

STATE BANK OF INDIA

**PREMISES AND ESTATE
LOCAL HEAD OFFICE BUILDING, BHOPAL.**

PART – A : TECHNICAL BID

TENDER ID- LHO/BHO/P&E/2025-26/87

TENDER FOR:

**PROPOSED VRF AIR-CONDITIONING WORK OF WEALTH MANAGEMENT &
PREMIER BANKING- VIRTUAL RELATIONSHIP MODULE (VRM): OPENING
OF VRM CENTRE IN BHOPAL CIRCLE AT 1st FLOOR OF SULTANIA ROAD
BRANCH PREMISES, BHOPAL (M.P.)**

TENDER SUBMITTED BY :

NAME : _____

ADDRESS : _____

DATE : _____

ARCHITECT :

M/s.STUDIOPLUS ARCHITECTS, BHOPAL,

24, Sixth Floor, Bansal One,
Rani Kamalapati Railway Station, Bhopal
TEL. NO. 0755-336398, 9303101076
E-mail : studioplus67@gmail.com

NOTICE INVITING TENDERS

State Bank of India, Premises & Estates Department, Local Head Office, Bhopal through its Architect **M/s. Studio plus, Bhopal** invites "online item rate E-tender" from the SBI Empaneled contractors under appropriate category for the captioned work.

The SBI Empaneled contractors who receive NIT from Architect are only entitled to quote for this tender.

The details of tender are as under:

S.No.	Description	
1.	Name of work	PROPOSED VRF AIR-CONDITIONING WORK OF WEALTH MANAGEMENT & PREMIER BANKING- VIRTUAL RELATIONSHIP MODULE (VRM): OPENING OF VRM CENTRE IN BHOPAL CIRCLE AT 1st FLOOR OF SULTANIA ROAD BRANCH PREMISES, BHOPAL (M.P.)
2.	Nature of Work	VRF AIR-CONDITIONING WORK
3.	Time allowed for completion	75 DAYS
4.	Estimated Cost of works	Rs.40,02,401.00 plus GST without AMC cost
4.	Earnest Money Deposit	Rs. 40,000/- (Rupees forty thousand only) by means of Demand Draft / Banker's Cheque (Valid for a period of 90 Days from the date of issue of the tender) from any scheduled Nationalized Bank drawn in favour of A.G.M. (P&E) State Bank of India, LHO Bhopal or Exempted for Micro and Small enterprises with uploading valid MSME/UDYAM registration certificate pertain to above work along with relevant documents and same has been received at this office. Hardcopy of Micro and small enterprises with valid MSME/UDYAM must be received at this office on or before of

		stipulated date & time within the Envelope otherwise tender will be not considered.
5.	Initial Security Deposit	2% of contract amount including (EMD will be returned on receipt of ISD). The successful bidder(s) shall be responsible to deposit initial security deposit @ 2% of the contract value by way of demand draft in favour Assistant General Manager (P&E) and payable at Bhopal within 10 days from the date of receipt of "Work Order" from SBI/Architects. The SBI may consider accepting ISD in the form of Bank Guarantee issued by any Scheduled Bank in the format supplied/approved by any the SBI within its sole discretion but the same cannot be considered as a right of the bidder.
6.	Date of issue of tender documents form Bank's website	From 15.12.2025 to 29.12.2025 <u>E-Tender Portal Address:</u> www.tenderwizard.com/SBIETENDER or https:// www.sbi.co.in-SBI in the news-Procurement news
7.	Last date & time for submission of Online Technical and Price bid, EMD	Up to 3:00 P.M. on 29.12.2025
8.	Date & Time of opening of e-tenders	3:30 P.M. on 29.12.2025
9.	Address at which along with EMD proof has to be submitted.	The A.G.M. (P&E), State Bank of India, Local Head Office, Hoshangabad Road, Bhopal 462011
10.	Place of opening tenders	The A.G.M. (P&E), State Bank of India, Local Head Office, Hoshangabad Road, Bhopal 462011
11.	Liquidated Damages	0.50% of contract amount per weeks subject to max. 5% of contract value or final bill value.
12.	Defect's liability period	12 Months from the date of Virtual Completion
13.	Validity of offer	90 days from the date of opening of Price-bid
14.	Value of Interim Certificate	Rs. 10 Lakhs. No advance on materials / plant / machinery or mobilization advance shall be paid under any circumstances.
15.	Submission of Technical Bid (Hard Copy)	Contractors shall download the entire Technical Bid to get acquainted with terms

		and conditions and <u>Shall upload compulsorily the pages numbered from 01 to 09 of the technical bid</u> without fail in the e-tendering portal after putting the signature and seal. Failing to upload as stated above, the tender will be rejected. However, L1 Tenderer should submit the whole technical bid spirally bound securely and in serial order containing all pages duly signed with company seal and date to this office within 7 days of receipt of confirmation. Failure to submit the hardcopy of Technical Bid may render the bidder disqualified.
16.	Agency for arranging e-tender/online bidding	<u>E-Tender Portal Address:</u> www.tenderwizard.com/SBIETENDER <u>Service provider:</u> M/s. Antares Systems Limited, Registered Office: #24, Sudha Complex, 3rd Stage, 4thBlock, Bangalore – 560069, Karnataka. Ph.: 080-49352000 / 40482000 Fax:080-49352034 Help Desk: 6503346659 / 9044314492 / 9063666150/ 151 / 152 / 9664658506 / 9664658623 / 26 / 6980085360 / 033 4604 6611 Project In-charge Mr. Kushal Bose, Mobile No.: +91 6686913156, e-Mail: kushal.b@antaressystems.com
17.	Corrigendum	The contractors have to visit the Bank's web site regularly for any corrigendum till the last date and time of opening of tender.

16. Tenders can be downloaded from the bank's website www.sbi.co.in (link) <SBI in the news <Procurement News>. It shall be responsibility of the contractor to arrange and ensure that all pages of technical and financial bid are properly bound separately. Tenders in loose pages may be disqualified.

17. The contractor shall sign and stamp each page of the tender document thereby ensuring the number and sequence of all pages.

18. No conditions other than mentioned in the tender will be considered, and if given they will have to be withdrawn before opening of the price-bid.

19. The SBI reserve their rights to accept or reject any or all the tenders, either in whole or in part without assigning any reason(s) for doing so and no claim / correspondence shall be entertained in this regard.

20. **Tenders received without EMD or valid Micro and small enterprises with valid MSME/UDYAM Documents** shall be summarily rejected and such tenders shall not be allowed to participate in the online price bidding process.

21. 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.

22. SBI has the right to accept / reject any / all tenders without assigning any reasons and no correspondence shall be entertained in this regard.

**The A.G.M. (P&E)
State Bank of India
L.H.O. Bhopal.**

Annexure-A

The steps involved in making the payment through SB Collect are as under:-

1. The Vendor needs to use SBI internet banking site <https://www.onlinesbi.com/>.
2. Select "**SB Collect**" from Top Menu that will lead to the next page:
3. "**Proceed**" will lead to the next page:
4. Select "**All India**" in "State of Corporate / Institution" & Select "**Commercial Services**" in "Type of Corporate / Institution".
5. "**Go**" will lead to the next page:
6. Select "**SBI**" in Commercial Services Name and "**Submit**"
7. Select "**Tender Application Fee**" in "Payment Category" and enter the "**Tender ID**" exactly as we preloaded with characters in Uppercase only in place of Circle Codes.
8. The next Page will be ready with few of the Preloaded Tender Details:
9. The Vendor will have to fill up the fields properly and upon making the payment a receipt will be generated with a Reference No.

NOTE : Any type of vendor, whether dealing with SBI or other bank can use this SB Collect facility. Even a contractor not dealing with any bank can use this portal and generate challan and deposit by cash in any SBI branch. The bank charges for cash deposit will be also borne by the vendor himself.

FORM TENDER

To,
The A.G.M,
Premises & Estate
State Bank of India,
Local Head Office, Hoshangabad Road,
Bhopal 462011

Dear Sir,

Having examined the drawings, specification, design and schedule of quantities relating to the works specified in the memorandum hereinafter set out and having visited and examined the site of the works specified in the said memorandum and having acquired the requisite information relating thereto as affecting the tender, I/We hereby offer to execute the works specified in the said memorandum at the rates mentioned in the attached Schedule of Quantities and in accordance in all respects with the specifications, design, drawings and instructions in writing referred to in conditions of tender, the Articles of Agreement, Special Conditions, Schedule of Quantities and Conditions of Contract and with such materials as are provided for by, and in all other respects in accordance with such conditions so far as they may be applicable.

MEMORANDUM

Description of work	PROPOSED VRF AIR-CONDITIONING WORK OF WEALTH MANAGEMENT & PREMIER BANKING- VIRTUAL RELATIONSHIP MODULE (VRM): OPENING OF VRM CENTRE IN BHOPAL CIRCLE AT 1st FLOOR OF SULTANIA ROAD BRANCH PREMISES, BHOPAL (M.P.)
Earnest Money	Rs. 40,000/- (Rupees forty thousand only) by means of Demand Draft / Banker's Cheque (Valid for a period of 90 Days from the date of issue of the tender) from any scheduled Nationalized Bank drawn in favour of A.G.M. (P&E) State Bank of India, LHO Bhopal or Exempted for Micro and Small enterprises with uploading valid MSME/UDYAM registration certificate pertain to above work along with relevant documents and same has been received at this office.

Percentage, if any, to be deducted from Bills and total amount to be retained	10 % from Running Bills, subject to maximum Total 5% of contract amount or actual Final Bill value including EMD & Initial Security Deposit.
Time allowed for completion of the Works from Twenty Oneth day after the date of written order or date of handing over of the site (whichever is later) to commence the work	75 DAYS

I / We have deposited a sum of **Rs.40,000/-(Rupees forty thousand only)** or hard copy of valid MSME certificate of the total tender amount as Earnest Money with the **A.G.M. (P&E) State Bank of India, LHO Bhopal**. which amount is not to bear any interest. Should I / We fail to execute the Contract when called upon to do so I / We do hereby agree that this sum shall be forfeited by me/us to SBI

1) Our Bankers are:

i)

ii)

The names of partners of our firm are:

i)

ii)

Name of the partner of the firm

Authorised to sign

Or

(Name of person having Power of Attorney to sign the Contract.

(Certified true copy of the Power of Attorney should be attached)

Yours faithfully,

Signature of Contractors.

Signature and addresses of Witnesses

i)

ii)

SAMPLE BUSINESS RULE DOCUMENT

PROPOSED VRF AIR-CONDITIONING WORK OF WEALTH MANAGEMENT & PREMIER BANKING- VIRTUAL RELATIONSHIP MODULE (VRM): OPENING OF VRM CENTRE IN BHOPAL CIRCLE AT 1st FLOOR OF SULTANIA ROAD BRANCH PREMISES, BHOPAL (M.P.)

(A) Business rules for E-tendering:

1. Only empaneled contractors with SBI under appropriate category who are invited by the project Architect/SBI shall only be eligible to participate.
2. SBI will engage the services of and E-tendering service provider who will provide necessary training and assistance before commencement of online bidding on Internet.
3. In case of e-tendering, SBI will inform the vendor in writing, the details of service provider to enable them to contact and get trained.
4. Business rules like event date, closing and opening time etc. also will be communicated through service provider for compliance.
5. Contractors have to send by email, the compliance form in the prescribed format (provided by service provider), before start of E-tendering. Without this the vendor will not be eligible to participate in the event.
6. The Contractors will be required to submit the hard copy of EMD and proof of tender application copies in sealed Envelope to the office of State Bank of India at the address mentioned hereinbefore by the stipulated date and time. Contractors not submitting any one or more documents shall not be eligible to participate in the online price bidding.
7. E-tendering will be conducted on schedule date & time.
8. **The e-tendering will be treated as closed only when the bidding process gets closed in all respects for the item listed in the tender.**

(B) Terms & conditions of E-tendering:

SBI shall finalize the Tender through e-tendering mode for which

M/s.....has been engaged by SBI an authorized service provider. Please go

through the guidelines given below and submit your acceptance to the same along with your Commercial Bid.

1. E-tendering shall be conducted by SBI through **M/s**.....on pre-specified date. While the Contractors shall be quoting from their own offices/ place of their choice, Internet connectivity and other paraphernalia requirements shall have to be ensured by Contractors themselves. In the event of failure of their Internet connectivity, (due to any reason whatsoever it may be) it is the bidders' responsibility. In order to ward-off such contingent situation bidders are requested to make all the necessary arrangements/ alternatives such as back-up power supply whatever required so that they are able to circumvent such situation and still be able to participate in the E-tendering successfully. Failure of power at the premises of Contractors during the E-tendering cannot be the cause for not participating in the E-tendering. On account of this the time for the E-tendering cannot be extended and SBI is not responsible for such eventualities.
2. **M/s**.....hall arrange to train your nominated person(s), without any cost to you. They shall also explain you all the Rules related to the E-tendering. You are required to give your compliance on it before start of bid process.
3. **BIDDING CURRENCY AND UNIT OF MEASUREMENT:** Bidding will be conducted in Indian currency & Unit of Measurement will be displayed in Online E-tendering.
4. **VALIDITY OF BIDS:** The Bid price shall be firm for a period specified in the tender document and shall not be subjected to any change whatsoever.
5. Procedure of E-tendering:

Online E-tendering :

- (a.a.1.a.i.3.a) The hard copy of the Technical as well as Price Bid is available on the Bank's website during the period specified in the NIT.
- (a.a.1.a.i.3.b) Online e-tendering is open to the empaneled bidders who receive NIT from the SBI and qualified for participating in the price bidding as provisions mentioned here in above through SBI approved Service Provider.
- (a.a.1.a.i.3.c) The Price-Bid shall be made available online by the Service Provider wherein the contractors will be required to fill-in their Item-wise rates for each item.
- (a.a.1.a.i.3.d) The Contractors are advised not to wait till the last minute to submit their online item-wise quote in the price bid to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.

(a.a.1.a.i.3.e) It is mandatory to all the bidders participating in the price bid to quote their rates for each and every item.

(a.a.1.a.i.3.f) In case, contractor fails to quote their rates for any one or more tender items, their tender shall be treated as ***"Incomplete Tender"*** and shall be liable for rejection.

6. LOG IN NAME & PASSWORD: Each Bidder is assigned a Unique User Name & Password by **M/s.....**The Bidders are requested to change the Password after the receipt of initial Password from **M/s.....**All bids made from the Login ID given to the bidder will be deemed to have been made by the bidder.

7. BIDS PLACED BY BIDDER: Bids will be taken as an offer to execute the work as specified. Bids once made, cannot be cancelled / withdrawn and the Bidder shall be bound to execute the work at the quoted bid price. In case the L-1 Bidder backs out or fail to complete the work as per the rates quoted, SBI shall at liberty to take action as deemed necessary including depaneling such contractors and forfeiting their EMD.

