



TENDER DOCUMENT FOR
INTERIOR & FURNISHING, ELECTRICAL AND
AIR CONDITIONING WORKS
AT WARDHA BRANCH AND ATM

S.No. _____

ISSUED TO: _____

DATE OF ISSUE : _____

LAST DATE OF SUBMISSION: _____

COST OF TENDER :-

Rs. 1500/-

ARCHITECT:

Praveen Desai.

C/8; Shrinivas Garden Soc, 1145, SM Road;
Near Police Ground, FC Rd,
Shivajinagar, Pune - 411016

Ph: 8237-005376.

Mail Id: pdanch@gmail.com.

INDIAN BANK

Notice Inviting Tenders

Indian Bank invites sealed tender from the Contractors for Interior, Furnishing & Electrical & A.C Works.

1. Name of work :- **Interior, Furnishing & Electrical & A.C Works at Indian Bank Branch & ATM At NEW BLDG; FIRST FL; PLOT NO 50/1; BACHHARAJ RD: WARDHA: NAGPUR.**
- 2 Time allowed for completion :- **30 Days**
- 3 Earnest money deposit :- **Rs 12000/-**
4. Initial Security Deposit :- 2% of the accepted contract value inclusive of the amount of EMD.
- 5.Total Security deposit :- As per Item 1.9 Sec.2 invitation to Tenderers 3 %
6. Cost of tender documents :- **Rs.1500/-**
7. a) Date and time of issue of tenders :- from 27.02.2019 **TO 07.03.2019** between 11.00 am to 05.00 pm From Architect's Office.
- b) Last date and time of receipt of tenders :- **08.03.2019 at 01.00 pm**
- c) Opening of Tender :- **08.03.2019 at 03:30 Pm**
- 8.Name & Address of Architect :- **Praveen Desai.**
C/8; Shrinivas Garden Soc, 1145, SM Road;
Near Police Ground, FC Rd,
Shivajinagar, Pune - 411016
Ph: 8237-005376. Mail Id: pdanch@gmail.com.
9. Address at which the tenders are to be submitted: - **Plot No.-1A, Karve Nagar, Wardha Road, Oppsite Airport Centre Point Hotel, Nagpur-440025.**
10. Place of opening tenders. :- As per S.No.9.Above.
11. Defects liability period. :- Twelve months.
12. Validity of offer :- 90 days
13. Liquidated damages. :- 1% per week up to maximum of 10% of contract value.

In case the date of opening of tenders is declared as a holiday the tenders will be opened on the next working day at the same time. Indian Bank has the right to accept /reject any/ all tenders without assigning any reason.

.....**For & behalf of Indian Bank**

SECTION - 2

INVITATION TO TENDERERS

INVITATION TO TENDERERS

Sealed tenders on Item Rate basis, are invited in the prescribed form, by the Chief Manager, INDIAN BANK For **INTERIOR, FURNISHING, ELECTRICAL & AIR CONDITIONING WORKS IN INDIAN BANK BRANCH & ATM AT NEW BLDG; FIRST FL; PLOT NO 50/1; BACHHARAJ RD; WARDHA; NAGPUR.**

TENDER. NO	NAME OF WORK	EARNEST MONEY	TIME OF COMPLETION
AKR/IB/16	Interior,Furnishing Electrical & AC works of Indian Bank Wardha, Nagpur	Rs.12000/- In Form of D.D drawn in favour of Indian Bank	30 Days from the second day of written order

The work as detailed in this tender shall be executed and completed in all respect within a period of **30 Days** from The 5nd day of written order to commence the work in accordance with the tender documents, Instructions to Tenderers, Technical specification, Bill of Quantities, conditions of contract, Schedules and drawings, to the satisfaction of Architect/ Employer.

The Tenderers is required to deposit Rs. 12000/- as Earnest Money along with the tender in the form of crossed Demand Draft only payable at Nagpur in favour of Indian Bank. The Earnest Money will be refunded with out any interest to the unsuccessful Tenderers after a decision is taken regarding award of contract.

1.4 Tenders, will be submitted in two sealed envelopes as under and super scribed with the name of work, and Tender No. AKR/ I B/ 16 must be submitted to Chief Manager, **Plot No.-1A, Karve Nagar, Wardha Road,Oppsite Airport Centre Point Hotel, Nagpur-440025.**

not later than **1:00 PM** on **08.03.2019** Tenders will be opened on the same day at **03:30 PM** in the presence of Tenderers or their authorized representatives.

Tender documents can be obtained on working day from the

On payment of tender cost (non-refundable) of **Rs.1500/- cash.** The relevant drawings are enclosed in the tender along with set of specifications.

1.6 Rates must be quoted for complete works at site inclusive of all costs, taxes and charges, etc. All taxes and duties including GST or any other tax applicable / enforced due to value added tax E.S.I. charges etc. as Applicable at Maharastra,Central or State Sales Tax, Octroi, Royalties etc. on works and materials required for use in the execution of this project shall be entirely borne and payable by the Contractor and the Employer will not entertain any claim what so ever in this respect.

1.7 The tender will be submitted in two separate envelopes.

Envelope No.1 Containing the forwarding letter to the tender bringing out Deviation if any from the tender and the Earnest Money deposit, only and should be super scribed as Envelope No.1 Please note, no deviation will be permitted in the bill of quantities and the specification enclosed with the tender.

EnvelopeNo.2 Consisting of priced Tender Document along with a duplicate of priced Tender Document (duly marked Original & duplicate) No alteration & deviation will be shall be permitted in the bill of quantities and the specification enclosed with the tender documents Issued, and it should super scribed as:

"Tender for Interior, Furnishing & Electrical & A.C Works at Indian Bank Branch & ATM At NEW BLDG; FIRST FL; PLOT NO 50/1; BACHHARAJ RD; WARDHA; NAGPUR.

Envelope No.3 It shall be adequate size & shall contain envelope No.1 & 2 & shall be properly sealed .

Envelope No.1 Containing the forwarding letter, Earnest Money Deposit will be opened at **3:30 PM** on **08.03.2019** in the office of the **Plot No.-1A, Karve Nagar, Wardha Road,Oppsite Airport Centre Point Hotel, Nagpur-440025.**

1.7 Envelope No.2 containing the tender etc. will be opened at **3:30 Pm** on **08.03.2019** in the same office mentioned above and if the date mentioned is declared a holiday it will be opened be at the time and date which will be announced After opening envelope No.1 containing the forwarding letter and the Earnest Money Deposit, all the deviations & conditions if any will be examined and conditions / deviations if not acceptable, the second envelope containing the tender etc. may not be opened in which case the tender automatically stands rejected. There should be no forwarding letter or conditions in envelope No. 2. The Tender is likely to be rejected in case any letter is found in the second Envelope.

1.8 the tenders shall remain valid for acceptance by the Employer, for a period of three months from the date of opening of tender. If any Tenderers withdraws his Tender before the said period, then the Bank shall be at liberty to forfeit Earnest Money paid along with the tender.

1.9 Total security deposit shall comprise of:

- (a) Earnest Money Deposit.
- (b) Initial Security Deposit.
- (c) Retention Money.

a) Earnest Money Deposit

This is an amount submitted by the contractor along with the tender.

b) Security Deposit

Total security deposit shall be 10 % of contract value. Out of this 2% of contract value is in the form of initial security deposit which includes the Earnest Money Deposit Balance shall be deducted from the running account bills of the works at the rate of 10% of the respective running account bill i.e. deduction from each running bill account will be 10% till total 10% of contract value is reached. The Security Deposit will be paid to the contractor after the defects liability period as specified in contract. No interest shall be paid on the amount retained by the bank as security deposit.

Initial Security Deposit

The successful tender or will have to submit a sum equivalent to 3% of contract value less Earnest money deposit by means of Demand Draft drawn in favour of Indian Bank with in a period of 5 days of acceptance of tender.

c) Retention Money

- i) The retention percentage (i.e. deduction from interim bill) shall be 10% of the gross value of each interim bill subject to above and shall be retained for a Period of 12 month of Defect Liability Period.
- ii) The maximum amount of retention money shall be 10% of the total security Deposit as explained above.
- iii) The total security deposit is refunded to the contractor 14 (fourteen) days after the end of defects liability period provided he has satisfactorily carried out all the work and attended to all defects in accordance with the conditions of the contract, subject to the following:

Contractor should remove his material, equipment, labour force, temporary Sheds/ stores etc. from the site

Earnest money of the successful Tenderers will be liable to be forfeited in the Event of refusal or delay on his part in depositing initial security deposit & Signing the agreement within 5 days, of the issue of letter of award of the work.

- Tender document duly filled and signed by the Tenderers shall be submitted as the tender of the work.
- The INDIAN BANK do not bind itself to accept the lowest or any tender, or to assign any reason there of and also Reserves the right of accepting the whole or part of the tender and the tenderer shall in such an event is bound to perform the contract at the same rates quoted in the tender for the various items of the work.

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Canvassing in any form in connection with the tender is strictly prohibited and the tenders submitted by the contractors who resort to canvassing in any form shall be liable for rejection.

The tendering firms, in case the Tenderers is a partnership firm, shall submit the Tender signed by all the partners. in the event of absence of any partner, it must be signed on his behalf by a person holding power of attorney authorizing him to do so and such power of attorney shall be attached along with the tender.

The contractor has to visit the site before filling the tender, assess the Difficulties for getting the interior done in working office. The furnishing shall be done after detailed discussions with the engineer-in-charge.

Indian Bank Premises.

**NEW BLDG; FIRST FL; PLOT NO 50/1;
BACHHARAJ RD; WARDHA; NAGPUR.**

APPENDIX SHOWING IMPORTANT SCHEDULES

- 1.SIGNING THE AGREEMENT :- WITHIN 5 DAYS OF THE ISSUE OF LETTER OF INTENT/ORDER.
- 2.DATE OF COMMENCEMENT OF WORK :- FROM THE 3RD DAY OF AWARD OF WORK OR WHEN THE SITE IS HANDED OVER WHICHEVER IS EARLIER.
- 3.PERIOD OF COMPLETION :- **30 DAYS**
- 4.LIQUIDATED DAMAGES :- 2% OF CONTRACT AMOUNT PER WEEK OD DELAY SUBJECT TO THE MAX. OF 10% OF THE ACCEPTED CONTRACTED SUM.
- 5.VALUE OF RUNNING / ON ACCOUNT BILL :- 75% OF AMOUNT WITHIN 7TH DAYS AFTER DATE OF RECEIPT OF ARCHITECT CERTIFICATE. AND BALANCE WITHIN 21 DAYS
- 6.INITIAL SECURITY DEPOSIT :- 3% OF THE ACCEPTED VALUE OF THE TENDER INCLUDING OF THE EARNEST MONEY.
- 7.TOTAL SECURITY DEPOSIT :- AS PER CLAUSE NO. 1.9
- 8.INCOME TAX DEDUCTION AND GST :- AT PREVAILING RATE FROM EACH BILL.
- 9.DEFECTS LIABILITY PERIOD :- 12 MONTHS AFTER COMPLETION OF WORK.
- 10.PERIOD OF FINAL MEASUREMENT OF WORK. :- 2 WEEK AFTER VIRTUAL COMPLETION OF WORK.

SECTION- 3

INSTRUCTIONS TO TENDERERS

SECTION-3

INSTRUCTIONS TO TENDERERS

The Tenderer shall examine carefully all the tender documents consisting of:

Invitation to Tenderers.	[Page no. 5 to 9]
Instructions to Tenderers.	[Page no. 10 to 13]
Letter & Form of Agreement.	[Page no. 14 to 18]
General and special conditions of contract.	[Page no. 19 to 33]
Condition for Electrical Works	[Page no. 34 to 47]
Material Specifications	[Page no. 48 to 61]
Bill of quantities.	[Page no. 62 to 79]

These shall form part of the Agreement:-

The tenderer is advised to visit and inspect site of at his own cost and responsibility and to secure all necessary information, which may be required for completing the tender. Ignorance of site conditions can't be an excuse for nonperformance of the contract. All costs, charges and expenses that may be incurred by the tenderer in connections with the preparation of his tender shall be borne by him and the Employer/Architect do not accept any liability whatsoever in this regard.

Time is the essence of the contract and the tenderers are required to complete the work in all respects within the stipulated time of completion and hand over the same, complete in all respects to the satisfaction of the Architects.

The tender should contain not only the rates but also the value of each item of work entered in the prescribed column of the B.O.Q. and all the items should be totaled up in order to show the aggregate value of the entire tender. The rates quoted by the tender should be expressed accurately both in words and figures so that there is no discrepancy. All corrections in the tender shall be duly attested by initials of the tenderers. Corrections, if not attested, may entail rejection of tender. The rates quoted by the tenderers in words in item rate tender following will be the basis in finalizing the tender viz

- a) When there is a difference between the rates in figures & in words, the rates which correspond to the amounts worked out by the contractor ,shall be taken as correct.
- b) When the amount of an item is not worked out by the contractor or it does not correspond with the rate written either in figures or in words ,then the rates quoted by the contractors in words shall be taken as correct
- c) When the rate quoted by the contractor in figures and in words tallies but the amount is not worked out correctly, the rate quoted by the contractor shall be taken as correct & not the amount

3.4 It shall be clearly understood that the rates quoted in the tender are to be, for complete work at site, as per instructions to Tenderers, conditions of contract, specifications and drawing, addenda referred to therein and also for all such works as are necessary for the proper completion of the contract, although specification

3.5 Thereof may not have been made in the specifications or drawings or tender documents. The rates shall be firm and shall not be subject to cost escalation on account of labour and material, and labour conditions or any other reason whatsoever.

