wall and ceiling of AHU room with 50 mm thick resin bonded glass wool having density of 32 kg/m³, fixed in 610mm x610mm frame workmade of 25x50x50x50x25 mm made out of 0.6mm thikGI sheet U shaped channel and covered with Reinforced Plastic tissue paper and 0.8 mm thick perforated aluminum sheet etc as required.	sq m	160.00
10	Supplying and fixing of following thickness duly laminated aluminum foil of mat finish closed cell Nitrile rubber (Class "O") insulation on existing duct after applying suitable adhesive for Nitrile rubber. The joints shall be sealed with 50 mm wide and 3 mm thick self adhesive nitrile rubber tape insulation complete as per specifications and as required.		
10.1	19 mm	sq m	640.00
	Gross Total (E)		
	Total Electrical Works (D + E)		
	Gross Total (Civil Work (A + B + C) + Electrical Works (D + E))		
F	**Buy back of scrap items:** Rebate for taking away the scrap of old materials generated in connection with electrical & civil works, etc.. The rate offered shall be inclusive of all taxes, labour, transportation, etc.	**L.S.**	**1**
	Net Total after Buyback (A+B+C+D+E-F)		
	Net Total after Buyback (A+B+C+D+E-F) in Words		