8. At the end of the E-tendering, SBI will decide upon the winner. SBI decision on award of Contract shall be final and binding on all the Bidder

9. SBI shall be at liberty to cancel the E-tendering process / tender at any time, before ordering, without assigning any reason.

10. SBI shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause.

11. Other terms and conditions shall be as per your techno-commercial offers and other correspondences till date.

12. OTHER TERMS & CONDITIONS:

- The Bidder shall not involve himself or any of his representatives in Price manipulation of any kind directly or indirectly by communicating with other suppliers / bidders.
- The Bidder shall not divulge either his Bids or any other exclusive details of SBI to any other party.
- SBI decision on award of Contract shall be final and binding on all the Bidders.
- SBI reserves their rights to extend, reschedule or cancel any E-tendering within its sole discretion.
- SBI or its authorized service provider **M/s.....**shall not have any liability to Bidders for any interruption or delay in access to the site irrespective of the cause.

- SBI or its authorized service provider **M/s**.....is not responsible for any damages, including damages that result from, but are not limited to negligence.
- SBI or its authorized service **M/s**.....will not be held responsible for consequential damages, including but not limited to systems problems, inability to use the system, loss of electronic information etc.

N.B.

- All the Bidders are required to submit the Process Compliance Statement (Annexure II) duly signed to M/s Antares Systems Limited, Bangalore.
- **All the bidders are requested to ensure that they have a valid digital signature certificate well in advance to participate in the online event.**

PROCESS COMPLIANCE STATEMENT (ANNEXURE II)

(The bidders are required to print this on their company's letter head and sign, stamp before emailing)

To,

M/s.....,

Address:;

Contact no.:

e-Mail:

PROPOSED VRF AIR-CONDITIONING WORK OF WEALTH MANAGEMENT & PREMIER BANKING- VIRTUAL RELATIONSHIP MODULE (VRM): OPENING OF VRM CENTRE IN BHOPAL CIRCLE AT 1st FLOOR OF SULTANIA ROAD BRANCH PREMISES, BHOPAL (M.P.)

Dear Sir,

This has reference to the Terms & Conditions for the E-tendering mentioned in the Tender document.

This letter is to confirm that:

- 1) The undersigned is authorized representative of the company.
- 2) We have studied the Commercial Terms and the Business rules governing the E-tendering as mentioned in RFP of SBI as well as this document and confirm our agreement to them.
- 3) We also confirm that we have taken the training on the E-tendering tool and have understood the functionality of the same thoroughly.
- 4) We confirm that SBI and **bidder**, shall not be liable & responsible in any manner whatsoever for my/our failure to access & bid on the e-E-tendering platform due to loss of internet connectivity, electricity failure, virus attack, problems with the PC, any other unforeseen circumstances etc. before or during the E-tendering event.
- 5) We confirm that we have a valid digital signature certificate issued by a valid Certifying Authority.

6) We, hereby confirm that we will honor the Bids placed by us during the E-tendering process.

With regards,

Date:

Signature with company seal

Name:

Company / Organization:

Designation within Company / Organization:

Address of Company / Organization:

Scan it and send to this Document on -----

ARTICLES OF AGREEMENT

(On non-judicial Stamp Paper of Rs. 1500/- or as per latest Govt. Rules)

This agreement made on the _____ day of _____ Two Thousand ____ BETWEEN State Bank of India a corporation incorporated under the State Bank of India Act, 1955 and having its Corporate office at State Bank Bhawan Madam Cama Road Nariman Point Mumbai and one of Local Head Offices at BHOPAL, (hereinafter called "the Employer") of the one part and M/s _____ through its _____ having its registered office at _____ (hereinafter called "the Contractor") of the other part.

WHEREAS the Employer is desirous of executing Works to be carried out **PROPOSED VRF AIR-CONDITIONING WORK OF WEALTH MANAGEMENT & PREMIER BANKING- VIRTUAL RELATIONSHIP MODULE (VRM): OPENING OF VRM CENTRE IN BHOPAL CIRCLE AT 1st FLOOR OF SULTANIA ROAD BRANCH PREMISES, BHOPAL (M.P.)**

.as per Schedule-I, to this agreement and has caused Drawings, Bills of Quantities and Specification describing the work to be done, prepared by **M/s STUDIOPLUS ARCHITECTS, Bhopal** (hereinafter called "the Architects").

AND WHEREAS the said Drawings, the Bills of Quantities marked pages ____ to ____ (inclusive) and the Specifications as stated have been signed by or on behalf of the parties hereto:

AND WHEREAS the Contractor has agreed to execute the work upon the Conditions of Tender and the Conditions of Contract and further subject to the Special Conditions set forth in Schedule-II hereto attached (hereinafter collectively referred to as "the said Conditions") as per the said Drawings and as described in the said Specification and included in the said Bills of Quantities for the sum of Rupees _____

NOW IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration of the sum of Rupees _____ to be paid at the time and in the manner set forth in the said Conditions, the Contractor shall upon and subject to the said Drawings and described in the said Specification and Bills of Quantities, complete the work within stipulated period of time.
2. The Employer shall pay to the Contractor the said sum of Rs. _____ or such other sum as shall become payable hereunder at the times and in the manner specified hereinafter.
3. The term "The Architects" in the said conditions shall mean **M/s STUDIOPLUS ARCHITECTS, Bhopal** or in the event of their ceasing to be Architects for the purposes of this Contract, such other

Signature of Contractor with Seal

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persons as shall be nominated for that purpose by the Employer, not being a person to whom the contractor shall object for reasons considered to be sufficient by the Employer mentioned in the said Conditions. Provided always that no persons subsequently appointed to be Architects under this Contract shall be entitled to disregard or overrule any decision or approval or direction given or expressed by the Architects for the time being.

4. The said Conditions, Specifications and Priced Bills of Quantities shall be read and construed as forming part of this agreement, and the parties hereto shall respectively abide by and submit themselves to the conditions and stipulations and perform the agreement on their parts respectively in such Conditions, Specifications and Priced Bills of Quantities contained.
5. This agreement is subject to jurisdiction of courts at **Bhopal M.P** only.
6. **The Asst. General Manager (P&E), LHO, BHOPAL** shall exercise powers on behalf of the said Employer for the purpose of the Contract Agreement.
7. Whereas both the parties agree to sign the following annexure Annexed to this Agreement in token of their acceptance.
 - (i) Agreement
 - (ii) General Conditions of contract.
 - (iii) Special Condition of Contract.
 - (iv) Safety Codes.
 - (v) Specifications.
 - (vi) Material Testing & Their Frequency.
 - (vii) List of Approved Makes/ Brands
 - (viii) Priced Bill of Quantities.
 - (ix) Drawings.
8. The Bank shall pay the contractor such sum as shall become payable hereunder at the times and in the manner specified in the said Conditions mentioned in the General Conditions of Contract.
9. Whereas the Contractor hereby undertakes and agrees to carry out and complete the works within **75 DAYS** from the date of handing over site or 15 days from the date of issue of letter of acceptances, whichever is later. The Contractor agrees and has deposited the sum of Rs. _____ by way of Initial Security Deposit for due fulfillment of this Contract for the Works. It is agreed that the Security Deposit shall be deducted from each running bills and refunded to the contractor as per clause 2 of the General Conditions of the Contract Annexed herewith.
10. Whereas it is agreed that the earnest money amounting to **Rs. 40,000/- (Rupees forty thousand only) or Valid MSME certificate pertain to works** deposited by the Contractor in the form of Demand Draft along with the tender shall be forfeited in full in case the Contractor does not remit the Initial Security Deposit within the stipulated period of the start of the works by the stipulated date mentioned in the award letter.
11. Whereas Shri _____ is the accredited representative(s) of the Contractor who would be responsible for taking instructions from the Employer in relation to the Works. The Contractor agrees to pay Sales Tax or any other Tax on material or finished works like Works Contract Tax, Turnover Tax, etc. including Income Tax in respect of this Contract of the Works and the Employer will not entertain any claim whatsoever in this regard nor shall the Employer be responsible to pay any Tax as mentioned above. If due to non – payment of any of the aforesaid Tax or other Taxes connected with the Works, the Employer suffers any loss or damages occurred due to the

Contractor then the Employer will be entitled to claim damages from the contractor for such loss and also for non-completion of the Work within **75 DAYS** stipulated in Para 9, above.

12. Whereas the Contractor hereby declares the list of all the relative working with the Employer which is annexed herewith.

OR

Whereas the Contractor declares that none of his relative is working with the Employer.

OR

Whereas the Contractor declares that he has associated himself with the agencies of the appropriate classes of person for Sanitary and Water Supply Installation etc. or any other specialized job to complete the works.

The Plans, Drawings, Specifications, Contract Documents and the Documents above mentioned shall form basis of this Contract and the decision of **AGM (P&E) , SBI PREMISES & ESTATE DEPARTMENT., 3rd Floor, LHO BUILDING Hoshangabad Road BHOPAL 462011** for the time being as mentioned in the Conditions of Contract in reference to all matters of dispute as to material, workmanship or account and as to the intended interpretation of the clauses of the Agreement or any of the document attached hereto shall be final and binding on both parties and may be made rule of the court.

The work comprises of the "**PROPOSED VRF AIR-CONDITIONING WORK OF WEALTH MANAGEMENT & PREMIER BANKING- VIRTUAL RELATIONSHIP MODULE (VRM): OPENING OF VRM CENTRE IN BHOPAL CIRCLE AT 1st FLOOR OF SULTANIA ROAD BRANCH PREMISES, BHOPAL (M.P.)**

." as mentioned above and all subsidiary and other works connected therewith on the same site as may be ordered to be done from time to time by **AGM (P&E), SBI PREMISES & ESTATE DEPARTMENT., 3rd Floor, LHO BUILDING Hoshangabad Road BHOPAL 462011** for the time being even though such works may not have been shown on the , Plans or described in the said Specifications or Schedule of Quantities of various classes of Work to be done.

13. The Employer through the **AGM (P&E), SBI PREMISES & ESTATE DEPARTMENT., 3rd Floor, LHO BUILDING Hoshangabad Road BHOPAL 462011** reserves himself the right of altering the Plans, Drawings and nature of Work of adding to or omitting any items of work or having portions of the same carried out departmentally or otherwise and such alterations or variations shall be carried out without prejudice to this Contract.
14. All disputes arising out of or in any way connected with this agreement shall be deemed to have arisen in **M.P** and only the court at **BHOPAL** shall have jurisdiction to determine the same.
15. The several parts of this Contract have been read to us and fully understood by us.

In Witness whereof the parties above named have executed these presents today and year first hereinabove written.

Signed, Sealed and Delivered by:

Authorised Representative of Employer

Authorised Representative of Contractor

SCHEDULE I

PROPOSED VRF AIR-CONDITIONING WORK OF WEALTH MANAGEMENT & PREMIER BANKING- VIRTUAL RELATIONSHIP MODULE (VRM): OPENING OF VRM CENTRE IN BHOPAL CIRCLE AT 1st FLOOR OF SULTANIA ROAD BRANCH PREMISES, BHOPAL (M.P.)

as described in Tender and Drawings inclusive hereto as Specifications.

SCHEDULE II

The following Letters/ Correspondence form a part of Agreement:

- 1.
- 2.
- 3.

As witness our hands the day and year first written above,

In presence of

Signature:

Signature by the said Employer

Name:

Name:

OccMPation:

Designation:

Address:

Address:

In presence of

Signature:

Signature by the said Contractor

Name:

Name:

Occpation:

Designation:

Address:

Address:

SECTION – 1

INSTRUCTIONS TO THE TENDERERS

1.0 Scope of work

State Bank of India invites e-tender's for **PROPOSED VRF AIR-CONDITIONING WORK OF WEALTH MANAGEMENT & PREMIER BANKING- VIRTUAL RELATIONSHIP MODULE (VRM): OPENING OF VRM CENTRE IN BHOPAL CIRCLE AT 1st FLOOR OF SULTANIA ROAD BRANCH PREMISES, BHOPAL (M.P.)**

1.1 Site and its location

The proposed work is to be carried out at 1st Floor of Sultania Road Branch Premises, Bhopal.

2.0 Tender documents

2.1 The work has to be carried out strictly according to the conditions stipulated in the tender consisting of the following documents and the most workmen like manner.

Instructions to tenderers

General conditions of Contract

Special conditions of Contract

Additional specifications

Drawings

Priced bid A

2.2 The above documents shall be taken as complementary and mutually explanatory of one another but in case of ambiguities or discrepancies, shall take precedence in the order given below;

- a) Price Bid
- b) Additional Specifications
- c) Technical specifications
- d) Drawings
- e) Special conditions of contract
- f) General conditions of contract
- g) Instructions to Tenderers

2.3 Complete set of tender documents including relative drawings can be downloaded from the website www.sbi.co.in-SBI in the news-Procurement news

2.4 The tender documents are not transferable.

3.0 **Site Visit**

3.1 The tenderer must obtain himself on his own responsibility and his own expenses all information and data that may be required for the purpose of filling this tender document and enter into a contract for the satisfactory performance of the work. The tenderer is requested satisfy himself regarding the availability of water, power, transport and communication facilities, the character quality and quantity of the materials, labour, the law and order situation, climatic conditions local authorities requirement, traffic regulations etc;

The tenderer will be fully responsible for considering the financial effect of any or all the factors while submitting his tender.

4.0 **Earnest Money**

4.1 The tenderers are requested to submit the Earnest Money of **Rs. 40,000/- (Rupees forty thousand only) EMD or Valid MSME certificate pertain to works by means of Demand Draft / Pay Order** (Valid for a period of 90 Days from the last date of submission of the tender) from any scheduled Nationalized Bank drawn **in favour of A.G.M. (P&E) State Bank of India, LHO Bhopal and payable in Bhopal. NO TDR / STDR SHALL BE ACCEPTED AS EMD**

4.2 EMD in any other form other than as specified above will not be accepted. Tender not accompanied by the EMD in accordance with clause 4.1 above shall be rejected.

4.3 No interest will be paid on the EMD.

4.4 EMD of unsuccessful tenderer will be refunded within 30 days of award of Contract.

4.5 EMD of successful tenderer will be retained as a part of security deposit.

5.0 Initial/ Security Deposit

The successful tenderer will have to submit a sum equivalent to 2% of accepted tender value less EMD by means of DD drawn in favour of A.G.M. (P&E) State Bank of India, LHO Bhopal within a period of 15 days of acceptance of tender

6.0 Security Deposit

6.1 Total security deposit shall be 5% of contract value. Out of this 2% of contract value is in the form of Initial Security Deposit (ISD) which includes the EMD. Balance 3% shall be deducted from the running account bill of the work at the rate of 10% of the respective running account bill i.e., deduction from each running bill account will be @10% till Total Security Deposit (TSD) including ISD reaches to 5% of contract value. The 50% of the Total Security Deposit shall be paid to the contract on the basis of architect's certifying the virtual completion. The balance 50% would be paid to the contractors after the defects liability period as specified in the contract.