3.6 The tenderers shall use only the form issued with this tender to fill up the rates.

3.7 Every page of the tender shall be signed on the left hand side bottom corner and any tender not so complied with is liable to be treated as defective and liable to be rejected.

3.8 In the event of a tender being selected for acceptance, The Bank will inform the tenderer of the specification and other documents for the acceptance with the tender. The tender of the successful tenderer shall also deposit the required amount of the Initial security money within the prescribed time and if the tenderer fails to deposit the required amount of the initial security money within the prescribed period, the Bank may reject the tender.

3.9 The successful tenderer will be notified about the acceptance of his tender by the Employer and he will have to deposit balance amount initial security and execute agreement within 5 (Five) days thereof, failing which his tender would be liable to rejection with forfeiture of the Earnest Money.

3.10 The tenderer shall fill up the complete form of article of agreement before submission of tender. Failure to comply may entail rejection of the tender.

3.11 The contractor will be governed by the Indian contract Act, Indian sale of good Act and all other relevant laws, All payments due to the contractor under the contract will be made in Indian Rupee currency.

3.12 The rates quoted shall be for complete work at site and should be inclusive of incidentals necessary for carrying out the work. The rates shall be inclusive of GST if applicable at Delhi for work contracts, or any other tax applicable enforced due to Value Added Tax, Central or State sales Tax, octroi Duty, Royalty, ESI or any other tax or duty levied by any government of public bodies. The rates shall be firm and shall not be subject to cost escalation of labour and material and exchange variations, labour conditions and other conditions whatsoever.

3.13 A schedule of approximate quantities for various items accompanies this tender. It shall be clearly understood that neither the Architect nor the Employer will accept any responsibility for the correctness or completeness of this schedule in respect of items and quantities and this schedule is liable to alterations by commission, deduction or additions at the discretion of the Employer in consultation with the Architect without violating the terms of the contract.

3.14 Form of 'Tender for works' contained in section-3 shall be completed along with submission of tender. In case of failure to do so the tender is liable to rejection.

3.15 The Employer does not bind itself to accept the lowest or any tender or to assign any reason thereof and also reserves the right of accepting the whole or part of the tender. The part acceptance will not violate the terms and conditions of the contract and will execute the work at the specified rates without any extra charges or compensation.

3.16 Income tax deductions will be made as per the prevailing rates from the contractor's on account bills.

3.17 No mobilization advance or secured advance is to be allowed to the contractor.

3.18 Power and water connection if required is to be arranged by the contractor and all expenses pertaining to electricity and water used during the course of work shall be borne by the contractor. In case electricity and water of Bank are used by the contractor, Lump sum amount of Rs. 5,000/- shall be deducted from the bills of the contractor.

3.19 Defects liability period is for 12 months.

3.20 As per IBA guidelines freak rate analysis will be conducted against lower and higher rates observed in any tender and contractor will have to submit rates analysis for such items for which freak rates have been observed .Higher freak rates can be lowered by the Bank to bring them at par with Architect's standard rates.

3.21 The tenderer, must associate himself with agencies of the appropriate class which are eligible to tender for: (i) Dismantling, flooring and other Civil work and (ii) furniture (iii) Electrical Works.

3.22 Contractor shall fabricate all the furniture at site & shall not cover the furniture with laminate /veneer/fabric till the approval of Architect.

3.23 Necessary certificate regarding the quality of material shall be obtained from the specified companies sample of materials used can be obtained by manufacturing companies from the semi finished items any loss to the contractor for replacement of such materials will be on their account only.

All samples approved shall be kept and displayed at site.

Indian Bank Premises.

**NEW BLDG; FIRST FL; PLOT NO 50/1;
BACHHARAJ RD; WARDHA; NAGPUR.**

SECTION- 4

FORWARDING LETTER & AGREEMENT

FORWARDING LETTER

FROM:

TO:

.....

.....

REF :

DEAR SIR,

With reference to the tender invited by you, I/we hereby offer to perform, provide, execute and complete the works in conformity with conditions of contract, drawings and specifications for the respective items of schedule of quantities attached hereto.

I/we have satisfied myself/ourselves as to the location and prevailing conditions of the site, and have read carefully the articles of agreement, conditions of contract, specification, general and special conditions, Technical specifications, etc. and I/we understand that the works are to be completed within One months from date of commencement and fully understand that the time will be the essence of the contract.

3. I/we enclosed a demand draft for **Rs.12000/-** drawn on **INDIAN BANK** payable at Nagpur in favour of the as earnest money and fully understand that this amount will not bear any interest.

4.I/we agree to keep the offer for 90 days from the date of opening the tender.

5.Should this tender be accepted in whole or in part, I/we hereby agree to abide by and fulfil all the terms and conditions annexed here to. If I/we fail to commence the work specified in tender documents, I/we agree that my/our earnest money shall stand forfeited absolutely to the Employer towards security deposit (retention money). I/we also agree to the balance retention money being deducted from my/our bills in accordance with the conditions of contract.

6.All the terms and conditions contained in the notice Inviting Tenders, Conditions of Tender, Special specifications, General specifications for execution of the work and additional conditions and the agreement etc. Constituting the tender documents have been fully read by me/us and explained to me/us and I/we hereby accept the same and sign hereunder in token of their Acceptance.

7. We are further enclosing herewith the following documents:

i) Demand draft no Dated.....drawn

Office Adress:

Your faithfully,
Name & Sign of Tenderers (S)
Office stamp & seal of the Tender (S)

AGREEMENT

This Agreement made at.....Day of.Between the INDIAN BANK having its **Indian Bank Branch & ATM At NEW BLDG; FIRST FL; PLOT NO 50/1; BACHHARAJ RD; WARDHA; NAGPUR.**

(hereinafter referred to as the Employer, Bank or Indian Bank which expression shall include their heirs, executors, administrators and assigns) of the one part and hereinafter referred to as contractors which expression shall include the present Directors /Partners & also Directors / Partners & also of Directors / Partners from time to time as also their respective heirs, Legal representatives, administrators and assigns) the other part.

WHEREAS EMPLOYER IS DESIROUS OF EXECUTING INTERIOR, FURNISHING, ELECTRICAL & A.C WORKS AT INDIAN BANK BRANCH & ATM AT NEW BLDG; FIRST FL; PLOT NO 50/1; BACHHARAJ RD; WARDHA; NAGPUR.

WHEREAS the said drawings and the specifications and the price 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, hereinafter referred as the said conditions the work shown upon the said drawings and described in the said conditions and the said priced schedule of quantities, which is a part of the Tender document for a sum of **Rs 1500/- (RUPEES ONE THOUSAND & FIVE HUNDRED ONLY).**

And WHEREAS the contractor has deposited Rs 12000/- as the Earnest Money with he Employer, which shall become part of security deposit to be retained until the expiry of the Defect liability period for the due observance of the contract.

NOW IT IS HERE BY AGREED AS FOLLOWS:-

- In consideration of the said contract, payments to be made to the said conditions execute and complete the works shown upon the said Drawings and such further detailed drawings as may be furnished to him by the said architects and described in the specifications and the priced schedule of quantities.
- The employer shall pay the contractor such sums as shall become payable hereunder at the times and in the manner specified in the said conditions.
- The said contract comprised the building above mentioned and all subsidiary works connected there, within the same site as may be ordered to be done from time to time by the said Architects, even-though such works may not be shown on the Drawings or described in the said specifications or the priced schedule of quantities.

4 The Employer in consultation with the Architect reserves the right to exercise control on quality of work, check of measurement, payment certificate, variation arising, in view of change of scope of work and approval of rates of extra substituted items. The decision of the Employer shall be final and binding in this regard.

The following documents shall be deemed to form and constructed as part of this agreement along with the amendments, Negotiated and confirmed in various subsequent, matters exchanged as mentioned hereinafter and parties hereto will respectively abide any and submit themselves to the conditions and stipulations & perform the agreement on their parts respectively in such conditions contained.

- Notice inviting Tender
- invitation to tenderers
- instruction to tenderers
- forwarding letter & agreement

- general & special conditions of the contract
- conditions for electrical works
- vii) material specifications
 - bill of quantities
- ix) contractor's letter dated...../...../...../ to the employer in acceptance of the award of contract.

6 all disputes arising out of or in any way connected with the agreement shall be deemed to have arisen at new Delhi only, the court in new Delhi shall have jurisdiction to determine the same.

the several parts of this contracts have been read to us and fully understood by us. witness our hand this.....day of.....2017

signed by the said _____ (employer) name _____	:	signed by the said _____ (contractor) name _____
designation _____	:	address _____

In the Presence of:-

Signature	:	Signature
Name	:	Name
Occupation	:	Occupation
Address	:	Address

SECTION- 5

SPECIAL CONDITION OF THE CONTRACT

INSURANCE FOR WORK

The contractor at the time of signing the contract or before commencing the Execution of work, without limit in his obligation and responsibilities shall insure the work at his own cost and keep them insured until the virtual completion of the work and shall be insured against all acts of God including Fire, Theft, Riots, War ,Floods, Act with a Nationalized Insurance Agency in the joint name of the Employer and the contractor (The name of the former being placed first in the policy) for the full amount of the contract. Such policy shall cover the property of the employer and fees for assessing the claim and in connection with his services generally and it shall not cover any property of the contractor or of any sub contractor or employee.

The contractor shall deposit the policy and receipt for the premium with the employer with in seven (7) days, from the date of signing of the contract and commencement of the execution of the work or unless otherwise instructed by the employer in default of the contractor insuring as provided above, the employer on his behalf may so insurance and may deduct the premium paid from any moneys or which may become due to the contractor, contractor shall as soon any claim under the policy is settled or the work reinstate by the Insurance office should elect to do so, proceed with all due diligence with the completion of the works in the same manner as through misfortunate /accident has not occurred and in all respect under the same condition of the contracts. The contractor in case of rebelling or reinstatement after accident shall be entitled to such extension of time for completion as the Employer deems fit.

1.1.1) INSURANCE IN RESPECT OF DAMAGE TO PERSONS AND PROPERTY:

The contractor shall be responsible for all injuries to Orson animals or things and for all structural and decorative damage to property, which may arise from the operation or neglect of himself or of any approved sub-contractor or Employees, whether such injury or damage arise from carelessness, accident or any other cause whatsoever in any way connected with the carrying out of this contract. The clause shall be held to include any damage to roads streets, footpath bridges and work forming the subject of the contract by frost or other of the weather. The contractor shall indemnify the Employer and hold him harmless in respect of all and any expenses arising from any such injury or damage under in respect of any compensation of damages consequent upon such claim.

2)The contractor shall reinstate all damages of every sort mentioned in this clause, so as to deliver up the whole of the contract work complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damages to property of third parties.

3) The contractor shall indemnify the Employer against all claims which may be made against the Employer by any member of the public or other third party in respect of works in consequence there of and shall at his own expense arrange to effect and maintain, until the virtual completion of the contract, with any Nationalize Insurance agency in the joint name of the Employer and the contractor against such risks and deposit such policy or policies with the Employer from time to time during the currency of this contract. The contractor shall similarly indemnify the Employer against all claims which may be made upon the Employer whether under the workmen's compensation Act or any other status in force during the currency of this contract or at common law in respect of any employee of the contractor or any sub-contractor and shall at his own expense effect and maintain with an approved office a policy of insurance in the joint name of the Employer and the contractor against such risks and deposit such policy or policies with the Employer from time

to time during the

currency of the contract. The contractor shall be responsible for any thing which may be excluded from the insurance policies above referred to and also for all other damages to any property arising out of and incidental to the negligent or defect carrying out of this contract. He shall also indemnify the Employer in respect of anti costs, charges or expenses arising out of any claim or proceedings and also in respect of any award of or compensation of damages arising there from.

4)The Employer shall be at liberty and is empowered to deduct the amount of any damage, compensation cost charges and expenses arising or occurring from or in respect of any such claim or damage from any sum or sums due to or become due to the contractor including the security deposit.

5) If the contractor fails to comply with the terms of these conditions, the Employer may insure the work and may deduct the amount of the premiums paid from any moneys that may be or become payable to the contractor or may at the opinion, not release running payable to the contractor shall have completed with the terms of this condition.

6) Such insurance, weather effected by the Employer or the will not limit or bar the liability and obligation of the contractor to delivery the work to the Employer completed in all respects according to the contract in case of loss or damage due to any of the aforesaid causes, the moneys payable under any such insurance shall be received and retained by the Employer until the work are finally completed and such moneys shell then be credited to the contractor in final settlement of accounts.

1.1.2 DIVISION OF WORK PHASE:

The Employer/ Architect reserve the right to divide the work in to two or more phases to facilitate renovation without disturbing the working of the bank. The contractor shell be responsible for erecting temporary high partition to separate the working part & the office from the area under renovation. Nothing extra shall be paid to the contractor for the same.