6.2 Additional Security Deposit

Additional Security deposit (ASD)/Additional performance Guarantee (APG) shall be applicable if the bid price is below 10.00 % of the estimated cost put to tender. The amount of such ASD/ APG shall be the difference between 90.00 % of estimated cost put to tender and the quoted price.

Such ASD could be in the form of DD / Banker Cheque in the Bank's name as per format approved by the Bank. On successful completion of work ASD will be returned to the contractor. In case contractor fails to complete the work in time or as per tender specification or leave the job incomplete, the bank will be at liberty to recover the dues from ASD or to forfeit such ASD as the case may be within its sole discretion.

6.3 No interest shall be paid to the amount retained by the Bank as Security Deposit.

7.0 Signing of contract Documents

The successful tenderer shall be bound to implement the contract by signing an agreement and conditions of contract attached herewith within 30 days from the receipt of intimation of acceptance of the tender by the Bank. However, the written acceptance of the tenders by the Bank will constitute a binding agreement between the Bank and successful tenderer whether such formal agreement is subsequently entered into or not.

8.0 Completion Period

Time is essence of the contract. The work should be completed in all respect accordance with the terms of contract within a period of **75 DAYS** from the date of award of work.

9.0 Validity of tender

Tenders shall remain valid and open for acceptance for a period of 90 days from the

date of opening price bid. If the tenderer withdraws his/her offer during the value period or makes modifications in his/her original offer which are not acceptable to Bank without prejudice to any other right or remedy the Bank shall be at liberty forfeit the EMD.

10.0 **Liquidated Damages**

The liquidated damages shall be 0.50% per week subject to a maximum of 5% of contract value.

11.0 **Rate and prices:**

11.1 The tenderers need not quote their rates for which no quantities have been given. In case the tenderers quote their rates for such items those rates will be ignored and will not be considered during execution.

11.2 The tenderers should not change the units as specified in the tender. If any unit is changed the tenders would be evaluated as per the original unit and the contractor would be paid accordingly.

The tenderer should not change or modify or delete the description of the item. If any discrepancy is observed he should immediately bring to the knowledge of the Architect/ SBI.

11.3 Each page of the BOQ shall be signed by the authorized person and cutting or overwriting shall be duly attested by him.

11.4 Each page shall be totaled and the grand total shall be given.

11.5 **The rate quoted shall be firm and shall include all costs, allowances, taxes, levies, charges, royalties, cess etc but excluding GST as applicable which will be reimbursed by the Bank as per Govt. Norms prevailing from time to time.**

11.6 The SBI reserve their rights to accept any tenders, either in whole or in part or may entrust the work in phases or may drop the part scope of work at any stage of the project within its sole discretion without assigning any reason(s) for doing so and no claim / correspondence shall be entertained in this regard.

11.7 In case it is decided by the SBI to drop one or more buildings from the scope of work at any stage of the project, the contractor shall not be entitled to raise any claim / compensation for such deleted scope of work. Also, the SBI may consider issuing work order for various buildings in phases but within a reasonable time interval and the contractor shall be bound to execute the same within the stipulated time period and as per rates quoted by them in this tender without any claim for price escalation.

12. **Restriction under Rule 144 9XI) of General Financial Rules 2017 of Ministry of**

Finance, India order no. F. No. 6/18/2019/PPD dated 23rd July 2020.

- I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender ONLY if the bidder is registered with the Competent Authority (registration committee constituted by the Department for promotion of industry and internal Trade).
- II. 'Bidder' (including the terms 'tender' 'consultant or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial judicial person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
- III. 'bidder from a country which shares land border with India (such a country); for this purpose means:
 - a. An entity incorporated, established or registered in such a country, or
 - b. A subsidiary of an entity incorporated, established or registered in such a country or
 - c. An entity substantially controlled through entities incorporated, established or registered in such a country, or
 - d. An entity whose beneficial owner is situated in such a country or
 - e. An Indian (or other) agent of such an entity or
 - f. A natural person who is a citizen of such a country or
 - g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.
- IV. The beneficial owner for the purpose of (iii) above will be as under:
 1. In case of A Company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more judicial person, has a controlling interest or who exercise control through other means.

Explanation-

 - a. "Controlling ownership interested" means ownership of or entitlement to more than twenty five percent of shares or capital or profits of the Company;
 - b. "Control" shall include right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;
 2. In case of a partnership firm, the beneficial owner is the natural person(s), who whether acting alone or together, through one or more judicial person,

has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;

3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who whether acting alone or together, through one or more judicial person, has ownership of or entitlement to more than fifteen percent of capital or profits of such association or body of individuals.
 4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
 5. In case of a trust, the trustiest, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
- V. An Agent is a person to do any act for another, or to represent another in dealing with third person .
- VI. [To be inserted in tenders for Works contracts, including Turnkey contract]. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.
- VII. All bidders need to submit a declaration-cum-certificate (along with evidence) in this regards as per “Annexure-I” failure to submit such valid declaration-cum-Certificate will make the bid liable for rejection.”

GENERAL CONDITIONS OF CONTRACT

1.0 **Definitions:** -

“Contract means the documents forming the tender and the acceptance thereof and the formal agreement executed between SBI (client) and the contractor, together with the documents referred there in including these conditions, the specifications, designs, drawings and instructions issued from time to time by the Architects/ Bank and all these documents taken together shall be deemed to form one contract and shall be complementary to one another.

1.1 In the contract the following expressions shall, unless the context otherwise requires, have the meaning hereby respectively assigned to them.

1.1.1 ‘SBI’ shall mean A.G.M. (P&E), State Bank of India, Local Head Office, Hoshangabad Road, Bhopal 462011 and includes the client’s representatives, successors and assigns.

1.1.2 ‘Architects/ Consultants’ shall mean M/s **Studio plus**, Bhopal.

1.1.3 ‘Site Engineer’ shall mean an Engineer appointed by the SBI at site as their representative for day-to-day supervision of work and to give instructions to the contractors.

1.1.4 ‘The Contractor’ shall mean the individual or firm or company whether incorporate not, undertaking the works and shall include legal personal representative of individual or the composing the firm or company and the permitted assignees of individual or firms of company.

The expression ‘works’ or ‘work’ shall mean the permanent or temporary work description in the “Scope of work” and / or to be executed in accordance with the contract includes materials, apparatus, equipment, temporary supports, fittings and things of kinds to be provided, the obligations of the contractor hereunder and work to be done by the contractor under the contract.

1.1.5 ‘Engineer’ shall mean the representative of the Architect/consultant.

1.1.6 ‘Drawings’ shall mean the drawings prepared by the Architects and issued by the Engineer and referred to in the specifications and any modifications of such drawings as may be issued by the Engineer from time to time ‘Contract value shall mean value of the entire work as stipulated in the letter of acceptance of tender subject such additions there to or deductions there from as may be made under the provide herein after contained.

- 1.1.7 Specifications' shall mean the specifications referred to in the tender and modifications thereof as may time to time be furnished or approved by the Architect/ Consultant.
- 1.1.8 "Month" means calendar month.
- 1.1.9 "Week" means seven consecutive days.
- 1.1.10 "Day" means a calendar day beginning and ending at 00 Hrs and 24 Hrs respectively.
- 1.1.11 "SBI Engineer" shall mean The Civil / Electrical Engineer in - charge of the Project, as nominated by the A.G.M. (P&E) State Bank of India, LHO Bhopal.
- 1.1.12 The following shall constitute the Joint Project Committee (herein under referred to as JPC) for assessing and reviewing the progress of the work on the project and to issue instructions or directions from time to time for being observed and followed by the Architects Site Engineer /PMC and other consultants / contractors engaged in the execution of the project.
- i) A.G.M. (P&E) State Bank of India, Local Head Office, Bhopal.
 - ii) SBI Engineer (Civil and Electrical) in-charge of the Project, as may be nominated by the M.D. & CEO.
 - iii) Concerned partner of the Architects and their Resident Architect.... Member.

CLAUSE

1.0 Total Security Deposit

Total Security deposit comprise of

Earnest Money Deposit

Initial security deposit

Retention Money

a) **Earnest Money Deposit -**

The tenderer shall furnish EMD of **Rs. 40,000/- (Rupees forty thousand only) EMD or Valid MSME certificate pertain to works** in the form of Demand draft or bankers cheque drawn in favour of A.G.M. (P&E) STATE BANK OF INDIA, LHO BHOPAL., on any Scheduled Bank. No tender shall be considered unless the EMD is so deposited in the required form. No interest shall be paid on this EMD. The EMD of the unsuccessful tenderer shall be refunded soon after the decision to award the contract is taken without interest. The EMD shall stand absolutely forfeited if the tenderer revokes his tender at any time the period when he is

required to keep his tender open acceptance by the SBI or after it is accepted by the SBI the contractor fails to enter into a formal agreement or fails to pay the initial security deposit as stipulated or fails to commence the work within the stipulated time. **NO TDR / STDR SHALL BE ACCEPTED AS EMD.**

b) **Initial Security Deposit (ISD)**

The amount of ISD shall be 2% of accepted value of tender including the EMD in the form of DD/FDR drawn on any scheduled Bank and shall be deposited within 15 days from the date of acceptance of tender.

ADDITIONAL SECURITY DEPOSIT / PERFORMANCE GUARANTEE

Additional Security deposit (ASD)/Additional performance Guarantee (APG) shall be applicable if the bid price is below 10.00 % of the estimated cost put to tender. The amount of such ASD/ APG shall be the difference between 90.00 % of estimated cost put to tender and the quoted price. Such ASD could be in the form of DD / Banker Cheque in the Bank's name as per format approved by the Bank. On successful completion of work ASD will be returned to the contractor. In case contractor fails to complete the work in time or as per tender specification or leave the job incomplete, the bank will be at liberty to recover the dues from ASD or to forfeit such ASD as the case may be within its sole discretion.

No interest shall be paid to the amount retained by the Bank as Security Deposit.

c) **Retention Money: -**

Besides the SD as deposited by the contractor in the above said manner, the Retention money shall be deducted from the running account bill at the rate of 10% of the gross value of work done by the contractor and claimed in each bill provided the total security deposit i.e. ISD plus EMD plus Retention Money shall both together not exceed 5% of the contract value. The 50% of the total security deposit shall be refunded to the contractor without any interest on issue of Virtual Completion certificate by the Architect/consultant. The balance 50% of the total security deposit shall be refunded to the contractors without interest within fifteen days after the end of defects liability period provided the contractor has satisfactorily attended to all defects in accordance with the conditions of contract including site clearance.

2.0 **Language**

The language in which the contract documents shall be drawn shall be in English.

3.0 **Errors, omissions and discrepancies**

In case of errors, omissions and/ or disagreement between written and scaled dimensions on the drawings or between the drawings and specifications etc., the following order shall apply.

- i) Between scaled and written dimension (or description) on a drawing, the latter shall be adopted.
- ii) Between the written or shown description or dimensions in the drawings and the corresponding one in the specification the former shall be taken as correct.
- iii) Between written description of the item in the specifications and descriptions in bills of quantities of the same item, the former shall be adopted:
 - a) In case of difference between rates written in figures and words, the rate in words shall prevail.
 - b) Between the duplicate / subsequent copies of the tender, the original tender shall be taken as correct.

4.0 **Scope of Work:**

The contractor shall carryout complete and maintain the said work in every respect strictly accordance with this contract and with the directions of and to the satisfaction Bank to be communicated through the architect/consultant. The architect/consultant at the directions of the SBI from time to time issue further drawings and / or write instructions, details directions and explanations which are here after collectively references to as Architect's /consultant's instructions in regard to the variation or modification of the design, quality or quantity of any work or the addition or omission or substitution work. Any discrepancy in the drawings or between BOQ and / or drawings and / or specifications. The removal from the site of any material brought thereon by the Contractor and any substitution of any other materials therefore the removal and / or re-executed of any work executed by him. The dismissal from the work of any person engaged thereupon.

5.0 i) **Letter of Acceptance:**

Within the validity period of the tender the SBI shall issue a letter of acceptance directly or through the architect by registered post or otherwise depositing at the of the contractor as given in the tender to enter into a Contract for the execution of the work as per the terms of the tender. The letter of acceptance shall constitute a bind contract between the SBI and the contractor.

ii) **Contract Agreement:**

On receipt of intimation of the acceptance of tender from the SBI / Architect the successful tenderer shall be bound to implement the contract and within fifteen days there of shall sign an agreement in a non-judicial stamp paper of appropriate value, subject to approval of Law Department of SBI, LHO, Bhopal.

6.0 **Ownership of drawings:**

All drawings, specifications and copies thereof furnished by the SBI through its Architect / consultants are the properties of the SBI. They are not to be used on other work.

7.0 Detailed drawings and instructions:

The SBI through its architects / consultants shall furnish with reasonable proper additional instructions by means of drawings or otherwise necessary for the execution of the work. All such drawings and instructions shall be consistent with contract documents, true developments thereof and reasonably inferable there.

The work shall be executed in conformity therewith and the contractor prepare a detailed programme schedule indicating therein the date of start and completion of various activities on receipt of the work order and submit the same to the SBI through the architect/consultant

7.0 Copies of agreement

Two copies of agreement duly signed by both the parties with the drawings shall be handed over to the contractors.

8.0 Liquidated damages:

If the contractor fails to maintain the required progress in terms of clause 6.0 of GOC or to complete the work and clear the site including vacating their office on or before the contracted or extended date or completion, without justification in support of the cause of delay, he may be called upon without prejudice to any other right of remedy available under the law to the SBI on account of such breach to pay a liquidated damages at the rate of 0.50% of the contract value which subject to a maximum of 5% of the contract value.

9.0 Materials, Appliances and Employees

Unless or otherwise specified the contractor shall provide and pay for all materials, labour, water, power, tools, equipment transportation and any other facilities that are required for the satisfactory execution and completion of the work. Unless or otherwise specified all materials shall be new and both workmanship and materials shall be best quality. The contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him. Workman whose work or behavior is found to be unsatisfactory by the SBI /Architect/ consultant he shall be removed from the site immediately.

10.0 Permits, Laws and Regulations:

Permits and licenses required for the execution of the work shall be obtained by the

contractor at his own expenses. The contractor shall give notices and comply with the regulations, laws, and ordinances rules, applicable to the contract. If the contractor observes any discrepancy between the drawings and specifications, he shall promptly notify the SBI in writing under intimation of the Architect/ Consultant. If the contractor performs any act, which is against the law, rules and regulations he shall meet all the costs arising there from and shall indemnify the SBI any legal actions arising there from.

11.0 Setting out Work:

The contractor shall set out the work and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions, and alignment of all parts thereof and get it approved by the architect / consultant before proceeding with the work. If at any time any error in this respect shall appear during the progress of the works, irrespective of the fact that the layout had been approved by, the architect / consultant the contractor shall be responsible for the same and shall his own expenses rectify such error, if so, required to satisfaction of the SBI.