1.1.3 TESTING OF WORK AND MATERIALS:

The contractor shall be required by the Architect/ Engineer-in-charge to arrange testing of material and portions of the work at his own cost in order to prove their soundness and efficiency. These tests should be carried out at the approved test laboratory required by the Architect/ Engineer-in-charge to arrange of materials and portions of the work at Institutions as directed .If after such test the work or portion of the work are found to be defective or inbound, the contractor shell if ordered by the Architect/ Engineer-in-charge pull down and re-erect the same at his own cost.

SECTION- 6

CONDITIONS OF THE CONTRACT

CONDITIONS OF CONTRACT

6.1 DEFINITIONS OF CONTRACT

In this contract (as hereinafter defined) the following words and expressions shall have the meaning thereby assigned to them unless the contract described a Different meaning .

i) '**EMPLOYER**' means the **INDIAN BANK, NAGPUR** (client) having its, **New Branch at NEW BLDG; FIRST FL; PLOT NO 50/1; BACHHARAJ RD; WARDHA; NAGPUR.**

and includes clients representative to deal with any matters on his behalf.

ii)'ENGINEER-IN- CHARGE' or 'Project Engineer' means the person appointed by the Bank as their representative to give instructions to the contractors.

iii) 'CONTRACTOR' means the individual, firm or company whether incorporated or not, with whom the contract is entered into and includes the heirs, executors administrator or successors permitted assignors or legal representative, as the case may be, of such individual, firm or company, and further includes the term successful tenderer.

iv) The expression contract means the documents forming the tender and acceptance there of includes the invitation to tender, instruction to tenderers, formal agreement executed between the employer and the contractor, general conditions of contract together with documents referred to therein, Technical specifications, drawing, and priced schedules of quantities. All these documents, taken together shall be deemed to form one contract and shall be complementary to one another.

v) Tender means the offer made by any individual, firm/firms or company companies for execution of the works.

vi)'Tender means the individual , firm/ firms or company/ companies submitting a tender.

vii) Contractor price means the cost worked out on the basis of quantities prescribed in the schedule of quantities and the of rates named in the acceptance of tender subject to such additions there to or deductions therefore as may be made under the provisions hereinafter contained.

viii)'Acceptance of tender' means the letter or memorandum from the employer communication to the tendered the acceptance of this tender and include the advance acceptance of his tender.

ix) The expression 'works' or 'work' where in these conditions shall unless here by mentioned either in the subject or context represents to such construction, to be constructed, 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

x)'Drawing' means the drawings referred to in the tender documents including any modifications of such drawings approved in writing by the Architect or his representative and furnished by the contractor and approved by the Architect or his representative and furnished by the contractor.

xi)'Temporary work' means all temporary works of every kind required in or about then execution completion or maintenance of the works.

xii)'Urgent work' shall mean any urgent measures which in the opinion of the Resident Engineer become necessary during the progress of the work to avoid any risk of accident or failures or which become necessary for execution urgently.

xiii) Constructional plant means all plants machinery, appliances of every natural required in or about the execution of the works but does not include materials or other things intended to form or forming part of the accepted tender.

xiv)'Site' means the actual place or places as described in the tender at which the construction of works is to be carried out by the contractor together or with so much of the area surrounding the said places as the contractor shall with the consent of the Resident Engineer, actually use in connection with the works otherwise than merely for the purpose of access to the said place or places.

xv)'Normal working hours' mean eight hours per day and the specific timing would very depending upon the seasons.

xvi)'A Day' shall mean a calendar day beginning and ending at 0.00 hours to 24 hours from midnight to mid - night irrespective of number of hours worked in that day.

xvii) 'A week' shall mean 7 (seven) days without regard to the number of hours worked in any day in that week.

xviii) 'A month' shall mean a calendar month without regard to the number of days in that month.

xix) Unit' means metric units.

xx) Terms & expression not herein defined shall have the meaning assigned to them in the Indian General Clauses Act 1897 or the Indian contract Act or the Indian Sales of goods Act or any other applicable India Law as the case may be.

xxi)'Approved and Approval' respectively mean approved or approval in writing including subsequent written confirmation of previous verbal approval.

xxii)'Test' means such tests as are prescribed by the specification herein or by the Architect./Banks Engineer or his representative, whether performed by the contractor.

xxiii) Act of Insolvency shall mean any act of insolvency defined by the presidency Towns Insolvency Act or the provincial Insolvency Act amending such original.

xxiv) 'Specification' means the standard specifications for works and materials of the employer and specifically brought out in the notice inviting the tender, as amplified added to or superseded by special specification and embodied in the contract. In absence of any specifications for any item of the work, the relevant specifications in CPWD and IS code shall be followed and work shall be executed accordingly.

xxv)'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 address and shall be deemed to have been received when in the ordinary course of post it would have been delivered.

xxvi) 'Period of Maintenance' shall mean the specified period of maintenance from the date of completion of the works, as certified by the Engineer.

xxvii) 'Hindrance Register' shall be maintained at the site of work showing the item affected, the date on which the delay occurred and the date on which the delay was cleared and reason for delay. These entries shall be done by the authorized representative of the Bank/contractor

xxviii) 'Virtual completion' virtual completion shall mean that the work are complete and ready for occupation, Including all Installations as required in the contract in complete working order to the full satisfaction of the Banks.

6.2 EXTENT OF CONTRACT

6.2.1 EXTENT OF CONTRACT:

The contractor shall supply at his own cost all materials instruments, ladders, Cordage, tackle, scaffolding, and temporary works required for the prop execution of works whether original, altered or substituted and whether included in the specifications or other document forming part of the contract or referred to in these conditions he is entitled to be satisfied, or not and which may be, necessary for the purpose of satisfying of, which he is entitled to require together with carriage, therefore to and from the works. The contractor shall also supply survey instruments and other materials necessary for the purpose of setting out works, and counting weighing and assisting to the measurement or examination at any time and from time to time of the work material, failing his so doing the same may be provided by the Engineer -in charge at the expenses may be deducted from any money due to the contractor, under the contract from his security deposit or the proceeds of sale thereof, The contractor shall also provide a sufficient portion of fencing the lights required to protect the public from accident, and shall be bound to bear the expenses of neglect of the above precaution, and to pay any damages and costs which may be awarded in any such suit, action or proceeding to any such person or which may with the constant of the contractor be paid to compromise and claim by any such claim/claims and the contractor shall indemnify the employer against any claim for any person on this account.

6.2.2 SUFFICIENCY OF TENDER

The contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the work and of his price for the work and of his prices stated in the schedule, which shall except in so far as it otherwise provided in the contract, cover all his obligation under the contract and all matters and things necessary for the proper completion and maintenance of the work.

6.2.3 ASSIGMENT OF LETTING OF CONTRACT

The contractor shall not assigns the contract any part thereof or any benefit or interest therein or there under or any claim arising out of the contract to any other party without the prior written consent of the employer.

6.2.4 POWER TO MAKE ALTERATION

The employer shall have power to make any alterations or addition to the stipulated specifications, drawing, design, and instruction that may appeal to him to be necessary or, advisable during the progress of the work and the contractor shall have no claim for compensation on account of such alterations or additions, the contractor shall be bound to carry out the work in accordance with any instructions which may be given to him in writing signed by the Bank and such alterations shall not invalidate the contract, and any additional work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the contractor on the same conditions in all respects on which he agreed to do the main work & at the same rates as are specify

in the tender for the main work.

7.1 ENGAGEMENT OF LABOUR:

The contractor shall employ labour in sufficient numbers either directly or through sub-contractors, where such subletting to maintain the required rate of progress and quality to ensure workmanship of the degree specified in the contract and to the satisfaction of the Architect. The contractor shall not employ in connection the works any person who has not completed his fifteenth year of age. The contractor shall comply with the provisions of the payment of wages Act, 1936, minimum wages Act, 1948, workmen's compensation Act, 1923, Industrial Dispute Act 1947, Maternity Benefit Act, 1961 and mines Act, 1952 the employer state Insurance Act, 1948 safety code and Labour welfare Act, employer's Liability Act, 1938, contract labour (regulation and abolishing) Act or rules, or any modifications there of under from time to time. The contractor shall indemnify the employer against any payment to be made under and for observance of the regulations aforesaid without prejudice to his right to claim indemnify from his sub-contractors. The contractor shall provide and maintain at his own expenses all lights, guards, fencing and watching when and where necessary or required by the resident engineer for the protection of the works or for the safety and convenience those employed on works of the public.

7.2 DISRUPTION OF PROGRESS:

The contractor shall give written notice to the Architect whenever Planning or progress of the works is likely to be delayed or disrupted unless any further drawings or order, Including a direction, instruction or approval, is issued by the Architect, within a reasonable time. The notice shall include details of the drawing or order required and of why and by when it is required and of any delay or disruption likely to be suffered if It is late. If by reason of any failure or inability of the Architects to issue within a time reasonable in all circumstances any drawing or order request by the contractor, the work suffers delay then the Architect shall take such delay into account in determining any extension of time to Which the contractor is entitled under Provision of contract here of, how ever, no other compensation will be admissible on this account.

7.3 RECTIFICATION OF DEFECTS:

If it shall appear to the Architect or his representative in charge of the works that any work has been executed with unsound, imperfect or unskilful workmanship or material of any inferior description, the contractor shall no deemed in writing from the Bank specifying the work materials or articulated complained of shall rectify or remove and reconstruct work so specified in part, as the case may require.

7.4 SAMPLE:

Samples of all materials to be used in works, as per the schedule of quantities, shall be Submitted for approval contract. No material of which samples have to be submitted shall be used in the work unless they have been approved in writing by the Bank /Employer.

7.5 COST OF SAMPLES:

The cost of preparing samples and workmanship will be borne the contractor except for such exclusions as are specifically mentioned in the specifications laid down in contract.

7.6 FREE ACCESS TO WORK SITE:

The contractor shall provide all necessary and reasonable facilities and free access to the works and his records at site of work to the, Resident Engineer and their representatives. He shall provide facilities and space to the satisfaction of the Architect or his representative for inspection of any part of work.

7.7 INSPECTION OF WORK:

All work under or in course of execution or executed in pursuance of the contract shall at all times be open to inspection and supervision of his representative and the contractor shall at all times

during the usual working hours, and at all other times which reasonable notice of the intention of his representatives to visit works shall have 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 to the contractor's agent shall be considered to have the same force as if they had been given to the contractor himself.

7.8 PREPARATION OF CONSTRUCTION PROGRAMME SCHEDULE:

As and when sufficient planning information is available, the contractor in consultation with the Architects shall prepare a programme schedule of the activities Contractor should prepare Bar-charts of the project activities in the light of the tendered quantities and their rates respectively. Under no circumstances shall this schedule be prepared later than one week of finalisation of contract. Throughout the work, all programmes, schedule and charts shall be revised wherever any significant changes occurs. The contractor shall also submit monthly progress chart to the Architect.

7.9 SITE ORDER BOOK:

The contractor shall maintain a site order book at the site of the works wherein the instruction of the Bank's Engineer shall be recorded. The site order book shall be the property of the employer and the instructions recorded therein shall be deemed to have the same force and effect as if they had been given to the contractor himself. The contractor or his representative on site must sign the book in taken of his having persuaded the orders given therein.

7.10 HINDRANCE REGISTER:

A Hindrance Register shall be maintained at the site of work where in the contractor shall notify the items affected and the execution of work, the date on which the delay was cleared. These entries shall be initiated by the Bank Engineer as well.

7.11 EXTENSION OF TIME FOR COMPLETION:

If the contractor shall desire an extension of the time for completion of the work on his having been unavoidable hindered in its execution or any other ground, he shall apply in writing to the Architects within 3 days of the date of starting of the hindrance on account of which he desires such extension as aforesaid.

7.12 LIQUIDATED DAMAGES FOR DELAY:

The time and date stipulated in the contract for the completion of the work or any Part or stage thereof shall be deemed to the essence of the contract. The work shall throughout the stipulated period of the contract, be carried out with all Intelligence. If The contractor fails to complete the work within the time prescribed or within the Extended time under the contract, he shall pay to the employer on demand amount without prejudice to other rights and remedied the employer may have against the Contractor, a sum equivalent to 1/2(half)% of contract value as liquidated damages for such fault, and not as a penalty for every week or part thereof which the works remain unfinished after the stipulated date of completion provided that the total liquidated damages payable shall not exceed 5% of the accepted contract price. The employer may, without prejudice to any other method of recovery, deduct the amount of such damages from any money due or which become due to the Contractor. The recovery or deduction of such damages shall not relieve the contractor from any obligations and liabilities under the contract.

7.13 FORCE MAJEURE

A)Neither contractor nor I B shall be considered in default in performance of their obligations if such performance is prevented or delayed by events such as but not to war, hostilities revolutions riots, civil commotion, strikes lockout, conflagrations, epidemics accident, fire, storms, floods, droughts, earthquake, or ordinance, or any act of god or for any other cause beyond the reasonable control of the partly affected or prevented or delayed. However a notice is required to be given within 30-days from the happening of the event with complete details, to the other partly to the contract, If it not possible to serve a notice, with in the shortest Possible period without delay.

B) As soon as the cause of force majeure has been removed the party whose ability to perform its obligations has been affected, shall notify the other of such

cessation and the actual delay incurred in such affected activity adducing necessary evidence in support thereof.

C) From the date of occurrence of a case of force-majeure, obligation of the party affected shall be suspended during the continuance of any inability so caused with the cause itself and inability resulting there from having been removed, the agreed time of completion of the respective obligation under this agreement shall stand extended by a period equal to the period of delay occasioned by such events.

D) Should one or both parties be prevented from fulfilling the contractual obligations by a state of force majeure lasting to a period of 6 months or more the two parties shall each other to decide regarding the future execution of this agreement.

DEFECTS LIABILITY PERIOD:

The contractor shall be responsible to make good and remedy at his own expenses within such period as may be stipulated by the employer any defect which may develop or may be noticed before the expiry of 13 months from the certified date of completion and intimation of which has been sent to the contractor within seven days if the expiry of the said period .If the contractor or his work people, or servants shall break, before, injured or destroy any part of a building road, road curbs, in enclosure water pipes, cables, drain electric or telephone posts or wires, trees, or grass and cultivated ground contiguous to the premises on which the work or any part of it is being executed or if any damage shall happen to the work.

8 SECURITY DEPOSIT:

8.1 (RETENTION MONEY)

After the initial security deposit has been made of the notice inviting tender the employer will at the time of making any payment to the contractor for work done or supply made under the contract, deduct 10% of gross value of each interim bill subject to a maximum retention money 3% of the contract value. The maximum amount of retention money will be the balance amount of total security deposit of 5%. All compensation or order sums of money payable by the contractor may be deducted from, or paid by, the sale of a sufficient part of his security deposit, or from any sums which become due to the contractor by the employer on any account whatsoever, and in event of his security deposit being reduced by reason of any such deductions or sale as aforesaid, the contractor shall within ten days thereafter make good in demand draft endorsed in favour of the employer as aforesaid any sum or sums which may have been deducted from or raised by sale of his security deposit or any part thereof.

8.2 REFUND OF INITIAL SECURITY DEPOSIT & RETENTION MONEY:

a) Initial Security Deposit

To be released on the recommendation of the Architect after the issue of certificate of virtual completion by him.

8.3 FORFEITURE OF SECURITY DEPOSIT:

The above said security deposit shall be liable to be forfeited, wholly or in part at the sole discretion of the employer if the contractor fails to carry out the work or perform or observe any of the conditions of the contract.

8.4 INTEREST ON THE SECURITY DEPOSIT:

No interest would be payable by the Employer to the contractor on the security held in deposit.

8.5 RESPONSIBILITIES STRUCTURAL FOR THE ADEQUACY:

The contractor shall comply with the provisions of the contract and with due cares and diligence, execute and maintain the work and provide all labour, including supervisions of all works, structural plans and other things whether 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 responsibilities for the adequacy, suitability and safety at site of all works and methods of the constructions provided.

9 MEASUREMENT AND PAYMENTS

9.1 A bill supported with measurements details shall be submitted by the contractor fortnightly to the Architect for all works executed in the previous period and the Architect or his representative shall verify the requisite measurement for the purpose of having the same verified for the claim as far as admissible, if possible before the expiry of 15 days from the presentation of the bill. All measurements to be taken in duplicate and all bills shall be submitted in triplicate along with contractor's copy of each. All such intermediate payments to the contractor shall be regarded as payments by way of advance against the final payment only and not as payments for work actually done and completed and shall not preclude the requiring of bad, unsound and imperfect or unskilful work to be removed and taken away and reconstructed or re-erected or be considered as an admission of due performance of the contract or any part thereof in any respect, or the actual of any claim not shall it conclude, determine or affect in any way the powers of the Architect under these conditions or any one of them as per the final settlement or adjustment of the account or otherwise, or in any other way vary from the contract.

9.2 FINAL BILL:

Final bill supported with consolidated measurement of the final work executed shall be submitted by the contractor within 1 month of completion of work. When the final bill has been verified and corrected, the Architect will give seven days notice to the contractor to countersign the bill in token of acceptance, the contractor shall countersign the bill within the above seven days or intimate in writing his retention to dispute. If the contractor fails to take approximate action as above within the period prescribed, the bill finalised by the Architect or his representative shall be final and binding on the contractor and the contractor shall have no right to dispute the same.

9.3 CLAIM FOR INTEREST

No claim for interest will be entertained by the Employer with respect to any moneys or balance which may be in its hands owing to a dispute between itself and the contractor or with respect of any delay on the part of the Employer in making or final payments or otherwise.

9.4 RATES FOR EXTRA ADDITIONAL, ALTERED OR SUBSTITUTED WORK:

The rates for additional, altered or substituted work shall be worked out in accordance with the following provision in their respective order

i) If the rates for similar additional, altered or substituted work are directly available in the contract for the work, the contractor for the work, the contractor is bound to carry for the work at the same rates as are available in the contract for the work.

ii) If the rates for additional, altered or substituted work are not directly available in the contract for the work the rates will be derived from the rates for a similar class of work as are specified in the contract for the work.

iii) If the rates for the altered, additional or substituted work cannot be determined in the manner specified in sub-clause (I) to (ii) above, then the contractor shall within 3 days of the date of receipt of carry out the work, inform the Architect of the rate or rates claimed. Rates finalise and approved by the Architect on the basis of these details will be final and binding. However the architect by notice in writing will be liberty to cancel his order to execute such work and arrange to carry it out in such a manner as he may deem advisable. But under no circumstances shall the contractor suspended the work once ordered in writing on the plea of non-settlement rates.

9.5 REIMBURSEMENT OF VARIATIONS IN PRICE:

Prices and rates quoted by the bidders shall be considered as firm for the complete work and entire duration of the contract. No claim for extra payment due to any rise in rates of raw material and labour or due to whatsoever reasons, shall be considered.

9.6 GUARANTEES:

9.6.1 QUALITY OF WORK:

The contractor shall guarantee that the material and workmanship are the best of their respective kind for the service intended and that all items of work will be free from all inherent defects in workmanship and materials. He shall also guarantee that the works will not fail in any respect due to quality of materials, workmanship and methods of construction. The specification assume a proper degree of skill on part of the contractor and workmen employed. The contractor shall consult the Architect or his representative, whenever in his judgement variation in the methods of construction or in the quality of materials would be beneficial or necessary to fulfil the guarantee called for. Such variations may be made by the contractor only when authorised by the Bank.

9.6.2 REJECTION

If during the 'period of Guarantee' as defined under clause 5.8.1 hereof, any work or material shall fall in any respect to meet the above guarantee, the contractor which will meet the above guarantee, immediately.

9.6.3 COST OF EXECUTION OF WORK OR REPAIR ETC:

All work of repair shall be carried out by contractor at his own expense if the necessity shall in the opinion of the Architect be due to the use of materials or workmanship not in accordance with the contract or on account of neglect or failure on the part of the contractor to comply with any obligations expressed or implied on the contractor's part under the contract.

9.6.4 REMEDY ON CONTRACTOR'S FAILURE TO CARRY OUT THE WORK REQUIRED:

If the contractor shall fail to do any such work as aforesaid required by the Architect the Employer shall be entitled to carry out such work which the contractor should have carried out, at the contractor's own cost. The Employer shall be entitled to recover from the contractor the cost thereof or may deduct the same from any money due or that may become due to the contractor.

9.6.5 CERTIFICATE OF COMPLETION WORKS:

On completion of the work, the contractor shall be furnished with a certificate, but no such certificate be given not shall the work be considered to complete until the contract shall have removed from the area of the premises (to be distinctly marked by the Bank in the site plan which the work shall be executed) all scaffolding, surplus materials and rubbish and clean the dirt from all wood work, door windows, walls, floors, or other parts of any building, in or upon which the work is to be executed, or of which he may have had in possession for the purpose of the execution hereof. If the contractor shall fail to comply with the requirements of the clause as to the removal of scaffolding, surplus materials and rubbish and cleaning off dirt on or before the date fixed for the completion of the work, the Bank may at the expenses of the contractor remove such scaffoldings, surplus materials, and rubbish and dispose of the same as he thinks fit, and the contractor shall forthwith pay the amount of all expenses so incurred, and shall have no claim in respect of any such scaffolding or surplus materials aforesaid, except for any sum actually by the sale thereof.

9.6.6 PERIOD OF GUARANTEE FOR COMPLETE WORK

The period of guarantee for the work shall be one year starting from the date of issue of the completion Certificate.

9.6.7 CONTRACT VALID DURING GUARANTEE PERIOD:

This contract shall remain valid and in force until the expiry of guarantee period.

10 RESCINDING / TERMINATE CONTRACT

10.1 In any case in which under any clause or clauses of this contract has rendered himself liable to pay compensation amounting to the whole of his security deposit in hands of Employer (whether paid in one sum or deduced by instalments) the Architect on behalf of the Employer shall have power to adopt any of the following course, as deemed best suited to the interests of Employer.

a) To rescind the contract (of which rescission notice in writing to the contractor under hand of the Architect shall be conclusive evidence) and in which case the security deposit of the contractor shall stand forfeit and be absolutely at the disposal of the Employer.

b) To employ a contractor paid by the Employer and to supply materials to carry out the work, or any part of the work, debiting the contractor with the cost of the labour and the price of the materials (of the amount of which cost and price certificate of Architect shall be final and conclusive against the contractor) and crediting him with value of the work done, in all respect in the same manner and at the same rates as if it had been carried out by the contractor under the terms of the contractor. The certificate of the Architect as to the value of the work done shall be final and conclusive against the contractor.

c) To measure up to the work of the contractor, and to take such part of the work of the contractor as shall be not executed out of his hands, and to give it to another contractor to complete in which case any expense which may be incurred in excess of the sum which would have been paid to the original contractor if the whole work had been executed by him (of the amount of which excess certificate in writing Architect shall be final and conclusive) shall be borne and paid by the original contractor and may be deducted from any money due to him by Employer under the contractor or otherwise, or from his security deposit or the proceeds of sale thereof, or a sufficient part thereof.

d) In the event of any of the above course being adopted by the Architect, the contractor will have no claim to compensation to any loss sustained by him by reason of his having purchased any materials, or entered into any engagement or made any advance on account of the execution of the work or performance of the contract and in case of the provision aforesaid the contractor shall not be entitled to be paid for any work actually performed under this contract unless and until the Architect shall have certified in writing the performance of such work and the value payable in respect and he shall only be entitled to be paid the value so certified.

10.2 TERMINATION OF CONTRACT:

If at any time after the commencement of the work the Employer for any reason whatsoever not require the whole or part thereof as specified in the tender to be carried out, Architect shall give notice in writing of the contractor who shall have no claim to any payment or compensation whatsoever on account of any profit or advantage, which would have derived from the execution of the work in full amount of the work got having been carried out, either shall he have any claim or compensation by reason of any alterations having been made in the original specification or the designs and instruction which shall involve any curtailment of the work originally contemplated.

10.3 JURISDICTION

The contract and its operation shall be governed by the laws of India for the time being in force, irrespective of the place of delivery of materials the place of execution of work or place of payment under this contract shall be deemed to have been entered into the NAGPUR.

10.4 BYE LAWS OF LOCAL AUTHORITIES:

The contractor shall confirm to the provision of any government Acts which relate to works & the regulations on bye-laws of any local authorities. The contractor shall give all such notices required by the said Act or laws etc. and pay all fees payable to such authorities and allow for these contingences in his tender rates including fees for encroachment, stacking charges, cost of restorations, etc. and all other fees payable to the local authorities. The contractor shall keep the Employer indemnified against all penalties and all liabilities for every kind of breach of any such. Act, rules, Regulations or Bye-laws Contractor shall comply with all laws and Statutory regulations dealing with the employment of labour as:

- i) The payment of wages Act,1936 (amended)
- ii)The minimum wages Act,1938 (arnended)
- iii)The workmen compensation Act,1923 (amended)
- iv)The contractor labour (Regulation & Abolishing Act 1970 and central rules

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- 1971 (amended)
 - v)Apprentice act 1961 (amended)
 - vi)Industrial employment (standing order) Act (amended)
 - vii) Material Benefit Act, 1961
 - viii)The Employees provident fund and miscellaneous provision act 1952 and (amended)
 - ix)Personnel insurance (compensation insurance) act 1963 and any other modification. Safety codes, Labour welfare Acts or rules or any modification thereof any other laws and regulations framed by the competent Legislative from time to time.

10.5 ACCIDENT

The contractor shall immediately on occurrence of any accident at or about the site or in connection with the execution of work, report such accident to the architect. The contractor shall also such report immediately to the competent authority whenever such report is required to be lodged by the law and take approximate action thereof.

10.6 ARBITRATION CLAUSE:

All disputes arising out of or in any way connected with the agreement shall be deemed to have arisen at New Delhi only, the court in New Delhi shall have jurisdiction to determine the same.

**Signature of the tenderer
With stamp seal**

SECTION- 7

CONDITIONS FOR ELECTRICAL WORKS

CONDITIONS FOR ELECTRICAL WORKS IN INDIAN BANK BRANCH & ATM At NEW BLDG; FIRST FL; PLOT NO 50/1; BACHHARAJ RD; WARDHA; NAGPUR.

NOTE: -

These preambles apply to all the sections of schedule of quantities and tendered rates shall take into account all these provisions in additions to various provisions in other parts of the tendered documents.

1.The quantities given in schedule are provisional. The contractor will be paid for the actual quantity of work executed at site at the rates quoted in his tender. The owner reserves the right to increases or decreases any of the quantities or to totally omit any item of work. The variation due to the above shall be limited to 25% of the total contract amount. Any claim by the contractor in these accounts will not be entertained.