12.0 Protection of works and property:

The contractor shall continuously maintain adequate protection. of all his work from damage and shall protect the SBI's properties from injury or loss arising in connection with contract. He shall make good any such damage, injury, loss, except due to causes beyond his control and due to his fault or negligence.

He shall take adequate care and steps for protection of the adjacent properties. The contractor shall take all precautions for safety and protections of his employees on the works and shall comply with all applicable provisions of Govt. and local bodies' safety laws and building codes to prevent accidents, or injuries to persons or property on about or adjacent to his place of work. The contractor shall take insurance covers as per clause 24.0 at his own cost. The policy may be taken in joint names of the contractor and the SBI and the original policy may be lodged with the SBI.

13.0 Inspection of work:

The SBI / Architect / Consultant or their representatives shall at all reasonable times have free access to the work site and / or to the workshop, factories, or other places where materials are lying or from where they are obtained and the contractor shall give every facility to the SBI./Architect/consultant and their representatives necessary for inspection and examination and test of the materials and workmanship. No person unless authorized by the SBI / Architect /Consultant except the representative of Public authorities shall be allowed on the work at any time. The proposed work either during its construction stage or its completion can also be inspected by the Chief Technical Examiner's Organization a wing of Central Vigilance commission.

14.0 Assignment and subletting

The whole of work included in the contract shall be executed the contractor and he shall not directly entrust and engage or indirectly transfer, assign or underlet the contract or any part or share there of or interest therein without the written consent of the SBI through the Architect and no undertaking shall relieve the contractor from the responsibility of the contractor from active & superintendence of the work during its progress.

15.0 **Quality of materials, workmanship & Test**

All materials and workmanship shall be best of the respective kinds described in the contract and in accordance with Architect/consultant instructions and shall be subject from time to time to such tests as the architect/consultant may direct at the place of manufacture or fabrication or on the site or an approved testing laboratory. The contractor shall provide such assistance, instruments, machinery, labor, and materials as are normally required for examining measuring sampling and testing any material or part of work before incorporation in the work for testing as may be selected and required by the architect/consultant.

ii) **Samples**

All samples of adequate numbers, size, shades & pattern as per specifications shall be supplied by the contractor without any extra charges. If certain items proposed to be used are of such nature that samples cannot be presented or prepared at the site detailed literature / test certificate of the same shall be provided to the satisfaction of the Architect/consultant. Before submitting the sample / literature the contractor shall satisfy himself that the material / equipment for which he is submitting the sample / literature meet with the requirement of tender specification. Only when the samples are approved in writing by the architect / consultant the contractor shall proceed with the procurement and installation of the particular material / equipment. The approved samples shall be signed by the Architect / Consultant for identification and shall be kept on record at site office until the completion of the work for inspection / comparison at any time. The Architect/Consultant shall take reasonable time to approve the sample. Any delay that might occur in approving the samples for reasons of its not meeting the specifications or other discrepancies inadequacy in furnishing samples of best qualities from various manufacturers and such other aspects causing delay on the approval of the materials / equipment etc. shall be to the account of the contractor.

iii) **Cost of tests**

The cost of making any test shall be borne by the contractor if such test is intended by or provided for in the specification or BOQ.

iv) **Costs of tests not provided for**

If any test is ordered by the Architect/ Consultant which is either

- a) If so intended by or provided for or (in the cases above mentioned) is not so particularized, or though so intended or provided for but ordered by the Architect / Consultant to be carried out by an independent person at any place other than the site or the place of manufacture or fabrication of the materials tested or any Government / approved laboratory, then the cost of such test shall be borne by the contractor.

16.0 Obtaining information related to execution of work

No claim by the contractor for additional payment shall be entertained which is consequent upon failure on his part to obtain correct information as to any matter affecting the execution of the work nor any misunderstanding or the obtaining incorrect information or the failure to obtain correct information relieve him from any risks or from the entire responsibility for the fulfillment of contract.

17.0 Contractor's superintendence

The contractor shall give necessary personal superintendence during the execution the works and as long, thereafter, as the Architect / Consultant may consider necessary until the expiry of the defects liability period, stated here to.

18.0 Quantities

- i) The bill of quantities (BOQ) unless or otherwise stated shall be deemed to have been prepared in accordance with the Indian Standard Method of Measurements and quantities. The rate quoted shall remain valid for variation of quantity against individual item to any extent. The entire amount paid under Clause 19, 20 hereof as well as amounts of prime cost and provision sums, if any, shall be excluded.

19.0 Works to be measured

The Architect/Consultant may from time to time intimate to the contractor that he require the work to be measured and the contractor shall forthwith attend or send a quantity representative to assist the Architect in taking such measurements and calculation and to furnish all particulars or to give all assistance required by any of them. Such measurements shall be taken in accordance with the Mode of measurements detail in the specifications. The representative of the Architect / Consultant shall take measurements with the contractor's representative and the measurements shall be entered in the measurement book. The contractor or his authorized representative shall sign all the pages of the measurement book in which the measurements have been recorded in token of his acceptance. All the corrections shall be duly attested by both representatives. No over writings shall be made in the M book should the contractor not attend or neglect or omit to depute his representative to take measurements the measurements recorded by the representative of the Architect / consultant shall be final. All authorized extra work, omissions and all variations made shall be included such measurement.

20.0 Variations

No alteration, omission or variation ordered in writing by the Architect / consultant vitiates the contract. In case the SBI / Architect / Consultant thinks proper at any during the progress of works to make any alteration in, or additions to or omission from the works or any. alteration in the kind or quality of the materials to be used therein, the Architect / Consultant shall give notice thereof in writing to the contractor shall confirm in writing within seven days of giving such oral instructions the contract shall alter to, add to, or omit from as the case may be in accordance with such but the contractor shall not do any work extra to or make any alterations or additions to or omissions from the works or any deviation from any of the provisions of the contract, stipulations, specifications or contract drawings without previous consent in writing of the Architect/ Consultant and the value of such extras, alterations, additions or omissions shall in all cases be determined by the Architect / Consultant and the same shall be added to or deducted from the contract value, as the case may be.

21.0 Valuation of Variations

No claim for an extra shall be allowed unless it shall have been executed under the authority of the Architect / Consultant with the concurrence of the SBI as herein mentioned. Any such extra is herein referred to as authorized extra and shall be made in accordance with the following provisions.

- a)
 - (i) The net rates or prices in the contract shall determine the valuation of the extra work where such extra work is of similar character and executed under similar conditions as the work priced herein.
 - (ii) Rates for all items, wherever possible should be derived out of the rates given in the priced BOQ.
- b) The net prices of the original tender shall determine the value of the items omitted, provided if omissions do not vary the conditions under which any remaining items of Works are carried out, otherwise the prices for the same shall be valued under sub-Clause 'c' hereunder.
- c) Where the extra works are not of similar character and/or executed under similar conditions as aforesaid or where the omissions vary the conditions under which any remaining items or works are carried out, then the contractor shall within 7 days of the receipt of the letter of acceptance inform the Architect/ consultant of the rate which he intends to charge for such items of work, duly supported by analysis of the rate or rates claimed and the Architect/ consultant shall fix such rate or prices as in the circumstances in his opinion are reasonable and proper, based on the market rate.
- d) Where extra work cannot be properly measured or valued the contractor shall be allowed day work prices at the net rates stated in the tender, of the BOQ or, if not, so stated then in accordance with the local day work rates and wages for the district;

provided that in either case, vouchers specifying the daily time (and if required by the Architect/Consultant) the workman's name and materials employed be delivered for verifications to the Architect /consultant at or before the end of the week following that in which the work has been executed.

- e) It is further clarified that for all such authorized extra items where rates cannot be derived from the tender, the Contractor shall submit rates duly supported by rate analysis worked on the 'market rate basis for material, labour hire / running charges of equipment and wastages etc. plus 15% towards establishment charges, contractor's overheads and profit. Such items shall, not be eligible for escalation.

22.0 **Final measurement**

The measurement and valuation in respect of the contract shall be completed within two months of the virtual completion of the work.

23.0 **Virtual Completion Certificate (VCC)**

On successful completion of entire works covered by the contract to the full satisfaction of the SBI, the contractor shall ensure that the following works have been completed the satisfaction of the SBI.

- a) Clear the site of all scaffolding, wiring, pipes, surplus materials, contractor's labour equipment and machinery.
- b) Demolish, dismantle, and remove the contractor's site office, temporary works, structure including labor sheds/camps and constructions and other items and things whatsoever brought upon or erected at the site or any land allotted to the contractor by the SBI not incorporated in the permanent works.
- c) Remove all rubbish, debris etc. from the site and the land allotted to the contractor the SBI and shall clear, level and dress, compact the site as required by the SBI.
- d) Shall put the SBI in undisputed custody and possession of the site and all land allot by the SBI
- e) Shall hand over the work in a peaceful manner to the SBI.
- f) All defects / imperfections have been attended and rectified as pointed out by the Architects to the full satisfaction of SBI.

Upon the satisfactory fulfillment by the contractor as stated above, the contractor is entitled to apply to the Architect / consultant is satisfied of the completion of work. Relative to which the completion certificate has been sought, the Architect/ consultant shall within Twenty One (14) days of the receipt of the application for completion certificate, issue a VCC in respect of the work for which the VCC has applied.

This issuance of a VCC shall not be without prejudice to the SBI's rights and contractor liabilities under the contract including the contractor's liability for defects liability nor shall the issuance of VCC in respect of the works or work at any site be construction as a waiver of any right or claim of the SBI against the contractor in respect of or work at the site and in respect of which the VCC has been issued.

24.0 Work by other agencies

The SBI / Architect / consultant reserves the rights to use premises and any portion the site for execution of any work not included in the scope of this contract which may desire to have carried out by other persons simultaneously and the contractor shall not only allow but also extend reasonable facilities for the execution of such work. The contractor however shall not be required to provide any plant or material for the execution of such work except by special arrangement with the SBI. Such work shall be carried out in such manner as not to impede the progress of the works included in the contract.

25.0 Insurance of works

25.1 Without limiting his obligations and responsibilities under the contract the contractor shall insure in the joint names of the SBI and the contractor against all loss of damages from whatever cause arising other than the excepted risks, for which he is responsible under the terms of contract and in such a manner that the SBI and contractor are covered for the period stipulated I clause of GCC and are also covered during the period of maintenance for loss or damage arising from a cause, occurring prior to the commencement of the period of maintenance and for any loss or damage occasioned by the contractor in the course of any operations carried out by him for the purpose of complying with his obligations under clause.

- a) The Works for the time being executed to the estimated current Contract value thereof, or such additional sum as may be specified together with the materials for incorporation in the works at their replacement value.
- b) The constructional plant and other things brought on to the site by the contractor to the replacement value of such constructional plant and other things.
- c) Such insurance shall be effected with an insurer and in terms approved by the SBI which approval shall not be unreasonably withheld and the contractor shall whenever required produce to the Architect / consultant the policy if insurance and the receipts for payment of the current premiums.

25.2 Damage to persons and property

The contractor shall, except if and so far as the contract provides otherwise indemnify the SBI against all losses and claims in respect of injuries or damages to any person or material or physical damage to any property whatsoever which may arise out of or

in consequence of the execution and maintenance of the works and against all claims proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto except any compensation of damages for or with respect to:

- a) The permanent use or occupation of land by or any part thereof.
- b) The right of SBI to execute the works or any part thereof on, over, under, in or through any lands.
- c) Injuries or damages to persons or properties which are unavoidable result of the execution or maintenance of the works in accordance with the contract
- d) Injuries or damage to persons or property resulting from any act or neglect of the SBI their agents, employees or other contractors not being employed by the contractor or for or in respect of any claims, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto or where the injury or damage was contributed to by the contractor, his servants or agents such part of the compensation as may be just and equitable having regard to the extent of the responsibility of the SBI, their employees, or agents or other employees, or agents or other contractors for the damage or injury.

25.3 Contractor to indemnify SBI

The contractor shall indemnify the SBI against all claims, proceedings, damages, costs, charges and expenses in respect of the matters referred to in the provision sub-clause 25.2 of this clause.

25.4 Contractor's superintendence

The contractor shall fully indemnify and keep indemnified the SBI against any action, claim, or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties which may be payable in respect of any article or part thereof included in the contract. In the event of any claim made under or action brought against SBI in respect of such matters as aforesaid the contractor shall be immediately notified thereof and the contractor shall be at liberty, at his own expenses to settle any dispute or to conduct any litigation that may arise there from, provided that the contractor shall not be liable to indemnify the SBI if the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the Architect / consultant in this behalf.

25.5 Third Party Insurance

- 25.5.1 Before commencing the execution of the work the contractor but without limiting his obligations and responsibilities under clause 24.0 of GCC shall insure against his liability for any material or physical damage, loss, or injury which may occur to any property including that of SBI or to any person, including any employee of the SBI, by or arising out of the execution of the works or in the carrying out of the contract,

otherwise than due to the matters referred to in the provision to clause 24.0 thereof.

25.5.2 Minimum amount of Third Party Insurance

Such insurance shall be affected with an insurer and in terms approved by the SBI which approval shall not be reasonably withheld and for at least the amount stated below. The contractor shall, whenever required, produce to the Architect / consultant the policy or policies of insurance cover and receipts for payment of the current premiums.

25.6 The minimum insurance cover for physical property, injury, and death is Rs.5 Lakh per occurrence with the number of occurrences limited to four. After each occurrence contractor will pay additional premium necessary to make insurance valid for four occurrences always.

25.7 Accident or Injury to workman:

25.7.1 The SBI shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workmen or other person in the employment of the contractor or any sub-contractor, save and except an accident or injury resulting from any act or default of the SBI or their agents, or employees. The contractor shall indemnify and keep indemnified SBI against all such damages and compensation, save and except as aforesaid, and against all claims, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

25.7.2 Insurance against accidents etc. to workmen

The contractor shall insure against such liability with an insurer approved by the SBI during the whole of the time that any persons are employed by him on the works and shall, when required, produce to the architect / consultant such policy of insurance and receipt for payment of the current premium. Provided always that, in respect of any persons employed by any sub-contractor the contractor's obligation to insured as aforesaid under this sub-clause shall be satisfied if the sub-contractor shall have insured against the liability in respect of such persons in such manner that SBI is indemnified under the policy but the contractor shall require such sub-contractor to produce to the Architect /consultant when such policy of insurance and the receipt for the payment of the current premium.

25.7.3 Remedy on contractor's failure to insure

If the contractor fails to effect and keep in force the insurance referred to above or any other insurance which he may be required to effect under the terms of contract, then

and in any such case the SBI may effect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the SBI as aforesaid from any amount due or which may become due to the contractor, or recover the same as debt from the contractor.

25.7.4 Without prejudice to the others rights of the SBI against contractors. In respect of such default, the employer shall be entitled to deduct from any sums payable to the contractor the amount of any damages costs, charges, and other expenses paid by the SBI and which are payable by the contractors under this clause. The contractor shall upon settlement by the Insurer of any claim made against the insurer pursuant to a policy taken under this clause, proceed with due diligence to rebuild or repair the works destroyed or damaged. In this event all the monies received from the Insurer in respect of such damage shall be paid to the contractor and the Contractor shall not be entitled to any further payment in respect of the expenditure incurred for rebuilding or repairing of the materials or goods destroyed or damaged.

26.0 **Commencement of Works:**

The date of commencement of the work will be reckoned as the date, fifteen days from the date of award of letter by the SBI.

27.0 **Time for completion**

Time is essence of the contract and shall be strictly observed by the contractor. The entire work shall be completed within a period of **75 DAYS** from the date of commencement. If required in the contract or as directed by the Architect / consultant. The contractor shall complete certain portions of work before completion of the entire work. However, the completion date shall be reckoned as the date by which the whole work is completed as per the terms of the contract.

28.0 **Extension of time**

If, in the opinion of the Architect/consultant, the work be delayed for reasons beyond the control of the contractor, the Architect/consultant may submit a recommendation to the SBI to grant a fair and reasonable extension of time for completion of work as per the terms of contract. If the contractor needs an extension of time for the completion of work or if the completion of work is likely to be delayed for any reasons beyond the due date of completion as stipulated in the contract, the contractor shall apply to the SBI through the Architect' Consultant in writing at least 30 Days before the expiry of the scheduled time and while applying for extension of time he shall furnish the reason in detail and his justification if an', for the delays. The architect/consultant shall submit their recommendations to the SBI in the prescribed format for granting extension of time. While granting extension of time the contractor shall be informed the period extended time which will qualify for levy of liquidated damages. For the balance period in excess of original stipulated period and duly

sanctioned extension of time by the provision of liquidated damages as stated under clause 10.0 shall become applicable. Further the contract shall remain in force even for the period beyond the due date of completion irrespective whether the extension is granted or not.

29.0 Rate of progress

Whole of the materials, plant and labour to be provided by the contractor and the mode, manner and speed of execution and maintenance of the works are to be of a kind and conducted in a manner to the satisfaction of the Architect / consultant should the rate of progress of the work or any part thereof be at any time be in the opinion the Architect / consultant too Slow to ensure the completion of the whole of the work the prescribed time or extended time for completion the Architect / consultant shall thereupon take such steps as considered necessary by the Architect / consultant to expedite progress so as to complete the works by the prescribed time or extended time. Such communications from the Architect / consultant neither shall relieve the contractor from fulfilling obligations under the contract nor he will be entitled to raise any claims arising out of such directions.

30.0 Work during nights and holidays

Subject to any provision to the contrary contained in the contract no permanent work shall save as herein provided be carried on during the night or on holidays without the permission in writing of the Architect / consultant, save when the work is unavoidable or absolutely necessary for the saving of life or property or for the safety of the work in which case the contractor shall immediately advise the Architect / consultant. However the provisions of the clause shall not be applicable in the case of any work which becomes essential to carry by rotary or double shifts in order to achieve the progress and quality of the part of the works being technically required / continued with the prior approval of the Architect / consultant at no extra cost to the SBI.

All work at night after obtaining approval from competent authorities shall be carried out without unreasonable noise and disturbance.

31.0 No compensation or restrictions of work

If at any time after acceptance of the tender SBI shall decide to abandon or reduce the scope of work for any reason whatsoever and hence not required the whole or any part of the work to be carried out. The Architect / consultant shall give notice in writing to that effect to the contractor and the contractor shall act accordingly in the matter. The contractor shall have no claim to any payment of compensation or otherwise what so ever on account of any profit or advantage which he might have derived from the execution of the Work fully but which he did not derive in consequence of the foreclosure of the whole or part of the work.

Provided that the contractor shall be paid the charges on the cartage only of materials actually and bonafide brought to the site of the work by the contractor and rendered surplus as a result of the abandonment, curtailment of the work or any portion thereof and then taken back by the contractor, provided however that the Architect / Consultant shall have in such cases the option of taking over all or any such materials at their purchase price or a local current rate whichever is less.

“In case of such stores having been issued from SBI stores and returned by the contractor to stores, credit shall be given to him at the rates not exceeding those at which were originally issued to the contractor after taking into consideration and deduction for claims on account of any deterioration or damage while in the custody of the contractor and in this respect the decision of Architect / consultant shall be final.

32.0 Suspension of work

- i) The contractor shall, on receipt of the order in writing of the Architect / consultant (whose decision shall be final and binding on the contractor) suspend the progress of works or any part thereof for such time and in such manner as Architect /consultant may consider necessary so as not to cause any damage or injury to the work already done or endanger the safety thereof for any of following reasons:
 - a) On account any default on the part of the contractor, or
 - b) For proper execution of the works or part thereof for reasons other than the default the contractor, or
 - c) For safety of the works or part thereof.
- The contractor shall, during such suspension, properly protect and secure the works the extent necessary and carry out the instructions given in that behalf by the Architect / consultant.
- i) If the suspension is ordered for reasons (b) and (c) in sub-para (i) above:
The contractor shall be entitled to an extension of time equal to the period of every such suspension. No compensation whatsoever shall be paid on this account.

33 Action when the whole security deposit is forfeited

In any case in which under any clause or clauses of this contract, the Contractor shall have rendered himself liable to pay compensation amounting to the whole of his security deposit the Architect / consultant shall have the power to adopt any of the following course as they may deem best suited to the interest of the SBI

- a) To rescind the contract (of which rescission notice in writing to the contractor by - Architect / consultant shall be conclusive evidence) and in which case the security, deposit of the contractor shall be forfeited and be absolutely at the disposal of SBI.
- b) To employ labour paid by the SBI and to supply materials to carry out the work, or

part of the work, debiting the contractor with the cost of the labour and materials cost of such labour and materials as worked out by the Architect/consultant shall final and conclusive against the contractor) and crediting him with the value of the work done, in all respects in the same manner and at the same manner and at the same rates as if it had been carried out by the contractor under the terms of this contract certificate of architect /consultant as to the value of work done shall be final conclusive against the contractor.

- c) To measure up the work of the contractor, and to take such part thereof as shall unexecuted, out of his hands, and to give it to another contractor to complete in which case any expenses 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 (The amount of which excess the certificates in writing of the Architects / consultant shall final and conclusive) shall be borne by original contractor and may be deducted f any money due to him by SBI under the contract or otherwise, or from his security deposit or the proceeds of sale thereof, or sufficient part thereof.

In the event of any of above courses being adopted by the SBI the contractor shall have no claim to compensation for any loss sustained by him by reasons of his having purchased or procured any material or entered into any engagements or make any advances on account of, or with a view to the execution of the work or the performance of the contract and in case the contract shall be rescind under the provision aforesaid, the contractor shall not be entitled to recover or to be paid any sum or any work thereto for actually performed under this contract, unless, and until the Architect / consultant will have certified in writing the performance of such work and the value payable in respect thereof, and he shall only be entitled to be paid the value so certified.

34.0 **Owner's right to terminate the contract**

If the contractor being an individual or a firm commit any 'Act of insolvency' or shall be adjusted an insolvent or being an incorporated company shall have an order for compulsory winding up voluntarily or subject to the supervision of Govt. and of the Official Assignee of the liquidator in such acts of insolvency or winding up shall be unable within seven days after notice to him to do so, to show to the reasonable satisfaction of the Architect / Consultant that he is able to carry out and fulfill the contract, and to dye security therefore if so required by the Architect / Consultant.

Or if the contractor (whether an individual firm or incorporated Company) shall suffer execution to be issued or shall suffer any payment under this contract to be attached by or on behalf of any of the creditors of the contractor.

Or shall assign or sublet this contract without the consent in writing of the SBI through the Architect/Consultant or shall charge or encumber this contract or any payment **due to** which may become due to the contractor there under:

- a) has abandoned the contract; or

- b) has failed to commence the works, or has without any lawful excuse under these conditions suspended the progress of the works for 14 days after receiving from the SBI through the Architect / consultant written notice to proceed, or
- c) has failed to proceed with the works with such diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon, or has failed to remove the materials from the site or to pull down and replace work within seven days after written notice from the SBI through the Architect / Consultant that the said materials were condemned and rejected by the Architect/consultant under these conditions; or has neglected or failed persistently to observe and perform all or any of the acts matters or things by this contract to be observed and performed by the contractor for seven days after written notice shall have been given to the contractor to observe or perform the same or has to the detriment of good workmanship or in defiance of the SBI or Architect's / consultant's instructions to the contrary subject any part of the contract. Then and in any of said cases the SBI and or the Architect / consultant, may not withstanding any previous waiver, after giving seven days' notice in writing to the contractor, determine the contract, but without thereby affecting the powers of the SBI or the Architect / consultant or the obligation and liabilities of the contractor the whole of which shall continue in force as fully as if the contract had not been determined and as if the works subsequently had been executed by or on behalf of the contractor. And, further the SBI through the Architect / consultant their agents or employees may enter upon and take possession of the work and all plants, took scaffoldings, materials, sheds, machineries lying upon the premises or on the adjoining lands or roads use the same by means of their own employees or workmen in carrying on and completing the work or by engaging any other contractors or persons to the work and the contractor shall not in any was interrupt or do any act, matter or thing to prevent or hinder such other contractor or other persons employed for complement and finishing or using the materials and plant for the works.

When the works shall be completed or as soon thereafter as convenient the SBI or architect / consultant shall give a notice in writing to the contractor to remove his surplus materials and plants and should the contractor fail to do so within 14 days after receive thereof by him the SBI sell the same by publication, and after due publication, and shall, adjust the amount realized by such auction. The contractor shall have no right to question any of the act of the SBI incidental to the sale of the materials etc.

35.0 **Certificate of payment**

The contractor shall be entitled under the certificates to be issued by the Architect / consultant to the contractor within 10 working days from the date of certificate to payment from SBI from time to time. The SBI shall recover the statutory recovering other dues including the retention amount from the certificate of payment.

Provided always that the issue of any certificate by the Architect / consultant during progress of works or completion shall not have effect as certificate of satisfaction relieve the contractor from his liability under clause.

The Architect / consultant shall have power to withhold the certificate if the work or in part thereof is not carried out to their satisfaction.

The Architect / consultant may by any certificate make any corrections required previous certificate.

The SBI shall modify the certificate of payment as issued by the architect / consultant from time to time while making the payment

The contractor shall submit interim bills only after taking actual measurements and properly recorded in the M books

The contractor shall not submit interim bills when the approximate value of work done by him is less than **Rs. 20.00 Lakh** and the minimum interval between two such bills shall be one month.

The final bill may be submitted by contractor within a period of one month from the date of virtual completion and Architect / consultant shall issue the certificate of payment within a period of two months. The SBI shall pay the amount within a period of four months from the date of issue of certificate provided there is no dispute in respect of rates and quantities.

The contractor shall submit the interim bills in the prescribed format with all details.

36.0 A. Settlement of Disputes and Arbitration

Except where otherwise provided in the contract all questions and disputes to the meaning of the specifications, design, drawings and instructions herein before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings specifications, estimates, instructions orders or these conditions or otherwise concerning the work or the execution or failure to execute the same whether arising during the progress of the work or after the cancellation, termination, completion or abandonment thereof shall be dealt with as mentioned hereinafter:

If the contractor considers that he is entitled to any extra payment or compensation in respect of the works over and above the amounts admitted as payable by the Architect or in case the contractor wants to dispute the validity of any deductions or recoveries made or proposed to be made from the contract or raise any dispute, the contractor shall forthwith give notice in writing of his claim, or dispute to to **the A.G.M.**, State Bank of India, Local Head Office, Hoshangabad Road, Bhopal 462011. And endorse a copy of the same to the Architect, within 30 days from the date of disallowance thereof or the date of deduction or recovery. The said notice shall give full particulars of the claim, grounds on which it is based and detailed calculations of the amount claimed and the contractor shall not be entitled to raise any claim nor shall the Bank be in any way

liable in respect of any claim by the contractor unless notice of such claim shall have been given by the contractor to the Asst. General Manager (Premises& Estate) in the manner and within the time as aforesaid. The Contractor shall be deemed to have waived and extinguished all his rights in respect of any claim not notified to to the **A.G.M.**, State Bank of India, Local Head Office, Hoshangabad Road, Bhopal 462011 in writing in the manner and within the time aforesaid.

B. Settlement of Disputes and Arbitration

The Asst. General Manager (Premises & Estate) shall give his decision in writing on the claims notified by the receipt of the contractor may within 30 days of the receipt of the decision of the Asst. General Manager (Premises & Estate) / Submit his claims to the conciliating authority namely the to the **A.G.M.**, State Bank of India, Local Head Office, Hoshangabad Road, Bhopal 462011. For conciliation along with all details and copies of correspondence exchanged between him and the Asst. General Manager (Premises & Estate).

- iii) If the conciliation proceedings are terminated without settlement of the disputes, the contractor shall, within a period of 30 days of termination thereof shall give a notice to the concerned Chief General Manager of the Bank for appointment of an arbitrator to adjudicate the notified claims falling which the claims of the contractor shall be deemed to have been considered absolutely barred and waived.
- iv) Except where the decision has become final, binding and conclusive in terms of the contract, all disputes or differences arising out of the notified claims of the contractor as aforesaid and all claims of the Bank shall be referred for adjudication through arbitration by the Sole Arbitrator appointed by the Chief General Manager it will also be no objection to any such appointment that the Arbitrator so appointed is a Bank Officer and that he had to deal with the matters to which the Contract relates In the course of his duties as Bank Officer. If the arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever another sole arbitrator shall be appointed in the manner aforesaid by the said Chief General Manager Such person shall be entitled to proceed with the reference from the stage at which it was let by his predecessor.

It is a term of this contract that the party invoking arbitration shall give a list of disputes with amounts claimed in respect of each dispute along with the notice for appointment of arbitrator.

It is also a term of this contract that no person other than a person appointed by such Chief General Manager as aforesaid should act as arbitrator.

The conciliation and arbitration shall be conducted in accordance with the provisions of the Arbitration & Conciliation Act 1996 or any or any accordance modification or reenactment thereof and the rules made there under.

It is also a term of the contract that if any fees are payable to the arbitrator these shall

be paid equally by both the parties. However, no fees will be payable to the arbitrator if he is a Bank Officer.

it is also a term of the contract that the arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the parties calling them to submit their statement of claims and counter statement of claims. The venue of the arbitration shall be such place as may be fixed by the arbitrator in his sole discretion. The fees, if any of the arbitrators shall, if required to be paid before the award is made and published, be paid half and half by each of the parties. The Cost of the reference and of the award (including the fees, if any of the arbitrator) shall be in the discretion of the arbitrator who may direct to any by whom and in what manner, such costs or any part thereof, shall be paid and fix or settle the amount of costs to be so paid.

37.0 Water supply

The contractor shall make his own arrangements for water required for the work and nothing extra will be paid for the same. This will be subject to the following condition.