2.All the items of work given in this schedule of quantities shall be executed strictly in accordance with the Indian Electricity Act. The Indian electricity rules and requirements of the Electric supply authority read in conjunction with the relevant drawings, specifications and the appropriate Indian Standards.

3.All measurements shall be taken in accordance with the Indian Standard Electrical Installation in buildings method of measurement of IS unless otherwise specified.

The contractor shall visit the site of work and shall satisfy himself if as to conditions under which the work is to be performed. No extra claim consequence of ignorance or on grounds of insufficient description will be allowed at later date.

5. No alteration whatsoever is to be made to the text or quantities of this schedule of quantities unless alteration is authorized in writing by the owner. Any such alterations, notes or additions shall, unless authorized in writing the disregarded when tender documents are considered.

In the event of error occurring to the amount column of the schedule, as a result of wrong extension of until rate and quantity, the until rate quoted by the tenderer shall be regarded as firm and the extensions shall be amended on the basis of rates.

Any error in description or in quantity or omission of items from the contract schedule shall not vitiate this contract but shall be corrected and deemed to be a variation required by the owner.

GENERAL CONDITIONS:

The specification generally applicable to this work shall be as per C.P.W.D. Specifications for Electrical work at Delhi except as otherwise specified in the description of items given in the schedule of quantities or in the General and Technical specifications the requirement of these specifications will be fulfilled by the Contractor within the Tendered rates and without extra charge. The item rates quoted shall be deemed to have taken these specifications into account.

1.The Electrical work will be carried out generally in accordance with the General specification 1972 with amendments up-to-date for Electrical work in Central Government buildings while complying in all respects with the requirements of the latest Indian Electricity Rules in force for the

time being.

2.The Electrical shall be carried out simultaneously with building work and will be continued will it is completed satisfactorily along with the completion of essential portions of building work.

If any Minor alterations are found necessary, the contractor will do the same within the tendered rates.

The work will be carried out in the best workman like manner and any defect in the work or changes in the design etc. if pointed out shall be carried out by the contractor within the tendered rates.

The contractor shall employ adequate labour to complete the work within the stipulated time and make his own arrangements for housing labour and storage of materials etc. A whole time Electrical Supervisor/Engineer shall be employed by the contractor who will remain at site of work to receive orders or an other instructions from the Architects/Engineer-in-charge./ consultant.

Any material supplied by the Employers, if damaged in any way during cartage or execution of work or otherwise, shall be made good by the contractor at his own cost.

During, the progress of work, portions of the building may be occupied and put to use by the owner but contractor will remain fully responsible for maintenance of the Electrical Installations till be entire work covered by this contract is satisfactorily completed by the Architects/Engineer-in-charge./ consultant.

8. CONTRACTOR TO OBTAIN INFORMATION BY HIMSELF

The contractor shall obtain for himself on his own responsibility and at his own expenses all the information which may be necessary for the purpose of tendering and for entering into contract, and must examine and study the specifications, drawings the design of electrical installation, inspect the site, the building plans etc. If the drawings are supplied to the contractor for tender purposes, the same must be returned in good condition with the tender. The contractor shall also not with standing an information given to him, make local and independent Enquirers.

9. TENDER RATES

All Tender rates will include for the cost of materials, erection connections, labour, supervision, tools,plant, transport all taxes contingencies, breakage, wastage, sundries, scaffolding, maintenance of installation for one year etc. i.e. they should be for an item complete in all respect.

10.APPROVALS

The contractor, while executing the work, shall conform to the provision of any Government Act relating to the work and to the regulations and Byelaws of the local authorities, and of the Company to whose system of supply the installation is proposed to be connected. The contractor shall given all notices, required by the Acts, Regulation of Bylaws. He will also undertake to provide test certificate and drawings as required and will make necessary arrangements to procure electricity supply without any extra charge. The contractor shall also obtain all approvals for the item of work done under this contract from the appropriate authorities. All inspection fees or submission fees paid by the contractor will be reimbursed by the owner against valid official receipt's. Contractor shall posses a valid electrical Contractor's License issued by the inspectorate of the Local Government, 'A' Class license category holders.

11.SAMPLES:

Samples of materials and fabrication drawings will be submitted by the contractor according to the schedule/specifications. Any deviation from the schedule/specification will have the written consent of the consultant/Architects. No approval given by the Consultants /Architect to any samples or drawings submitted by the Contractor shall in any way exonerate the contractor from his liability to carry out the work the accordance with the terms of contract.

12. DRAWINGS:

A. WORKING DRAWINGS

The contractor will submit 4(four) sets of working drawings indicating detailed layouts for approval and proceed with work there after. All fabrication drawings and other literature will also be submitted in advance for approval.

B.COMPLETIONS DRAWINGS

The contractor shall submit one complete set of Original Tracing and further two copies of layout drawings to the Consultants/Architects after completion of the work. These complete drawings shall give the following information:

I.Runs of conduits, Diameter of conduit, number of wires contained in each conduit and size of wire for point wiring, mains, sub mains.

II. Location of all Distribution Boards, Main Switches, Junction and outlet boxes.

III.Complete Schematic Diagram of the installation. Cables, dummy pipes, earthing and communication systems and all other services covered under this contract

IV. The Drawings will be submitted in 4 (four) different sets as below:-

SET NO:1 : Lighting layout giving details of the entire lighting system.

SET NO:2 : Power layout giving details of the entire power system.

SET NO:3 : Communication layout, mains, sub mains, Lighting Protection, earthing system and any other details not covered in earlier drawings.

SET NO:4 : Schematic diagram.

No completion certificate will be issued until the completion drawings in the above mentioned forms are submitted. The drawings will be prepared and submitted by the contractor without extra charge Rs. 10,000/- may be kept for non-completion of these.

13. PROGRESS AND TIME OF COMPLETION

a. The work will commence immediately after the contractor receives instructions to proceed.

b. The contractor will work in cooperation with the building contractor and other contractors and shall arrange to place his conduits in the masonry and concrete work as the building or other work proceeds. Any hold up of the building or other work because of delay in laying of conduits or otherwise, shall be the responsibility of the Electrical Contractor and will make him liable for damages if any, by the Employers.

c. The contractor shall in consultation with the Consultants/Architects draw up a time schedule on commencement of the work. This time schedule will be strictly adhered to.

SPECIFICATIONS

1. INTERNAL WIRING

1.1 System of wiring

The system of wiring shall consist of single core PVC insulated standard copper conductor in PVC conduits concealed or exposed as called for on the drawings.

1.2 General

Prior to laying and fixing of conduits, the Contractor shall carefully examine the drawings indicating the layout of conduits, satisfy himself about the sufficiency of number and size of conduits, location of junction boxes, sizes and location of switch boxes and other relevant details. Any discrepancy found in the drawings shall be brought to the notice of the Employer/ its representative. Any modifications suggested by the Contractor shall be got approved by the Architect before the actual laying of conduits is commenced.

1.3 Materials

PVC Conduits: PVC conduits shall be of min 2 mm wall thickness and ISI marked to heavy duty.

1.3.1 Connections

All joints shall be fully water tight and sealed by applying cementing jointing compound as per manufacturer's recommendation. Junction boxes and running joints shall be provided at suitable places to allow for subsequent extensions, if any, without undue dismantling of conduit system. As far as possible, diagonal run of conduits shall be avoided. Conduit system shall be erect and straight as far as possible. Separate conduits shall be run for 15amps-power outlet wiring. The Joints in conduit shall be free of burrs to avoid damage to installation of conductors while pulling them through the conduit.

1.4 Bends in Conduit

Where necessary, bends or diversion may be achieved by means of bends and / or circular inspection boxes with adequate and suitable inlet and outlet connections. In case of recessed system each junction box shall be provided with a cover properly secured and flush with the finish wall surface, so that the conductors inside the conduit are easily accessible. No bend shall have radius less than 2 ½ times the outside diameter of the conduit.

1.5 Fixing Conduits

Conduits and junction boxes shall be kept in position while the walls, slabs and floor are under construction and proper hold fasts shall be provided. Conduits shall be so arranged as to facilitate easy drawing of wire through them. Adequate junction boxes of approved quality and size shall be provided. Where conduits Cross expansion joints in the building, adequate expansion fittings or other approved devices shall be used to take care of any relative movement. All conduits shall be installed so as to avoid steam and hot water pipes. Conduit stubs in floor slabs shall be kept as short as possible above finished floor level in order to avoid any damage to them. After the conduits, junction boxes, outlet boxes and switch boxes are installed in position, their outlet shall be properly plugged or covered so that water, mortar, insects or any other foreign matter does not enter into the conduit System. Where called for, surface conduits shall be fixed by means of spacer bar saddles at intervals not more than 1000 mm and 100 mm from both sides of fitting or accessories. The saddles shall be 3mm x19mm galvanized mild steel flat, properly treated, Securely fixed to support by means of raw bolts and brass machine screws. Conduit in chases shall be avoided. Where unavoidable, conduit shall be fixed by means of Staples not more than 600mm apart and the chases filled with cement mortar 1:6 Cutting of horizontal chases is prohibited. All socketed connections shall be made fully water tight by the use tooling or as suggested by manufacturer PVC Conduits.

1.6 .Switch outlets & Junction boxes

All outlets for switches, sockets and other receptacles shall be equipped with rust proof outlet boxes of sheet steel fabricated from 16 SWG sheet as called for having smooth external and internal surface to true finish. Where called for, outlet boxes for receiving switches and fan regulators shall be fabricated to approved sizes and covered with 3/16th inch thick decorative laminate sheet. Outlets exposed to the weather shall be fully weather tight, complete with rubber gasketed covers. Outlets where used shall be painted with two coats of bituminous paint before they are fixed in position, outlet boxes fixed in concrete shall have a minimum depth of 75mm and the wall thickness of the boxes and spouts shall not be less than 2mm.

1.7 Inspection Boxes

Rust proof boxes of cast iron and required size, having smooth external and internal finish, shall be provided to permit periodical inspection and to facilitate removal and replacement of wires when required. Inspection boxes shall be mounted on walls/ ceiling finished surface and shall be provided with 3/16th inch thick decorative laminate sheet cover to the box with brass screws. Adequate ventilation holes shall be provided in the inspection box covers.

1.8 Telephone system

Conduit, junction boxes, draws boxes, outlet boxes and covers to boxes for telephone system shall be as described under relevant clauses elsewhere in these specifications. The conduit for telephone wiring shall be of specified size and shall terminate at outlets as indicated on the drawings. All telephone system conduits shall have '14' SWG galvanized steel pull wires installed.

1.9 Conductors

All PVC insulated copper conductor wires shall conform in all respects to Indian Standards.

1.10 Bunching of wires

Wires carrying current shall be so bunched in the conduit that the outgoing and return cables are drawn in the same conduit. Cables originating from two different phases shall not be run in the same conduit.

1.11 Drawing Conductor

The drawing and jointing of copper conductor wires and cables shall be executed with due regard to the following precaution: While drawing insulated wires into the conduits, care shall be taken to avoid scratches and kinks, which cause breakage of conductors. There shall be no sharp bends. Insulation shall be shaved off like sharpening of a pencil and it shall not be removed by cutting it square of wiring. Strands of wires shall not be cut for Connecting terminals. The terminals shall have sufficient cross sectional area to take all strands and shall be thinned. The connecting brass screws shall have flat ends. All looped joints shall be connected through terminal blocks / connectors. The pressure applied to tighten terminal screws shall be just adequate, neither too much nor too less. Conductor having nominal cross-sectional area exceeding 4 Sq.mm shall always be provided with cable sockets. At all bolted terminals, brass flat washers of large area and approved steel spring washers shall be used. Brass nuts and bolts shall be used for all connections. Only certified wiremen and cable jointers shall be employed to do jointing work. All wires and cables shall bear the manufacturer's label and shall be brought to site in new and original packaging. For all internal wiring, PVC insulated wires of 250/440 volts grade shall be used. The sub-circuit wiring for points shall be carried out in looping in system and no joint shall be made.

2. SWITCHES, RECEPTACLES & FIXTURES

2.1 Switches

All 5/15amp switches shall be piano type switches 220 V A.C. All switches shall be fixed inside the switch boxes on the cover plates with Brass machine screws and nuts leaving ample space at the back and sides for accommodating wires. Flush mounted fan regulators shall be fixed inside the switch boxes over the cover plate with brass machine screws and nuts. The switch controlling the light point or fan shall be connected on the phase wire of the circuit. Switches shall be located at 1200mm above floor level unless otherwise indicated. Cover Plates: All switch receptacles and telephone system outlets in the walls shall be Provided with white urea powder pressed cover plate of standard configuration of Switches manufacturer. The cover plates shall be secured to the box with counter sunk brass screws.