- i) That the water used by the contractor shall be fit for construction purposes to the satisfaction of the Architect / consultant's.
- ii) The contractor shall make alternative arrangements for the supply of water if the arrangement made by the contractor for procurement of water in the opinion of the Architect / consultant is unsatisfactory.
- iii) In case contractor is permitted to use SBI's source of water i.e. Municipal connection, Bore well (existing or new) etc., the SBI - may consider recovering @1% of contract amount from the final bill of contractor.

37.1 The contractor shall construct temporary well / tube well in SBI - land for taking water for construction purposes only after obtaining permission in writing from the SBI The contractor has to make his own arrangements for drawing and distributing the water at his own cost. He has to make necessary arrangements. To avoid any accidents or damages caused due to construction and subsequent maintenance of the wells. He has to obtain necessary approvals from local authorities, if required, at his own cost. He shall restore the ground to its original condition after wells are dismantled on completion of work or hand over the well to the SBI without any compensation as directed by the architect / consultant.

38.0 Power supply

The contractor shall make his own arrangements for power and supply / distribution system for driving plant or machinery for the work and for lighting purpose at his own cost, The cost of running and maintenance of the plants are to be included in his tender prices, He shall pay all fees and charges required, by the power supply and include the same in his tendered rates and hold the owner free from all such costs. He has to obtain necessary approval from the appropriate authorities, if required.

39.0 **Treasure trove etc.**

Any treasure trove, coin or object antique which may be found on the site shall be the property of SBI and shall be handed over to the bank immediately.

40.0 **Method of measurement**

Unless otherwise mentioned in the schedule of quantities or in mode of measurement, the measurement will be on the net quantities or work produced in accordance with up to date rules laid down by the Bureau of Indian Standards. In the event any dispute / disagreement the decision of the Architect / consultant shall be final and binding on the corrector.

41.0 **Maintenance of registers**

The contractor shall maintain the following registers as per the enclosed perform at site of work and should produce the same for inspection of SBI -/Architect / consultant whenever desired by them. The contractor shall also maintain the records / registers as required by the local authorities / Govt. from time to time.

- i) Register for secured advance
- ii) Register for hindrance to work
- iii) Register for running account bill
- iv) Register for labour

42.0 **Force Majeure**

42.1 Neither contractor nor SBI shall be considered in default in performance of the obligations if such performance is prevented or delayed by events such as but not war, hostilities revolution, riots, civil commotion, strikes, lockout, conflagrations, epidemics, accidents, fire, storms, floods, droughts, earthquakes or ordinances or any act of or for any other cause beyond the reasonable control of the party affected or prevents 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 party to the contract, if it is not possible to serve a notice, within the shortest possible period without delay.

42.2 As soon as the cause of force majeure has been removed the party whose ability 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.

42.3 From the date of occurrence of a case of force majeure obligations of the party affected shall be suspended during the continuance of any inability so caused. With the caused itself and inability resulting there from having been removed, the agreed time completion of the respective obligations under this agreement shall stand

extended a period equal to the period of delay occasioned by such events.

- 42.4 Should one or both parties be prevented from fulfilling the contractual obligations by 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.

43.0 **Local laws, Acts Regulations:**

The contractor shall strictly adhere to all prevailing labour laws inclusive at contract labour (regulation and abolition act of 1970) and other safety regulations. The contractors should comply with the provision of all labour legislation including the latest requirements of the Acts, laws, any other regulations that are applicable to the execution of the project.

- i) Minimum wages Act 1948 (Amended)
- ii) Payment of wages Act 1936 (Amended)
- iii) Workmen's compensation Act 1923 (Amended)
- iv) Contract labour regulation and abolition act 1970 and central rules 1971 (Amended)
- v) Apprentice act 1961 (amended)
- vi) Industrial employment (standing order) Act 1946 (Amended)
- vii) Personal injuries (Compensation insurance) act 1 963 and any other modifications
- viii) Employees' provident fund and miscellaneous provisions Act 1952 and amendment thereof
- ix) Shop and establishment act
- x) Any other act or enactment relating thereto and rules framed there under from time to time.
- xi) Prevailing Indian Electricity rules & act.

44.0 **Accidents**

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

SPECIAL CONDITION OF CONTRACT

Scope of work

1.0 The scope of work is to carry out for the **PROPOSED VRF AIR-CONDITIONING WORK OF WEALTH MANAGEMENT & PREMIER BANKING- VIRTUAL RELATIONSHIP MODULE (VRM): OPENING OF VRM CENTRE IN BHOPAL CIRCLE AT 1st FLOOR OF SULTANIA ROAD BRANCH PREMISES, BHOPAL (M.P.)**

2.0 Address of site

The site is located at 1st FLOOR OF SULTANIA ROAD BRANCH PREMISES, BHOPAL.

3.0 Dimensions and levels

All dimensions and levels shown on the drawings shall be verified by the contractor and the site and he will be held responsible for the accuracy and maintenance of. All the dimensions and the levels. Figured dimensions are in all cases to be accepted and dimension shall be scaled. Large scale details shall take precedence over small scale drawings. In case of discrepancy the contractor shall ask for clarification from the Architect / consultant before proceeding with the work.

04 Notice of operation

The contractor shall not carry out any important operation without the Consent in with from the Architect / consultant:

5.0 Construction records

The contractor shall keep and provide to the Architect / consultant full and accurate records of the dimensions and positions of all new work and any other information necessary to prepare complete drawings recording details of the work as construction.

6.0 Safety of adjacent structures and trees

The contractor shall provide and erect to the approval of the Architect / consultant supports as may be required to effectively protect all structures and protective give to

trees, which may be endangered by the execution of the works or otherwise such permanent measures as may be required by the Architect to protect the tree structures.

7.0 Temporary works.

Before any temporary works are commenced the contractor shall submit at least in advance to the architect / consultant for approval complete drawings of all temporary works he may require for the execution of the works. The contractor shall carry out the modifications relating to strength, if required by the architect / consultant may require in accordance with the conditions of contract at his own cost The contractor shall be solely responsible for the stability and safety of all temporary works and unfinished works and for the quality of the permanent works resulting from the arrangement eventually adopted for their execution.

8.0 Waterpower and other facilities

- a) The rate quoted by the contractor shall include all expenses that are required for providing all the water required for the work and the contractor shall make his own arrangements for the supply of good quality water suitable for the construction and good quality drinking water for their workers If necessary the contractor has to sink a tube well / open well and bring water by means of tankers at his own cost for the purpose The SBI will not be liable to pay any charges in connection with the above
- b) The rate quoted in the tender shall include the expenses for obtaining and maintaining power connections and shall pay for the consumption charges
- c) The contractors for other trades directly appointed by the SBI shall be entitled to take power and water connections from the temporary water and power supply obtained by the contractor However, the concerned contractor shall make their own arrangements to draw the supply and pay directly the actual consumption charges at mutually agreed rates between them. All municipal charges for drainage and water connection for Construction purposes shall be borne by the contractor and charges payable for permanent connections, if any, shall be initially paid by the contractor and the SBI will reimburse the amount on production of receipts
- d) The SBI as well as the Architect / consultant shall give all possible assistance to the Contractor's to obtain the requisite Permission from the various authorities, but the responsibility for obtaining the same in time shall be of the contractor

9.0 Facilities for contractor's employees

The contractor shall make his own arrangement for the housing and welfare of his staff and workmen including adequate drinking water facilities. The contractor shall also make the arrangements at his own cost for transport where necessary for his

staff and workmen to and from site of work at his own cost.

10.0 **Lighting of works**

The contractor shall at all times provide adequate and approved lighting as required for the proper execution and supervision and inspection of work.

11.0 **Firefighting arrangements**

- i) The contractor shall provide suitable arrangement for firefighting at his own cost. This purpose he shall provide requisite number of fire extinguishers and adequate number of buckets, some of which are to be always kept filled with sand and some with water these equipment shall be provided at suitable prominent and easily accessible place and shall be properly maintained.
- ii) Any deficiency in the fire safety or unsafe conditions shall be corrected by the contractor at his own cost and, to the approval of the relevant authorities. The contractor make the following arrangements at his own cost but not limited the following:
 - a) Proper handling, storage and disposal of combustible materials and waste.
 - b) Work operations which can create fire hazards.
 - c) Access for fire-fighting equipments.
 - d) Type, number and location of containers for the removal of surplus materials and rubbish.
 - e) Type, size, number and location of fire extinguishers or other tire fighting equipment.
 - f) General house keeping

12.0 **Site order book**

A site order book shall be maintained at site for the purpose of quick communication between the Architect / Consultant. Any communication relating to the work may be conveyed through records in the site order book. Such a communication from one party to the other shall be deemed to have been adequately served in terms of contract Each site order book shall have machine numbered pages in triplicate and shall carefully maintained and preserved by the contractor and shall be made available to the architect / consultant as and when demanded- Any instruction which the architect /consultant may like to issue to the contractor or the contractor may like to bring to the architect / consultant two copies of such instructions shall be taken from the site order book and one copy will be handed over to the party against proper acknowledgment and the second copy will be retained for their record.

13.0 **Temporary fencing/ barricading**

The contractor shall provide and maintain a suitable temporary fencing / barricading and gates at his cost to adequately enclose all boundaries of the site for the protection of the public and for the proper execution and security of the work and in accordance with the requirement of the architect I consultant and regulations of local authorities.

These shall be altered, relocated, and adopted from time to time as necessary and removed on completion of the work.

14.0 Site meetings

Site meetings will be held to review the progress and quality evaluation. The contractor shall depute a senior representative along with the site representative and other staff of approved sub-contractors and suppliers as required to the site meetings and ensure all follow up actions. Any additional review meetings shall be held if required by the architect/ consultant. -

15.0 Disposal of refuse

The contractor shall cart away all debris, refuse etc. arising from the work from the site and deposit the same as directed by the architect / consultant at his own cost. It is the responsibility of the contractor to obtain from the local authorities concerned to the effect that all rubbish arising out of contractor's activities at the construction site or any other off-site activities borrow pits has been properly disposed off.

16.0 Contractor to verify site measurement.

The contractor shall check and verify all site measurements whenever requested other specialists' contractors or other sub-contractors to enable them to prepare the own shop drawing and pass on the information with sufficient promptness as will in any way delay the works.

17.0 Displaying the name of the work

The contractor shall put up a name board of suitable size as directed by the architect/ consultant indicating there in the name of the project and other details as given by the architect/consultant at his own cost and remove the same on completion of work.

18.0 As built drawings

- i) For the drawings issued to the contractor by the Architect / Consultant. The architect Consultant will issue two sets of drawings to the Contractor for the items for some changes have been made. From the approved drawings as instructed by the SBI / Architect / Consultant. The contractor will make the changes made on these copies and return these copies to the architect / Consultant for their approval. In cases revision is required or the corrections are not properly marked the architect / Consultant will point out the discrepancies to the contractor. The contractor will have to incorporate these corrections and / or attend to discrepancies either on copies as directed by the architect / consultant and resubmit to him for approval. The architect / consultant will return one copy duly approved by him.
- ii) For the drawings prepared by the contractor

The contractor will modify the drawing prepared by him wherever the changes made by the SBI / Architect / consultant. And submit two copies of such modified drawings to the architect/ consultant for approval. The architect / consultant will return one copy of the approved drawing to the contractor.

19.0 Approved make

The contractor shall provide all materials from the list of approved makes at his own cost and also appoint the specialized agency for the waterproofing anti-termite, aluminum doors and windows and any other item as specified in the tender. The architect/consultant may approve any make / agency within the approved list as given in the tender after inspection of the sample/mock up.

20.0 Procurement of materials

The contractor shall make his own arrangements to procure all the required materials for the work .All wastages and losses in weight shall be to the contractors account

(Restriction under Rule 144 9XI) of General Financial Rules 2017 of Ministry of Finance, India order no. F. No. 6/18/2019/PPD dated 23rd July 2020.)

- I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender ONLY if the bidder is registered with the Competent Authority (registration committee constituted by the Department for promotion of industry and internal Trade).
- II. 'Bidder' (including the terms 'tender' 'consultant or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial judicial person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
- III. 'bidder from a country which shares land border with India (such a country); for this purpose means:
 - a. An entity incorporated, established or registered in such a country, or
 - b. A subsidiary of an entity incorporated, established or registered in such a country or
 - c. An entity substantially controlled through entities incorporated, established or registered in such a country, or
 - d. An entity whose beneficial owner is situated in such a country or
 - e. An Indian (or other) agent of such an entity or
 - f. A natural person who is a citizen of such a country or
 - g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.
- IV. The beneficial owner for the purpose of (iii) above will be as under:
 1. In case of A Company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through

one or more judicial person, has a controlling interest or who exercise control through other means.

Explanation-

- a. "Controlling ownership interested" means ownership of or entitlement to more than twenty five percent of shares or capital or profits of the Company;
 - b. "Control" shall include right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;
2. In case of a partnership firm, the beneficial owner is the natural person(s), who whether acting alone or together, through one or more judicial person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;
 3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who whether acting alone or together, through one or more judicial person, has ownership of or entitlement to more than fifteen percent of capital or profits of such association or body of individuals.
 4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
 5. In case of a trust, the trustiest, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
- V. An Agent is a person to do any act for another, or to represent another in dealing with third person.
- VI. [The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.
- VII. All bidders need to submit a declaration-cum-certificate (along with evidence) in this regards as per "Annexure-I" failure to submit such valid declaration-cum-Certificate will make the bid liable for rejection."

21.0 Excise duty, taxes, levies etc.;

The contractor shall pay and be responsible for payment of all taxes, duties, levies, royalties, fees, cess or charges in respect of the works including but not limited to sales tax, tax on works contract excise duty, and octroi, payable in respect of

materials, equipment plant and other things required for the contract. All of the aforesaid taxes, duties, levies, fees and charges shall be to the contractor's account and the SBI shall not be required to pay any additional or extra amount on this account but **excluding GST**. Variation of taxes, duties, fees, levies etc if any, till completion of work shall be deemed to be included in the quoted rates and no extra amount on this account. Variation of taxes, duties, fees, levies etc if any, till completion of work shall be deemed to be included in the quoted rates and no extra claim on this account will in any case be entertained. If a new tax or duty or levy or cess or royalty or octroi is imposed under as statutory or law during the currency of contract the same shall be borne by the contractor. **The rate quoted shall be firm and shall include all costs, allowances, taxes, levies, charges, royalties, cess etc. but excluding GST as applicable which will be reimbursed by the Bank as per Govt. norms prevailing from time to time.**

22.0 **Acceptance of tender**

The SBI shall have the right to reject any or all tenders without assigning any reason. They are not to bind to accept the lowest or any tender and the tenderer or tenderers shall have no right to question the acts of the SBI However adequate transparency would be maintained by the SBI

23.0 **Photographs:**

- The Contractor shall at his own expense supply to the Architects with duplicate hard copies of large photographs not less than 25 cm. x 20 cm. (10" x 8") of the works, taken from two approved portions of each building, at intervals of not more than one months during the progress of the work or at every important stage of construction.
- In addition to above, the contractor shall be bound to submit adequate no. of site photographs along with their each Running Bill for the project clearing showing major progress of work measured and claimed therein failing which the Architect/ SBI may consider returning the Bill to the contractor and no claim for delay on this account will be entertained.