2.2 Wall socket outlet

All 5 amp 3pin socket outlets where called for shall be switches and 3 pin type. All 15 amp 3 pin wall socket outlets where called for shall be switched. The sockets shall be erected approximately 150

mm above floor level (to the bottom of the box), unless otherwise specified. The switch controlling the point outlets and socket outlets shall be on the phase wire of the circuit. The earth terminal of the socket shall be connected to the earth terminal provided inside the box by means of 2.5 sq. mm insulated copper wire. No joints are allowed in the length of the conductors. If the use of joint connections is unavoidable due to any specific reasons, prior permission in writing shall be obtained from the employer/ its representative/ Engineer in charge before the use of such connections. No wire shall be drawn into any conduit, until all work, of any nature that may cause injury to the wire, is completed. Care shall be taken in pulling the wires so that no damage occurs to the installation of the wire. Before the wires are drawn into the conduits, the conduits shall be thoroughly cleaned of moisture, dust, dirt or any other obstruction by forcing compressed air through the conduit. The minimum size of PVC insulated copper conductor wires for all sub circuit shall be as follows: Wiring for lights, exhaust fans and ceiling fan points shall be 1.5 sq.mm .The two 15 amp power outlets shall be grouped be 1.5 sq.mm. The two 15 amp power outlets shall be grouped in one circuit where called for, Wiring for the first power outlet shall be carried out with 4 sq.mm. PVC insulated copper conductor wires. Wiring for the second power outlet shall be carried out with 4 sq.mm. All power outlets shall be provided with 2.5sq.mm insulated copper earth wires.

2.3 Colour code of conductors

Color code shall be maintained for the entire wiring installation: Red, Yellow, Blue for the three phases, Black for neutral, Green for earth.

2.4 Ceiling fans

All ceiling fans shall be provided with suspension arrangements in the concrete slab / roof numbers. It is the duty of the contractor to make those provisions at the appropriate stage of construction. The fan hook boxes shall be fabricated from 16 SWG sheet steel in hexagonal shape and provided with 12mm dia. MS rod bent to shape. Exhaust fans shall be fixed at location shown on the drawings. They shall be wired to a plug socket and at a convenient location near the fans. All switch and outlet boxes fan and light fittings shall be bonded to earth through copper wire properly screwed on to the body to make an effective contact.

3.CABLES

3.1General

MV cables shall be supplied, inspected, laid, tested and commissioned in accordance with drawings, specifications, relevant Indian Standard. Specifications, and cable manufacture's instructions. The cable shall be delivered at site on original drums with manufacturer's name clearly written on the drums. The recommendation of the cable manufacture with regard to jointing and sealing shall be strictly followed:

3.2 Materials

The MV cables shall be PVC insulated Aluminum conductor armoured cable conforming to IS: 1554 laid in trenches, ducts and underground as shown on drawings.

3.3 Inspection

All cables shall be inspected upon receipt at site and checked for damage during transit.

3.4 Cable termination

Cable terminations shall be done in terminal cable box using cable glands. All pipe sleeves shall be sealed with sealing compound.

3.5 Bonding of cables

Where a cable enters any piece of apparatus it shall be connected to the casing by means of an approved type of armored clamp and gland. The clamps must grip the armoring firmly to the gland or casing, so that no undue stress is passed on to the cable conductors due to vibrations. The gland

or cone shall be capable of effecting a good electrical bond between both the armoring and the casing.

3.6 Laying cables

Cables shall be laid by skilled and experienced workmen using adequate rollers to minimize stretching of the cables. The cable drums shall be placed on jacks before unwinding the cable, Great care shall be exercised in laying cables to avoid forming kinks, the drums shall be unrolled and cables run over wooden rollers in trenches at intervals not exceeding 2 meters. Cables shall be laid at a depth of 0.75 meters below ground level.

A cushion of sands, not less than 80mm shall be provided both above and below the cable and joint boxes and other accessories. Cables shall not laid in the same trench or along side of a water main. The cables shall be laid first in excavated trench and a layer of 80mm sand shall be lifted and placed over the sand bed. The second layer of 80-mm sand shall then be spread over the cable. The relative position of the cables, laid in the same trench shall be preserved and the cables shall not cross each other as far as possible. At all changes in directions in horizontal and vertical planes, the cable shall be bent smooth with a radius of bend not less than 12 times the diameter of cable. Minimum 3 meters long loop shall be provided at both sides of every straight joint and 5 meters at each end of cable. Distinguishing marks shall be made on the cable ends for identification. Insulation tapes of appropriate voltage and in Red, Yellow and Blue colors shall be wrapped just below the sockets for phase identification.

3.7 Protection of cables

The cables shall be protected by bricks on the top layer of sand for the full length of underground cable. Where more than one cable is running in the same trench, the bricks shall cover all the cables and shall project a minimum of approximately 80 mm on either side of the cables.

Cables under road crossing and any other places subject to heavy traffic shall be protected by running them through hume pipe of suitable size. The depth of the hume pipe shall be 1 meter below the finished road level.

3.8 Excavation & Back Filling

All excavation and back fill including timbering, shording and pumping required for the installation of the cables shall be carried out by the Contractor in accordance with the drawings and requirements laid down elsewhere. Trenches shall be dug true to line and grades. Back fill for trenches shall be filled in layers not exceeding 150 mm. Each layer shall be properly rammed and consolidated before laying the next layer. The Contractor shall restore all surfaces, roadways, side walks, curbs, walks or other works cut by excavation to their original conditions, satisfactory to the employer / its representative, including disposal of surface soil as directed.

3.9 Testing of cables

Prior to laying cables, the following tests shall be carried out: Insulation test between phases, phase and earth for each length of cable before and after jointing.

On completion of cable laying work, the following test shall be conducted in the presence of the employer/ its representative.

- a. Insulation Resistance Test (Sectional and overall)
- b. Continuity Resistance Test
- c. Earthing Test.

All tests shall be carried out in accordance with relevant Indian Standard Code of Practice and Indian Electricity Rules. The Contractor shall provide necessary instruments, equipment and labour for conducting the above test and shall bear all expenses in connection with such tests. All tests shall be carried out in the presence of the employer/ its representative.

3.10 Markers & Warning Plates

Approved CL cable markets shall be provided along the route of the cables at every 30 meters distance and at both ends of road crossing, indicating "MV CABLES". Special CL markers shall be provided at all buried cable joints indicating "ELECTRICAL CABLE JOINT".

4 DISTRIBUTION BOARDS

The Distribution Panel and Distribution boards shall be suitable for operation on 3 phase/single phase/ single Phase 415/230 volts. 50 cycles neutral grounded at transformer and short circuit level not less than 9ka at 415 volts.

The distribution panel/Board shall comply with the latest edition of relevant Indian Standards and Indian Electricity Rules and Regulations.

4.1 Construction

The Distribution panels/ boards shall be CRCA sheet steel cubical, indoor, dead front, floor mounting / wall mounting type. The Distribution boards shall be totally enclosed, completely dust and vermin proof. Gaskets between all adjacent units and beneath all covers shall be used to render the joints dust proof. Distribution boards shall be preferably arranged in multitier. All doors and covers shall be fully gasketed with foam rubber and/ or rubber strips and shall be lockable. All MS sheet steel used in the construction of Distribution boards shall be 16 SWG thick and shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet metal shall be seam welded, all welding slag grounded off and welding pits wiped smooth with plumber metal.

All panels and covers shall be properly fitted and square with the frame and holes in the panel correctly positioned. Fixing screws shall enter into holes trapped into an adequate thickness of metal or provided with hank nuts. Self threading screws shall not be used in the construction of distribution boards.

Knockout holes of appropriate size and number shall be provided in the distribution board in conformity with the location of incoming and outgoing.

4.2 Bus Bar Connections

Rectangular cross section suitable for full load current for MCB'S shall be provided on the phase of live conductors of each circuit, and a neutral bar for earthed neutral. The individual banks of MCB'S shall be detachable. Phase separation barriers of 3mm thick Bakelite sheet shall be provided between. There shall be ample space behind the fittings to accommodate all the wiring. All the internal wiring of distribution boards shall be concealed behind 3mm thick Bakelite sheet. All the distribution boards shall be completely factory wired, read for connections. All the terminals shall have adequate current rating and size to suit individual feeder requirements. Each circuit shall be clearly numbered from left to right to correspond with the wiring diagram. All the switches and circuits shall be distinctly marked with a small description of the service installed.

4.3 Switch Fuse

The switch fuse units shall be 3 pole double break type suitable for load duty quick make and break action. Separate neutral link shall be provided in the switch. All switch fuse units shall be provided with hinged doors duly interlocked with operating mechanism, so as to prevent opening of the door when the switch is in "ON" position and also to prevent closing of the switch when the door is not properly secured. All contacts shall be silver plated and all live parts shall be shrouded. High rupturing capacity (HRC) fuse links shall be provided with switch fuse units and shall be in accordance with IS:2208 and having rupturing capacity not less than 31 MVA at 415 volts. HRC fuse links shall be provided with visible indicators to show that they have operated.

4.4 Earthing

Copper earth bars of 25 mm x 3mm shall be provided for the distribution panel for the full length of the panel and connected to the frame work. Provisions shall be made for

connection from this earth bar to the main ear thing bar on both sides of the distribution panel.

4.5 Painting

All sheet steel shall undergo a process of degreasing, pickling in acid, cold rinsing, phosphating passivating and then sprayed with a high corrosive resistant primer. The primer shall be baked in an oven. The finishing treatment shall be by application of two coats of synthetic enamel paint of approved colour and stoved.

4.6 Labels

Engraved PVC labels shall be provided on all incoming and outgoing feeder switches. Circuit diagram showing the arrangement of the circuit inside the distribution board shall be pasted on inside of the panel door and covered with transparent laminated plastic sheet. All the distribution boards shall be subject to tests specified in relevant Indian Standard and test certificate shall be furnished.

5. EARTHING

5.1 Earthing

All the non-current carrying metal parts of electrical installation shall be earthed properly. All metal conduits, trunking, cable sheaths, switch gear, distribution fuse boards, lighting fittings sand all other parts made of metal of specified earthing conductors to an efficient earth electrode. All earthing will be in conformity with the relevant provision of rules 33 and 61 of the Indian Electricity Rules 1956, and Indian Standard Specifications IS: 3043.

5.2 Earthing Conductors

Every earthing conductor shall be of bare G.I/ Copper/ insulated coppers called for on drawings/specified in bills of quantities and shall be protected against mechanical injury or corrosion.

5.3 Sizing of Earthing Conductors

The cross sectional area of earthing conductor shall be as called for on the drawing.

5.4 Construction of Earthing conductors

Main earthing conductors shall be taken from the earth connectors at the main switch boards to an earth electrode with which the connection is to be made. Sub - main earthing conductors shall run from the main switch board to the sub-distribution boards. Circuit earthing conductors shall run from the exposed metal of equipment and shall be Connected to any point on the earthing conductors, or its distribution board.

5.5 Earthing Stations

Pipe Earthing:

Earthing electrode shall consist of a C.I. pipe (12 mm wall thickness) of 100 mm dia and 3.7 meters long. The electrode shall be buried vertically in the ground as far as practicable below permanent moisture level with its top not less than 200 mm below ground level. The electrode shall be in one piece and no joints shall be allowed in the electrode. Wherever possible earth electrodes shall not be located in proximity to a metal fence. It shall be kept clear of the building foundations and in no case shall be nearer than 2 meters from the outer face of the wall. The pipe earth electrode shall be kept vertically and surrounded with 150 mm thick layer of charcoal dust and salt mixture up to a height of 2.5 meters from the bottom. At the top of the electrode a funnel with a mesh shall be connected to the electrode, just below the funnel, with proper terminal lugs and check nuts. The funnel over the C.I. pipe and earth connection shall be housed in a masonry chamber, approximately 300 mm long, 300 mm deep. The masonry chamber shall be provided with a cast iron cover resting over a CI frame embedded in masonry.

5.6 Earthing Connections

All metal clad switches and other equipment carrying single-phase current shall be connected to earth by a single connection. All metal clad switches carrying medium voltage shall be connected to

earth by two separate and distinct connections. The earthing conductors inside the building wherever exposed shall be properly protected from mechanical injury by running the same in G.I. pipe of adequate size. The earthing conductor shall be painted to protect it against corrosion.

Earthing conductor outside the building shall be laid 600 mm below the finished ground level. The overlapping in GI strips in joints shall be riveted. Lugs of adequate capacity and size shall be used for all termination of conductor wires above 6sqw.mm size. Lugs shall be bolted to the equipment body to be earthed after the metal body is cleaned of paint and other oily substance.

5.7 Resistance to Earth

The resistance of each earth system shall not exceed 1.0 ohm.

6. Testing

6.1 General

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

1. Wiring continuity test
2. Insulation continuity test
3. Earth continuity test
4. Earth Resistivity test

Besides the above tests any other tests specified by the local authority shall also be carried out. All tested and calibrated instruments for testing, labour and materials and incidentals necessary to conduct the above tests shall be provided by the contractor at his own cost.

6.2 Testing of Wiring

The entire wiring systems shall be tested for continuity of circuits, and earthing after wiring is completed and before energizing by the Contractor in the presence of the Architects.

6.3 Insulation Resistance Test

The insulation resistance shall be measured by applying between earth and the whole system of conductors or any section thereof, with all fuses in place and all switches closed 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 660 volts for medium voltage 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 be carried out after removing all metallic connections between the two pole of the installation and in these circumstances the insulation resistance between conductors of installation shall not be less than specified above. The insulation resistance between the case of frame work of housing and power appliance and all live parts of earth appliance shall not be less than specified in the relevant Indian Standard specification or where there is no such specification shall not be less than half a megohm.

6.4 Earth Continuity Test

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

6.5 Testing of Polarity of Non -linked single pole switches

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

6.6 Earth Resistivity Test.

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

I.S. STANDARD

In general the materials, equipment and workmanship shall conform to the following Indian Standard, unless otherwise called for:-

1. PVC Insulated (Heavy Duty) cables for working voltage up to & including 1100 v (Revised). : I.S. 1554 - 1976 PT
2. PVC Insulated Cables (for voltage up to 1000 v) : I.S. 694 - 1977
3. Rigid Steel Conduits for Electrical Wiring (Second Revision) : I.S. 9537 - 1972
4. Accessories for rigid steel conduits for electrical wiring : I.S. 3837 - 1976
5. Boxes for the enclosures of Electrical Accessories. : I.S. 5133 - 1969
6. 3Pin plug & socket outlets : I.S. 1293 - 1967
7. Adhesive insulating tapes for Electrical Lighting fitting : I.S. 2448 - 1968 II
8. General safety requirements for Electrical Lighting Fittings. : I.S. 1913 - 1969
9. Electric Ceiling Fans and regulators. : I.S. 347 - 1966
10. Propellor type AC Ventilating fan : I.S. 2312 - 1967
11. Code of practice for earthing : I.S. 3043 - 1987
12. Code of practice for safety of building (General) Electrical installation : I.S. 1646 - 1961
13. Airbreal switches & fuses combination units for voltage not exceeding 1000 V AC or 1200 V DC. : I.S. 1904 - 1976

14. HRC Cartridge fuse link up to 650 V	: I.S. 9224 - 1979
15. Protection of Building and allied structures against lighting.	: I.S. 2309 - 1969
16. Fittings for rigid steel conduits for Electrical wiring.	: I.S. 2667 - 1976
17. Heavy duty air break switch & composite unit of air break switches & fuses for voltage not exceeding 1000 V	: I.S. 4064 - 1978
18. General requirements for switchgear & control-gear for voltage not exceeding 1000 V	: I.S. 4237 - 1982
19. Switch socket outlet	: I.S. 4615 - 1968
20 MCCB, MCB, RCCB SPECIFICATIONS	: AS PER I.S.
21 CONDUITS	: AS PER I.S. SPECIFICATIONS

LIST OF APPROVED BRANDS / MAKES

One of the following make of the material shall be used. The contractor will have to get the sample approved from the Architect whose decision shall be binding on the contractor. The condition is also applicable for any material not mentioned in the specification or schedule of work. No deviations are allowed in these even during/after Tender.

LIST OF APPROVED MAKES/ BRANDS

INTERIOR WORK :

1. Commercial block board & Commercial pre-treated Wood preservative plywood. & Commercial ply , Teak Board & Ply	: CENTURY(Not Sanik) ARCHITECT/ GREEN (Not Ecotek) /DURO PREMIUM RANGE/ ALPRO/ (Not Contractors Range) : CENTURY(Not Sanik) ARCHITECT/ GREEN (Not Ecotek) /DURO PREMIUM RANGE / ARCHID-MONARCH. (Not Contractors Range)
2 Flush door shutters	: CENTURY(Not Sanik) ARCHITECT/ GREEN (Not Ecotek) /DURO PREMIUM RANGE (Not Contractors Range)
3 Kailwood	: 1st Class Kail
4. Teak wood	: C P TEAK / BURMA TEAK
5 Veneer	: TRUE WOOD CENTURY, GREENPLY/SAMRAT AROSA/

6. WINDOW GLASS (SHEET, PLATE)	: HPG / TRIVENI / INDO ASIA,
7. ALUMINIUM DOOR FITTINGS	: ECIE
8. FLOAT GLASS	: MODI/SAINT GOBAIN
9. LOCKS	: GODREJ/HETTICH
10. ALUMINIUM FRAME FOR WINDOW PARTITION ETC	: HINDALCO/ INDAL
11. LAMINATE & DECORATIVE LAMINATE	: FORMICA/GREEN/MERINO/SUNMICA CENTURY/GREEN LAM/VENTURA GLO/ EURO PRATEIK/SIBU
12. CEMENT BONDED PARTICLE BOARD	: BISON/ E.C.I.E
13. GLASS UP TO 5.5MM THICKNESS	: HINDUSTAN SAFETY GLASS/MODI/ TRIVENI
14. 12MM THICK PLATE GLASS	: SAINT GOBAIN/MAX HEREMES/ ASAHI GLASS/H.P.G.
15. FABQUARD TREATMENT (DOVE CORPORATION/SCOTCH GUARD)	: ON ALL UPHOLSTERED ITEMS & CARPETS.
16. BLINDS-HORIZONTAL OR VERTICAL	: VISTA LEVELOR
17. PVC TILES	: ARMSTRONG
18. CARPET	: TRANSASIA/MODI
19. SLOTTED ANGLES	: MEK VINAR
20. HINGES & CHANNEL	: HETTICH
21. HANDLES (GLASS DOOR)	: DORMA
22. FALSE CEILING	: INDIA GYPSUM /ARMSTRONG
23. ANTI TERMITE & FIRE RETARDANT PAINT	: VIPER
24. TOUGHENING	: GOLD PLUS/GURIND/ASAHI FLOAT
25. DOOR CLOSER	: DORMA/DOORKING

CIVIL WORK

1. Vitrified Tiles(600mmx600mm)	: JOHSON, MARBO GRANITE, MARBITO, RAK
2. Ceramic tiles	: KAJARIA, NITCO
3.1 Paint	: NEROLAC. BERGER, ICI, ASIAN PAINTS

3.2.Cement Paint	: SUPER SNOCEM , ACROCEM
3.3 Wax Polish	: MANSION OR EQUIVALENT
3.4 Bitumen Sealing Compound	: SHALITEX
3.5 Bitumen	: SHALIMAR
4.Bricks	: AS PER IS :1077 FROM APPVD. KILN
5.Fine Sand	: AS PER IS :383 (LATEST EDITION)
6..Stone Aggregate	: AS PER IS :383 (LATEST EDITION FROM APPVD. QUARRY
7. Structural steel	: AS/IS226&2062
a) Mild Steel	: AS/ IS 432
b) Cold Twisted	: AS/ IS 1786
d) Nuts & Bolts	: AS/ PER 1367
8. Building lime	: SANTNA
9. White lime	: DEHRADUN OR APPROVED EQUIVALENT
10. Water -proofing compound	: CICO,M.C.BANCHEMI,SICA QUALERETE, AERONITE (AERO).ROFE, VAM ORGANIC
11. Surface ceiling compound	: PIDLITE,OR EQUIVALENT.

SANITARY WORK

1. G.I Pipes	: I.T.C., B.S.T. Jindal (B" CLASS)
2. P.V.C. Pipes	: WAVIN INDIA,GARWARE PLASTIC.
3. Gully traps and stoneware pipes	: PERFECT
4. Vitreous china fixtures	: HINDUSTAN SANITARY
5. Flushing cistern-PVC	: HINDUSTAN SANITARY WARE, CERA,NEYCER
6. Bib-cocks and stop cocks	: GEM PENGUIN, PARKO,ESSO,(ISI GRADE) KINGSTON.
7. Full way valve	: LEADER,G.G
8. Brass bib-cock & full way value	: L&K,LEADER
9. G.I Fittings	: R BRAND
10. Stainless steel Kitchen sink	: AMC/PRESTIGE/NEELNATH
11. Toilet roll holder	: SEIKO/ADMIRAL

12. Mixer for kitchen.

: PARKO/DRIPLESS

APPROVED MAKE OF EQUIPMENT FOR ELECTRICAL WORKS

All the equipment & material used in the execution of the work shall be either one of the approved makes listed below unless otherwise specified :

S.F.U.	:SIEMENS/ L& T
M.C.C.B.	:CROMPTON / AFG /CRABTREE/ L & T/HAVELLS
BOX & MODULE PLATE	:CRABTREE FLUSH METAL BOX EXCLUSIVE MODULE PLATE
Distribution boards	:Fabricated compact mentalised type
MCBS	:MDS (Load Kontakt)/HAVELLS INDOKOPP
PVC Insulated single Core Wires	:Asian , Gloster ,SKYLINE
Telephone Cables	:Delton / Skytone / D-LINK
PVC Insulated Single Core Wires	: Universal / Skytone/Havells
M.S Conduit (ISI)	:AKG / BEC
PVC CONDUIT	:NIC / AKG / ICI /BEC
Switches & Sockets & TELEPHONE JACK	:M.K. , CRABTREE OF HAVELL .S ANCHOR/RIDER
Fluorescent Fittings	:Philips, Crompton Greaves / BAJAJ
Incandescent Fittings	:DECON / MR. LIGHT
Ceiling Fans	:GEC / CGI / USHA/CG
Exhaust Fans	:Crompton Heavy Duty

APPROVED MAKE OF EQUIPMENT OF A.C MACHINE

1. VOLTAS LTD.
2. BLUE STAR
3. CARRIER AIRCON
4. L.G. ELECTRONICS
5. HITACHI LIFE SOLUTION

TECHNICAL DATA (AIR-CONDITIONING WORK)

BASIS OF DESIGN

Site of Location: INDIAN BANK BRANCH & ATM AT NEW BLDG; FIRST FL; PLOT NO 50/1; BACHHARAJ RD; WARDHA; NAGPUR.

INDOOR DESIGN CONDITIONS

Indoor design Conditions for Centrally Air Conditional Spaces shall be as follows:

DB : 22 ± 1 Deg C (72 ± 2 Deg F)
RH : Less than 60%

NOTE:

No winter heating is provided.

DUCTING

Maximum flow velocity : 450M/ Min
Maximum friction : 1 Cm WG / 100M Run
Maximum velocity at-supply air outlet : 150M/ Min

SPLIT UNIT

Supply, installation, testing & commissioning of Micro Processor based Air-cooled Duct able split Air-conditioning Units each comprising an out doors one ductable table /indoor unit Condensing units shall be complete with fan/ cooling coil & refrigerant piping with controls & first charge of fragrant R-22 gas & oil.

Evaporating gas & oil. Evaporating unit shall consist of a fan section with dynamically balanced centrifugal an driven by FHP motor etc. Enclosure as specified. The evaporating unit shall be equipped with synthetic fiber filter insulated drain pan, thermostat all complete in a unit The enclosure shall be factory painted to a smooth finish.

Duct Work and Outlets

1. **General**

- 1.1 The work under this part shall consist of furnishing labour materials, equipment and appliances as specified necessary and required to install all sheet metal and other allied work to make the air conditioning supply, ventilating, and exhaust system ready for operation as per drawings.
- 1.2 Except as otherwise specified all duct work and related items shall be in accordance with these specifications.
- 1.3 Duct work shall mean all ducts, casings, dampers, access doors, joints, stiffeners and hangers.

2. **Duct Materials**

- 2.1 The ducts shall be fabricated from galvanized steel sheets class VIII conforming to ISS:277-1962 (revised) or aluminum sheets conforming to ISS:737-1955 (wherever aluminum ducts are specified).
- 2.2 All duct work, sheet metal thickness and fabrication unless otherwise directed, shall strictly meet requirements, as described in IS: 655-1963 with amendment-I (1971 edition)

The thickness of the sheet shall be as follows: -

	Size of Duct	Sheet Thickness	Type of Joints	Bracing if any
2.2.1	Up to 750 mm	0.63 mm		G.I. Flange
2.2.2	751 mm to 1000 mm	0.80 mm		25x25x3 mm at Angle iron frame with 8 mm dia nuts & bolts the rate of 1 M from joints
2.2.3	1001 mm to 1500 mm	0.80 mm		40x40x5 mm at Angle iron frame with 8 mm dia nuts & bolts the rate of 1 M from joints
2.2.4	1501 mm to 2250 mm	1.00 mm	50x50x5 mm Angle iron frame with 10 mm dia nuts & bolts at 125 mm centre.	40x40x3 mm at the rate of 1.2 M to be Braced Diagonally
2.2.5	2251 mm and Above	1.25 mm	50x50x6 mm Angle iron frame with 10 mm dia nuts & bolts at 125 mm centre.	40x40x3 mm at the rate of 1.6 M from joints
2.3	The gauges, joints and bracings for sheet metal ductwork shall further conform to the provisions as shown on the drawings.			
2.4	Ducts larger than 600 MM shall be cross broken, duct sections up to 1200 MM length may be used with bracing angles omitted.			
2.5	Changes in section of ductwork shall be affected by tapering the ducts with as long a taper as possible. All branches shall be taken off at not more than 45 DEG. Angle from the axis of the main duct unless otherwise approved by the Engineer-In-Charge.			
2.6	All ducts shall be supported from the ceiling/slab by means of M.S. Rods of 9 MM (3/8") DIA with M.S. Angle at the bottom. The rods shall be anchored to R.C. Slab using metallic expansion fasteners.			
3.	<u>Installations</u>			
3.1	During the construction, the contractor shall temporarily close duct openings with sheet metal covers to prevent debris-entering ducts and to maintain opening straight and square, as per direction of Engineer-In-Charge.			
3.2	Great care should be taken to ensure that the ductwork does not extend outside and beyond height limits as noted on the drawings.			
3.3	All ductwork shall be of high quality approved galvanized sheet steel guaranteed not to crack or peel on bending or fabrication of ducts. All joints shall be airtight and shall be made in the direction of airflow.			

The ducts shall be re-in forced with structured members where necessary, and must be secured in place so as to avoid vibration of the duct on its support.