SAFETY CODE

1. First aid appliances including adequate supply of sterilized dressing and cotton wool shall be kept in a readily accessible place.
2. An injured person shall be taken to a public hospital without loss of time, in cases when the injury necessitates hospitalization.
3. Suitable and strong scaffolds should be provided for workmen for all works that cannot safely be done from the ground.
4. No portable single ladder shall be over 8 meters in length. The width between the side rails shall not be less than 30 cm. (clear) and the distance between two adjacent runnings shall not be more than 30 cm. When a ladder is used an extra mazdoor shall be engaged for holding ladder.
5. The excavated material shall not be placed within 1.5 meters of the edge of the trench half of the depth of trench whichever is more. All trenches and excavations shall be provided with necessary fencing and lighting.
6. Every opening in the floor of a building or in a working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be one meter.
7. No floor, roof or other part of the structure shall be so overloaded with debris or material as to render it unsafe.
8. Workers employed on mixing and handling material such as asphalt, cement, mortar, concrete and lime shall be provided with protective footwear and rubber hand gloves.
9. Those engaged in welding works shall be provided with welders' protective eye shield and gloves.
10. (i) No paint containing lead or lead products shall be used except in the form of paste readymade paint.
(ii) Suitable facemasks should be supplied for use by the workers when the paint applied in the form of spray or surface having lead paint dry rubbed and scrapped.
11. Overalls shall be supplied by the contractor to the painters and adequate facilities

- shall be provided to enable the working painters to wash during cessation of work.
12. Hoisting machines and tackle used in the works including their attachments anchor and supports shall be in perfect condition.
 13. The ropes used in hoisting or lowering material or as a means of suspension shall be durable quality and adequate strength and free from defects.

APPENDIX HEREINBEFORE REFERRED TO

- 1) Name of the organization Offering Contract : The A.G.M., State Bank of India, Local Head Office, Hoshangabad Road, Bhopal 462011
- 2) Consultants : M/s. **Studio plus, Bhopal**
- 3) Site Address : 1st Floor of Sultania Road Branch Premises Bhopal (M.P.)
- 4) Scope of Work : **PROPOSED VRF AIR-CONDITIONING WORK OF WEALTH MANAGEMENT & PREMIER BANKING-VIRTUAL RELATIONSHIP MODULE (VRM): OPENING OF VRM CENTRE IN BHOPAL CIRCLE AT 1st FLOOR OF SULTANIA ROAD BRANCH PREMISES, BHOPAL (M.P.)**
- 5) Name of the Contractor : -----

- 6) Address of the Contractor : -----

- 7) Period of Completion : **:75 DAYS**
From the Date of Commencement
- 8) Earnest Money Deposit : of **Rs. 40,000/- (Rupees Fifty five thousand five hundred only) EMD or Valid MSME certificate pertain to works** (Valid for a period of 90 Days from the date of issue of the tender) from any scheduled Nationalized Bank drawn **in favour of The A.G.M. (P&E)SBI, LHO BHOPAL -. and payable in Bhopal. NO TDR/STDR**

SHALL BE ACCEPTED AS EMD

- 9) Retention Money : As per clause no. 1.0(c) of general Conditions
- 10) Defects Liability Period : Twelve Months from the date of Virtual Completion.
- 11) Insurance to be undertaken by the Contractor at his cost : 125% of Contract Value (Contractor's all risk policy)
- 12) Liquidated damages : 0.5% of the Contract amount shown in the tender per week subject to max. 5% of the contract value or actual final bill value.
- 13) Value of Interim Bill (Min.) : **Rs. 20 Lakhs.**
- 14) Date of Commencement : 15 days from the date of acceptance letter is issued to the Contractor/ or the day on which the Contractor is instructed to take possession of the site whichever is earlier.
- 15) Period of Final Measurement : 3 Months from the date of Virtual Completion.
- 16) Initial Security Deposit : 2% of the Accepted Value of the Tender. (Clause No. 1.0 - b)
- 17) Total Security Deposit : As per clause No. 1.0
- 18) Refund of initial Security Deposit Comprising of EMD and ISD. : 50% of the Security Deposit shall be refunded to the Contractor on completion of the work and balance refunded only after the Defect Liability Period is over.
- 19) Period for Honoring Certificate : 1. One Month for R.A. Bills
2. The final bill will be submitted by the Contractor within one month of the date fixed for completion work and the Bill shall be certified within 3 months from the date of receipt of final bill provided the bills are submitted with all pre-requisite documents/test reports etc. prescribed in the tender.

Signature of Tenderer.

Date:

LETTER OF DECLARATION

To,
The A.G.M.,
PREMISES & ESTATES,
State Bank of India,
Local Head Office, Hoshangabad Road,
Bhopal 462011

Dear Sir,

PROPOSED VRF AIR-CONDITIONING WORK OF WEALTH MANAGEMENT & PREMIER BANKING- VIRTUAL RELATIONSHIP MODULE (VRM): OPENING OF VRM CENTRE IN BHOPAL CIRCLE AT 1st FLOOR OF SULTANIA ROAD BRANCH PREMISES, BHOPAL (M.P.)

Having examined the terms & conditions, drawings, specifications, design relating to the works specified in the memorandum hereinafter set out and having visited and examined the site of the works specified in the said memorandum and having acquired the requisite information relating thereto and affecting the quotation, I/We hereby offer to execute the works specified in the said memorandum within the time specified in the said memorandum on the item rate basis mentioned in the attached schedule and in accordance in all respect with the specifications, design, drawings and instructions in writing referred to in conditions of Tender, the articles of agreement, conditions of contract and with such conditions so far as they may be applicable.

MEMORANDUM

(a)	Description of work	PROPOSED VRF AIR-CONDITIONING WORK OF WEALTH MANAGEMENT & PREMIER BANKING- VIRTUAL RELATIONSHIP MODULE (VRM): OPENING OF VRM CENTRE IN BHOPAL CIRCLE AT 1st FLOOR OF SULTANIA ROAD BRANCH PREMISES, BHOPAL (M.P.)
(b)	Earnest Money	<i>Rs. 40000/- (Rupees forty thousand only) EMD or Valid MSME certificate pertain</i>

		to works by means of Demand Draft / Banker's Cheque from any scheduled Nationalized Bank drawn in favour of A.G.M. (P&E) STATE BANK OF INDIA, LHO BHOPAL.
(c)	Time allowed for completion of work from the date of issue of work order.	75 DAYS from the date of commencement as per tender.

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

I/we have deposited Demand Draft / Banker's Cheque for a sum of **Rs. 40,000/- (Rupees forty thousand only) EMD or Valid MSME certificate pertain to works** as Earnest money deposit with the SBI -. Should I/we do fail to execute the contract when called upon to do so, I/we hereby agree that this sum shall be forfeited by me/us to SBI .

We understand that as per terms of this tender, the SBI may consider accepting our tender in part or whole or in phases. We, therefore, undertake that we shall not raise any claim / compensation in the eventuality of Bank deciding to drop any of the building / buildings from the scope of work of this tender at any stage during the contract period. Further, we also undertake to execute the work entrusted to us in phases on our approved rates and within the stipulated time limit without any extra claim for price escalation as provided for **in Clause 11.1.7 and 11.1.8 "Instructions to Tenderers" of this tender.**

We, hereby, also undertake that, we will not raise any claim for any escalation in the prices of any of the material during the currency of contract/execution/completion period.

Yours faithfully,

Signature of contractor
With Seal

34. FORMAT OF RUNNING
(in M.S. Excel Format)

- 1) Name of _____ :
- 2) Name of work _____ :
- 3) Sr. No. of this bill _____ :
- 4) No. and date of previous bill _____ :
- 5) Reference to Agreement No. _____ :
- 6) Date of written order to commence _____ :
- 7) Date of completion as per agreement _____ :

Sl. No.	Item Description	Unit	Rate(Rs)	As per tender	
				Qty	Amount(Rs)

Up to previous R/A Bill		Up to Date (Gross)		Present Bill		Remark
Qty	Amount(Rs.)	Qty	Amount(Rs.)	Qty	Amount(Rs.)	

Note:

1. If part rate is allowed for any item, it should be indicated with reasons for allowing such a rate.
2. If adhoc payment is made, it should be mentioned SpeciallyNet value since Previous bill.

III. CERTIFICATE

The measurements on the basis of which the above entries for the running Bill No..... made have been taken jointly on and are recorded at pagesto Of measurementbook no./Sheets

Signature and date of Contractor Signature and date of Architect's representative Signature and date of Engineer of SBI

The work recorded in the above mentioned measurements has been done at the site satisfactory as per tender drawings, conditions and specifications.

Architect Site Engineer/Bank's Engineer

IV – MEMORANDUM FOR PAYMENT

R. BILL NO

1. Total amount due since previous bill (D) (A+B) Rs.....

2. PVA on account of escalation in price of
steel cement and other materials and
labour as detailed
in separate statement enclose Rs.....

3. Deductions:
 - a. Secured Advance paid in the previous R.A. Rs..

 - b. Retention money on value of
works as per accepted tenders:
up to date amount
Less: Already recovered (-) Rs.....
Balance to be recovered Rs.....

 - c. Mobilization advance, if any
 - i. Outstanding amount (Principal + Interest)
as on date Rs.....

 - ii. To be recovered in this bill Rs.....

 - iii. Any other departmental material cost
to be recovered as per contract, if any Rs.....

 - iv. Any other departmental service charges to
be recovered if any, as per contract (Water,
power etc.)

Enclose statement	Rs.....
4. Total deduction as per contractor	Rs.....
5. Net amount payable as per Contract (E-F)	Rs.....

(Rupees.....) in words.

This bill amounting to(both figures and words)
has been scrutinized by me after due test check of the measurement of works as
required and as recommended for payment.

Dated Signature of Bank"s

Engineer In charge of the
project

STATUTORY DEDUCTIONS:

- | | |
|-----------------------------|---------|
| 1. Total amount due (E) | Rs..... |
| 2. Less: Income Tax Payable | Rs..... |
| 3. Net Payable | Rs..... |

The figure in the Memorandum for Payment has been verified and the bill
passed for payment Rs.....(Words and
figures)

Date:

Signature of Premises officer

36 . DETAILS OF INSURANCE POLICIES

Type of Policies	Name of Insurance	Amount (Rs.)	Policy No.	Validity
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Workmen Compensation

Remarks:

1. This only an „on –account payment and is not be interpreted either as approval of work, materials brought or affixed at site or for that matter approval of any sort.
2. The quantum of work done and materials delivered at site have been certified by
3. Should you wish to audit such work, kindly contract the undersigned and oblige.

37. PROFORMA OF HINDRANCE REGISTER

Name of Work : Date of state of
work: Name of Contractor : Period of
completion: Agreement No. : Date of
completion:

Sr. no.	Nature of hindrance	Date of occurrence	Date of which hindrance	period of hindrance	Signature SE/PE	Remarks
1	2	3	4	5	6	7

SE = Site Engineer

PE = Project Engineer

38. MAINTENANCE OF RECORDS

A) Registers at the site office of the Banks Engineer:

1. Measurement Books
2. Drawing register
3. Materials and site register
4. Hindrance Register
5. Site visit & instructions Register.

Declaration-cum-certificate on the letter head of bidder regarding restrictions on procurement from bidders from a country or countries, on grounds of defence in India or matters directly related thereto, including national security

We have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India.

We the bidder (Specify full name.....) certify that we are NOT, from such a country OR if from such a country has been registered with competent Authority.

We hereby certify that we fulfill all the requirement in this regard and is eligible to be considered.

(Signature of Authorized Signatory along with Seal)
Name of authorized signatory
Designation of Authorized signatory

List of Evidences enclosed:

1. Copy of certificate of valid registration with the Competent Authority (Score out if not applicable)
- 2.....
- 3.....

S.No	Description of Items	Make of Material
1	Modular type 6/16/32 amp switch, socket, step electronic fan regulator 250 Volt, cover plate, box, bulb holder, 3 pin ceiling rose,TV/Telephone socket with all accessories	Legrand/ Anchor(Roma)/MK/Crabtree
2	MCCB(25 KA) breaking capacity	Legrand/Hagger/Siemens/Schneider
3	MCCB/ELCB (10 KA) breaking capacity	Legrand/Hagger/Siemens/Schneider
4	MS steel/PVC Conduit with accessories	AKG/BEC/NIC/Precision
5	DBs (IP 43)	Legrand/Hagger/Siemens/Schneider
6	PVC insulated copper wire(FR) 650V/1100Volt grade	Finolex/Havells/RR cable
8	PVC/XLPE insulated Al./Cu. Armoured cable 1100 Volt Grade	Finolex/Havells/RR cable/ C.C.I(Cable Corp. Of India)
9	Telephone wire/cable	Finolex/Delton
10	Data cable, Cat-6 cable, Switch, Jack Panel, Rack, Patch cords, Computer I/Os and other accessories	D-link, Legrand
11	Switch Fuse Unit(SFU)	L&T/ Siemens/Schneider
12	Contactors	L&T/ Siemens/Schneider
13	Meters	L&T/Conserve/Elmeasure
14	Cable Termination	Dowells/Comet
15	Cable Tray	Profab/Metalemms/Asian Ancillary Corporation
16	Light Fixture	Philips/Wipro/Crompton Greaves/Havells
17	Ceiling Fan/Wall Fan	Orient/Usha/Crompton Greave/Havells
18	Exhaust Fan	Crompton Greave/Almonard/Alstom/Usha/Havells
19	Amplifier/Speakers	Bosch/Ahuja
20	Sensors(Occupancy)	Honeywell(MK)/ Siemens/Johnson control
21	Panel	As per IS standard/ CPRI Tested

APPROVED MAKE OF AIR CONDITIONING WORKS		
	VRF / VRV OUTDOOR UNIT	Daikin/ O-General/Mitsubishi Electric/Bluestar/LG Only
	AIR COOLED CONDENSING UNIT AIR CONDITIONING UNIT	Daikin/ O-General/Mitsubishi Electric/Bluestar/LG Only
	Air Conditioners	Daikin/ O-General/Mitsubishi Electric/Bluestar/LG Only
	Drain Pipe	Kasta/ Supreme/Astral/Finolex
	Voltage Stabilizer	Microteck, V-Gard
	Timer	Legrad/L&T other eq. ISI make

Note:- All the material to be ISI marked. The material shall be only of the approved make only as specified as above. The Contractor shall submit samples of all the makes as specified in above specified makes and the Bank shall have the power to select any of them. The Bank's decision in this regard shall be binding on the contractor. In case any material is not available for any one or all of the above approved make the Bank's shall select and approve alternative makes. The contractor is binding to arrange that material. The LT panel as per IS standard/CPRI Tested.