- 3.4 All air turns of 45 degrees or more shall include curved metal blades or vanes arranged so as to permit the air to make the abrupt turns without an appreciable turbulence. Turning vanes shall be securely fastened to prevent noise or vibration.
- 3.5 The ductwork shall be varied in shape and position to fit actual conditions at building site. All changes shall be subjected to the approval of the Engineer-In-Charge. The contractor shall verify all measurements at site and shall notify the Engineer-In-Charge of any difficulty in carrying out his work before fabrication.
- 3.6 Sponge rubber or approved equal gaskets of 6 MM maximum thickness shall be installed between duct flanges as well as between all connections of sheet metal ducts to walls, floor columns, heater casings and filter casings. Sheet metal connections shall be made to walls and floors by means of wooden member anchored to the building structure with anchor bolts and with the sheet screwed to them.
- 3.7 Flanges bracings and supports are to be black, mild steel and are to be painted with rust proof primer on all surfaces before erection. Accessories such as damper blades and access panels are to be of materials of appropriate thickness and the finish similar to the adjacent ducting, as specified.
- 3.8 Joints, seams, sleeves, splitters, branches, takeoffs and supports are to be as per duct details as specified, or as decided by Engineer-In-Charge.
- 3.9 Joints requiring bolting or riveting may be fixed by Hexagon nuts and bolts; stove bolts or buck bolts, rivets or closed centre top rivets or spot welding. Self-tapping screws must not be used. All jointing material must have a finish such as cadmium plating or Galvanized as appropriate.
- 3.10 Fire retarding flexible joints is to be fitted to the suction and delivery of all fans. The material is to be normally double heavy canvass or as directed by Engineer-In-Charge. On all circular spigots the flexible materials are to be screwed or clip band with adjustable screws or toggle fitting. For rectangular ducts the material is to be flanged and bolted with a backing flat or bolted to mating flange with backing flat.
- 3.11 The flexible joints are to be not less than 75 MM and not more than 250 MM between faces.
- 3.12 The ductwork should be carried out in a manner and at such time as not to hinder or delay the work of the other agencies especially the boxing or false ceiling contractors.

Duct passing through brick or masonry, wooden framework shall be provided within the opening. Crossing duct shall have heavy flanges, collars on each side wooden frame to make the duct leak proof.

4. Dampers

- 4.1 At the junction of each branch duct with main duct and split of main duct, volume dampers must be provided. Dampers shall be two gauges heavier than the gauge of the large duct and shall be rigid in construction.
- 4.2 The volume dampers shall be of an approved type, lever operated and completed with locking devices which will permit the dampers to be adjusted and locked in any positions and clearly indicating the damper position.
- 4.3 The dampers shall be of splitter, butterfly or louver type. The damper blade shall not be less than 1.25 MM (18) Gauge; reinforced with 25 MM angles 3 MM thick along any unsupported side longer than 250 MM. Angles shall not interfere with the operation of dampers, nor cause any turbulence.
- 4.4 Automatic and manual volume opposed blade dampers shall be completed with frames and bronze bearings as per drawings. Dampers and frames shall be constructed of 1.6 MM steel sheets and blades shall not be over 225 MM wide. The dampers for fresh air inlet shall additionally be provided with fly mesh screen, on the outside, of 0.8 MM thickness with fine mesh.

4.5 Wherever require for system balancing, a volume balancing opposed blade damper with quadrant and thumb screw lock shall be provided.

4.6 After completion of the ductwork, dampers are to be adjusted and set to deliver airflow as specified on the drawings.

4.7 Automatic fire dampers shall be provided wherever shown on the drawings. The damper shall be multi blade louver type. The blades should remain in the air stream in open position and shall be constructed with minimum 1.8 MM thick galvanized sheets. The frame shall be of 1.6 MM thickness. Other materials shall include locking device, motorized actuator, control panel to trip AHU motor etc.

The fire dampers shall be capable of operating automatically on receiving signal from a fire alarm panel. All control wiring shall be provided between fire damper and electric panel.

5. **Access panel**

5.1 A hinged and gasketed access panel measuring at least 450 MM x 450 MM shall be provided on duct work before each reheat coil and at each control device that may be located inside the duct work.

6. **Miscellaneous**

6.1 All ductwork joints are to be true right angle and with all sharp edges removed.

6.2 Sponge rubber gaskets also to be provided behind the flange of all grilles.

6.3 Each chute from the duct, leading to a grille, shall be provided with an air deflector to divert the air into the grille through the shoot.

6.4 Diverting vanes must be provided at the bends exceeding 600 MM and at branches connected into the main duct without a neck.

6.5 Proper hangers and supports should be provided to hold the duct rigidly, to keep them straight and to avoid vibrations. Additional supports are to be provided where required for rigidity or as directed by Engineer-In-Charge.

6.6 The ducts should be routed directly with a minimum of directional change.

6.7 The ductwork shall be provided with additional supports/hangers, wherever required or as directed by the Engineer-In-Charge, at no extra cost.

6.8 All angle iron flanges to be welded electrically and holes to be drilled.

6.9 All the angle iron flanges to be connected to the GSS ducts by rivets at 100 MM centers.

6.10 All the flanged joints, to have a sponge rubber packing stuck to the flanges with suitable adhesive.

6.11 The G.S.S. Ducts should be lapped 6 MM across the flanges.

6.12 The ducts should be supported by approved type supports at a distance not exceeding 2.0 Meters.

7. **Standard Grilles**

7.1 The supply and return air grilles shall be fabricated from extruded aluminum sections. The supply air grilles shall have single/double louvers. The front horizontal louvers shall be of extruded section, fixed/adjustable type. The rear vertical louvers where required shall of aluminum extruded sections and adjustable type. The return air grille shall have single horizontal extruded section fixed louvers. The grilles may or may not be with an outer frame.

7.2 The damper blades shall also be of extruded aluminum sections. The grill flange shall be fabricated out of

aluminum-extruded section. Grilles longer than 450 MM shall have intermediate supports for the horizontal louvers.

8. **Diffusers**

8.1 The ceiling type square diffusers shall be of aluminium extruded sections with flush or step down face, as specified with fixed pattern and neck.

8.2 All supply diffusers shall be provided with extruded aluminium dampers, with arrangement for adjustment from the bottom.

8.3 The slot diffusers shall be of aluminium extruded sections with diffusion plate and sliding damper.

9. **Linear Diffusers/Grilles**

9.1 The linear diffusers/grilles shall be fabricated from Aluminium extruded sections.

9.2 The diffusion blades shall be extruded, flush mounted type with single or double direction airflow.

9.3 The frame shall be of aluminium-extruded section and shall hold the louvers tightly in fixed position.

9.4 The dampers as described under grilles shall be provided wherever specified.

10. **Exhaust Grilles**

10.1 The exhaust grilles shall be fabricated from aluminium extruded sections.

10.2 The exhaust grilles shall be horizontal fixed bar grilles with 15° blade inclination.

11. **Painting and Vision Barrier**

11.1 All grilles, and diffusers shall be powder coated, before installation, in approved colour.

11.2 All ducts immediately behind the grilles/diffusers etc. are to be given two coats of black paint in matt finish.

11.3 The return air and dummy portion of all linear grilles shall be provided with a vision barrier made of 24 gauge-galvanised sheets. The vision barrier shall be fixed to the false ceiling frame with self-tapping screws and shall be given two coats of black paint in matt finish. Care shall be taken to ensure that the return air path is not obstructed.

12. **Testing**

12.1 After completion, all duct system shall be tested for air leakage.

12.2 The entire air distribution system shall be balanced to supply the air quantity as required in various areas and the final tabulation of air quantity through each outlet shall be submitted to the Engineer-In-Charge for approval.

Split System Air Conditioners

1. **General**

1.1 The contractor shall supply and install split system air conditioner wherever indicated. The system shall be complete in all respects and comply with the specifications as given.

2. **Condensing Units**

- 2.1 Each condensing unit shall be complete unit with hermetic compressor/s, air cooled condenser, condenser fans with motors, internal piping, switches and internal wiring and shall be enclosed in a weather proof outdoor type housing.
- 2.2 The compressor shall be hermetic, with enclosed gas cooled motor. The compressors shall be suitable for R-22.
- 2.3 The condenser coil shall be air-cooled type with aluminium fins and copper tubes and necessary refrigerant connections. The copper tubes shall not be less than 1/2" O.D.
- 2.4 The condenser air fans shall be propeller type direct driven, each complete with motor. The air quantity and area of the condenser shall be adequate for working in the specified outdoor conditions.
- 2.5 The casing shall be fabricated from galvanised steel, zinc phosphated and finished with baked enamel paint. The casing shall make the whole unit fully weather proof, suitable for outdoor installation.
- 2.6 The unit shall include a remote control assembly with thermostat at and starting and speed switches.
- 2.7 The necessary charge of refrigerant gas and lubricated oil shall be provided to run the system.

3. **Fan Coil Unit**

- 3.1 The fan coil unit shall be high mounted type and shall be matched to the respective-condensing unit. Each unit shall consist of cooling coil, fan, filters, outer casing, drain pan, accessories etc.
- 3.2 The cooling coil shall have copper tubes of not less than 3/8" O.D. and continuous aluminium plate fins with integral collors. The tubes shall be staggered in the direction of the airflow.
- 3.3 The fan section shall consist of (2) two light weight aluminium impellers, statically and dynamically balanced, mounted directly on to a double shaft single phase, multiple winding motor capable of running at 3 speeds.
- 3.4 The unit casing shall be made of high quality moulded plastic and shall be insulated to lower the noise level and eliminate condensation. The supply and return air grilles shall be high quality moulded plastic.

4. **Refrigerant Piping**

- 4.1 The condensing unit and evaporator unit shall be interconnected by Type -I seamless copper refrigerant liquid and suction lines using flared or brazed fittings. Necessary accessories shall be incorporated in the circuit.
- 4.2 The suction line shall be insulated with 6 mm rubber foam insulation sections.

5. **Miscellaneous**

- 5.1 The cooling unit shall have control panel, housing the starting switches, contactor, relays etc.
- 5.2 Isolation pads shall be provided under the units.
- 5.3 Drain line shall be provided from fan coil unit upto drain trap. (To be priced separately).
- 5.4 Suitable M.S. angle iron supporting frame shall be provided for the condensing unit and supporting arrangement for the indoor units.
- 5.5 Interconnecting power and control cabling shall be provided between condensing unit and evaporator unit.

Insulation

1. **General**

The Insulation of water piping, air handling units, ducting, chillers etc., shall be carried out as per specifications given below:

2. **Materials**

The materials to be used for insulation shall be as follows, unless some other material is specifically mentioned elsewhere.

3. **Duct Insulation**

3.1 **Material**

3.1.1 Insulating material shall be resin bonded glass wool, faced with aluminium foil on one side reinforced with Kraft paper and fused to the insulation material. The thermal conductivity of the insulation material shall not exceed 0.034 kcal per hr-sqm- °C /mtr at 32°C mean temperature and density shall not be less than 24 kg./Cum.

3.1.2 Duct Insulation thickness shall be as follows:

Duct in conditioned space	-	25 mm thick
Duct in unconditioned space	-	50 mm thick
Duct treated with fresh air	-	50 mm thick

3.2 **Application**

3.2.1 Application on ducts not wider than 900 mm.

3.2.1.1 Apply CPRX compound on the surface after cleaning the ducts
Fix blankets of insulation material of specified thickness tightly to the surface with joints well butted and secured.

3.2.1.2 All joints shall be sealed with 50mm wide aluminium adhesive based tape as specified.

3.2.1.3 The insulation material on the ducts shall be finally secured with 19mm x 24 Ga G.I. wire mesh.

3.2.2 Application on ducts wider than 900 mm.

3.2.2.1 Apply CPRX compound on the surface after cleaning the ducts

3.2.2.2 Blanket type glass fibre covering the ducts pulled snug but not so tight so as to compress corners more than 25%. Use insulation having 50mm overlap or cut insulation long enough to allow for "peel off" of insulation from jacket to effect a minimum overlap of 50mm Staple lap with flare type staples on 25mm centres. The standing seams, stiffeners, and braces shall be insulated with same insulation blanket. Cover and seal all staples with reinforced glass cloth.

3.2.2.3 For ducts upto 450mm deep, mechanically fasten insulation to duct using one row of pins, plates or discs located on not over 300mm centres longitudinally equidistant laterally between duct top and bottom. For ducts over 600mm deep, apply fasteners as before only using a minimum of two rows.

3.2.2.4 Cover all joints with 50mm wide adhesive aluminium tape and finally cover with 19mmx24 Ga GI wire mesh.

4 Duct Acoustic Lining

4.1 **Material**

Resin bonded glass wool of density 24 Kg/ Cum. and K-Value of 0.034 kcal/hr – Sqm - °C – Mt. Of 25 mm thickness.

4.2 **Application**

4.2.1 The duct surface shall first be cleaned from inside.

4.2.2 Then frame of 25 mm square section made of 18 Ga (1.2 mm) thick G.I. sheet should be fixed on both ends of the duct piece.

4.2.3 The insulation slabs should be fixed between these sections of ducts using adhesive compound and self adhesive **stick pins**.

4.2.4 The insulation shall be covered with RP tissue, sealing all joint so that no fibre is visible.

4.4.5 The insulation shall then be covered with 0.5 mm perforated aluminium sheets.

4.4.6 The sheet of insulation shall be secured to the duct by means of stick pins as mentioned above.

Contractor's Signature With Seal