Seal & Signature of the contractor

TECHNICAL SPECIFICATIONS FOR HVAC AND ELECTRICAL WORKS

CHAPTER: I GENERAL

1. All works shall be carried out as per accepted standard and as per IS: Specifications.
2. All materials, fittings, accessories etc. for use in electric installation shall be as per approved list of material attached, unless otherwise specified. In the case of materials for which no specific make is approved or specified the same shall confirm to relevant Indian Standard Specification and/or shall be approved by the Engineer in Charge.
3. In general, circuit wiring is to be done in separate conduits and not in point wiring conduits.
4. Wiring shall be done only in steel conduit system.
5. 2x1.5 Sqmm (22/0.3mm) multi stranded denotes 2 wires of 1.5 Sqmm. (22/0.3mm) multi stranded and so on for other sizes.
6. In case where metric size/rating materials is/are not available, equivalent British size/rating shall be permitted to be used with the written approval of the Consultant.
7. In point wiring for light points where bulkhead is provided in place of ceiling rose/batten holder, Rs.16.00 per point to be deducted (-).
8. Blanking plates shall be provided in the MCB distribution board in the blank unused ways, where MCBs are not provided, no extra payment to be allowed for the same, and if blanking plate not provided Rs.3/- per plate (per way) to be deducted from the rates of MCB enclosures (-).
9. The rates given in this schedule, are for the finished work covering cost of all materials, labour, royalties, lease rent, wastage temporary work, hire charges of tools and plant, equipment and machinery required to complete the work, overhead charges and profit etc. unless specified otherwise.
10. In case of any contradiction in the provision of the specifications and Schedule of rate, the provision of the latter would take precedence.
11. In booking dimensions, the order shall be consistent and generally in the sequence of length, width and height or depth or thickness.

13. The following tolerance shall be permitted in measurement unless stated otherwise. Any work done extra over the specified dimensions shall be ignored. Tolerances for areas and cubic contents are applicable only for Civil Works associated with the electrical work:

- (a) Dimension shall be measured to the nearest 0.05 M.
- (b) Areas shall be worked out in the nearest 0.01 Sqm.
- (c) Cubic contents shall be worked out to the 0.01 Cum.

14. The agency carrying out the work shall certify that the work has been carried out as per statutory or other regulations in force and prescribed specifications.

15. The materials and labour involved shall be described and it shall be stated that the materials used are of approved make of the Board and as per list attached to the agreement/NIT etc.

16. The provision of scaffolding or ladder or any tools and plants required shall be deemed to be included in the item, unless otherwise stated.

17. Cutting through walls and floors lifting up floor boards and refixing cutting out plaster and making good all the work disturbed, notching or drilling holes through joists etc. shall be deemed to be included with the item of work.

18. The work shall be strictly carried out in accordance with the detailed layout plan of Electrical installation unless otherwise necessary to be altered due to site conditions during the course of execution.

19. Completion plans for the installation carried out shall be furnished.

20. Method and type of wiring shall be fully described and measured separately, it shall be classified according to the size and types of cables used.

21. Concealed conduit work and surface conduit work shall also be classified and described separately the former shall include embedding the conduit and allied fitting in walls, floors etc. during constructions or cutting chases, or both and making good as necessary.

22. Point wiring shall include all work necessary in complete wiring of any length via a switch :

- (a) Ceiling rose or connector (in case of ceiling and exhaust fan points or stiff pendent).
 - (b) Ceiling rose (in case of pendent points except stiff pendent points).
 - (c) Lamp holder (in case of wall brackets, batten points bulk head fittings and similar other fittings).
 - (d) Call bell or Buzzer (in this case the words "Via the switch" shall be read as "Via the bell push or ceiling rose" as the case may be.
 - (e) Upto Electric Clock outlet.
 - (f) Upto socket outlet.
- 22.1 When there is only one point on the distribution circuit (one way), the same shall be measured in two parts as circuit wiring according to the definition of the circuit wiring and the other as "Points" according to the above definition for "Points".
- 22.2 The following shall be deemed to be included in the Point Wiring.
- (a) Rigid steel conduit/rigid PVC non-metallic conduit/ casing and capping/batten as the case may be, accessories for the same and wiring cables from controlling switch or any other type of switch to the point with ferrule numbering.
 - (b) Switch and ceiling rose or connector or batten holder with special and suitable round block for neatly housing the connector as required.
 - (c) In case of wall brackets, bulkhead fitting and similar fittings, cable as required upto the Lamp Holder.
 - (d) Bushed conduit or porcelain tubing when cables pass through wall etc.
 - (e) Earth wire from 3 pin socket point to the common earth including connection to the pin of 3/5 pin socket outlet except earth wire from the first tapping of live wire to the sub distribution board.
 - (f) All PVC/Wooden/Metal blocks switch boards and boxes sunk or surface type, with suitable covering, (Phenolic laminated sheet) including those required for mounting fan regulator but excluding those under the distribution board and main control switch.
 - (g) All fixing accessories such as clips, nails, screws, phil plug, rawl plug, wooden plug etc. as required.

- (h) Joint for junction boxes and connecting the same as required.
- (i) Connections to ceiling rose or connector, socket outlet, lamp holder, fan regulator etc.
- (j) Socket outlets as specified.
- (k) Inter connection wiring between points on the same circuits in same switch box or from another.
- (l) Connector as required for looping of wiring for two or more wires wherever required.
- (m) Pendants, if provided shall be paid extra.
- (n) All the switches, socket, plate, boxes, blank plate and regulator to be modular plate type.

22.3 The mechanical protection provided to the wiring coming within 1.5 Mtr. from floor level upto switch board shall be deemed to have been included in the item of work. Method of installation and making good the damages shall be described in the specification.

22.4 The common earth continuity conductor shall be described stating material size and method of installation.

23.3 Any junction box provided for extending the wiring beyond the point referred to shall not be treated as the nearest tapping point.

CHAPTER: II

METALLIC CONDUIT WIRING SYSTEM

2.0 SCOPE

This chapter covers the detailed requirements for wiring work in metallic conduits. This chapter covers both surface and recessed types of works.

2.1 APPLICATION

(i) Recessed conduit is suitable generally for all applications. Surface conduit work may be adopted in places like workshops, plant rooms, pump rooms, wiring above false ceiling/below false flooring and at locations where recessed work may not be

possible to be done. The type of work viz. surface or recessed shall be as specified in the respective works.

(ii) Flexible conduits may only be permitted for inter connections between switch gear, DB's and conduit terminations in wall.

2.2 MATERIALS

2.2.1 Conduits

(i) All rigid conduit pipes shall be of steel and be ISI marked. The wall thickness shall be not less than 1.6mm (16 SWG) for conduits upto 32mm dia and not less than 2mm (14 SWG) for conduits above 32mm dia. These shall be solid drawn or reamed by welding and finished with galvanized or stove enamelled surface.

(ii) The maximum number of PVC insulated cables conforming to IS:694-1990 that can be drawn in one conduit is given sizewise in Table-1 and the number of cables per conduit shall not be exceeded. Conduit sizes shall be selected accordingly in each run.

(iii) No steel conduit less than 20mm in diameter shall be used.

2.2.2 Conduit accessories

(i) The conduit wiring system shall be complete in all respects including their accessories.

(ii) All conduit accessories shall be of threaded type and under no circumstances pin grip type or clamp grip type accessories shall be used.

(iii) Bends couplers etc. shall be solid type in recessed type of works and may be solid or inspection type as required, in surface type of works.

(iv) (a) Saddles for surface conduit work on wall shall not be less than 0.55mm (24 gauge) for conduits upto 25mm dia and not less than 0.9mm (20 gauge) for largest diameter. The corresponding widths shall be 19mm and 25mm.

(b) The minimum width and the thickness of girder clips used for fixing conduits to steel joists, and clamps shall be as per Table-II.

2.2.3 Outlets

- (i) The switch box or regulator box shall be made of metal on all sides, except on the front. In case of welded mild steel sheet boxes, the wall thickness shall not be less than 1.2mm (18 gauge) for boxes upto a size of 20cm X 30cm and above this size 1.6mm (16 gauge) thick MS boxes shall be used. The metallic boxes shall be duly painted with anticorrosive paint before erection as per Specifications.
- (ii) GI earth terminal with stud and 2 G.I. washers shall be provided in each MS box for termination of protective conductors and for connection to socket outlet/metallic body of fan regulator etc.
- (iii) A metal strip shall be welded/screwed, to the metal box as support if tumbler type of control switches, sockets and/or fan regulators are to be fixed therein.
- (iv) Clear depth of the box shall not be less than 50/60 mm and this shall be increased suitably to accommodate mounting of fan regulators in flush pattern.
- (v) The fan regulators can also be mounted on the switch box covers, if so stipulated in the tender specifications, or if so directed by the Engineer- in-Charge.
- (vi) Except where otherwise stated, 3mm thick phenolic terminated sheets shall be fixed on the front with brass screws, or aluminum alloy/cadmium plated iron screws as approved by the Consultant.

2.3 INSTALLATION

2.3.1 Common aspects for recessed and surface conduit works

- (i) Conduit Joints
 - (a) The conduit work of each circuit or section shall be completed before the cables are drawn in.
 - (b) Conduit pipes shall be jointed by means of screwed couplers and screwed accessories only. Threads on conduit pipes in all cases shall be between 13mm to 19mm long sufficient to accommodate pipes to full threaded portion of couplers or accessories.
 - (c) Cut ends of conduit pipes shall have no sharp edges, nor any burrs left to avoid damage to the insulation of the conductors while pulling them through such pipes.

(d) The Consultant, with a view to ensuring that the above provision has been carried out, may require that the separate lengths of conduit etc. after they have been prepared, shall be submitted for inspection before being fixed.

(e) No bare threads portion of conduit pipe shall be allowed unless such bare threaded portion is treated with anticorrosive pipe servative or covered with approved plastic compound.

(ii) Bends in conduit

(a) All necessary bends in the system, including diversion, shall be done either by neatly bending the pipes without cracking with a bending radius of not less than 7.5cm or alternatively, by inserting suitable solid or inspection type normal bends, elbows or similar fittings, or by fixing cast iron inspection boxes, whichever is most suitable.

(b) No length of conduit shall have more than the equivalent of four quarter bends from outlet to outlet.

(c) Conduit fittings shall be avoided as far as possible on conduit system exposed to weather. Where necessary, solid type fittings shall be used.

(iii) Outlets

(a) All outlets such as switches, wall sockets etc. may be either flush mounting type, or of surface mounting type, as specified in the Additional Specifications.

(iv) Painting after erection

After installation, all accessories of conduit pipes, fittings, switch and regulator boxes etc. shall be painted.

2.3.2 Additional requirements for surface conduit work

(i) Painting before erection

The outer surface of conduit including all bends, unions, tees, junction boxes, etc. forming part of the conduit system, shall be adequately protected against rust when such system is exposed to weather, by being painted with 2 coats of red oxide paint applied before they are fixed.

(ii) Fixing conduit on surface

(a) Conduit pipes shall be fixed by saddles, secured to suitable approved plugs with screws in an approved manner at an interval of not more than one metre, but on either side of the couplers or bends of similar fittings, saddles shall be fixed at a distance of 45 cm from the centre of such fittings.

(b) Where conduit pipes are to be laid along the trusses steel joists etc. the same shall be secured by means of saddles or girder clips or clamps as required by the Consultant.

(c) In long distance straight run of conduit, inspection type couplers at reasonable intervals shall be provided, or running threads with couplers and jamnuts shall be provided.

(iii) Fixing outlet boxes

Only a portion of the switch box shall be sunk in the wall, the other portion being projected out for suitable entry of conduit pipes into the box.

2.3.3 Additional requirements for recessed conduit work

(i) Making chase

(a) The chase in the wall shall be neatly made, and of ample dimensions to permit the conduit to be fixed in the manner desired.

(b) In the case of buildings under construction, the conduits shall be buried in the wall before plastering, and shall be finished neatly after erection of conduit.

(c) In case of exposed brick/rubble masonry work, special care shall be taken to fix the conduit and accessories in position along with the building work.

(ii) Fixing conduits in chase

(a) The conduit pipe shall be fixed by means of staples, J-hooks or by means of saddles, not more than 60cm apart, or by any other approved means of fixing.

(b) All threaded joints of conduit pipes shall be treated with some approved preservative compound to secure protection against rust.

(iii) Fixing conduits in 'RCC work'

(a) The conduit pipes shall be laid in position and fixed to the steel reinforcement bars by steel binding wires before the concreting is done. The conduit pipes shall be fixed firmly to the steel reinforcement bars to avoid their dislocation during pouring of cement concrete and subsequent tamping of the same.

(b) Fixing of standard bends or elbows shall be avoided as far as practicable, and all curves shall be maintained by bending the conduit pipe itself with a long radius which will permit

easy drawing in of conductors.

(c) Location of inspection/junction boxes in RCC work should be identified by suitable means to avoid unnecessary chipping of the RCC slab subsequently to locate these boxes.

(iv) Fixing inspection boxes

(a) Suitable inspection boxes to the minimum requirement shall be provided to permit inspection and to facilitate replacement of wires, if necessary.

(b) These shall be mounted flush with the wall or ceiling concrete. Minimum 65mm depth junction boxes shall be used in roof slabs and the depth of the boxes in other places shall be as per IS:2667-1977.

(c) Suitable ventilating holes shall be provided in the inspection box covers.

(v) Fixing switch boxes and accessories

Switch boxes shall be mounted flush with the wall. All outlets such as switches, socket outlets etc. shall be flush mounting type, unless otherwise specified in the Additional Specifications.

(vi) Fish wire

To facilitate subsequent drawing of wires in the conduit. GI fish wire of 1.6mm/1.2mm (16/18 SWG) shall be provided alongwith the laying of the recessed conduits.

(vii) Bunching of cables

(a) Cables carrying direct current may, if desired, be bunched whatever their polarity, but cables carrying alternating current, if installed in metal conduit shall always be bunched so that the outgoing and return cables are drawn into the same conduit.

(b) Where the distribution is for single phase loads only, conductors for these phases shall be drawn in one conduit.

(c) In case of three phase loads, separate conduits shall be run from the distribution boards to the load points, or outlets as the case may be.

2.3.4 Earthing requirements

(i) The entire system of metallic conduit work, including the outlet boxes and other metallic accessories, shall be mechanically and electrically continuous by proper screwed joints, or by double checknuts at terminations. The conduit shall be continuous when passing through walls or floors.

(ii) Protective (loop earthing) conductor(s) shall be laid along the runs of the conduit between the metallic switch boxes and the distribution boards/switch boards, terminated thereto. These conductors shall be of such size and material as specified. Depending upon their size and material, the protective earth conductors shall be either drawn inside the conduits along with the cables, or shall be laid drawn inside the conduits alongwith the cables, or shall be laid external to

the conduits. When laid external to the conduits, this shall be properly clamped with the conduit at regular intervals.

(iii) The protective conductors shall be terminated properly using earth studs, earth terminal block etc. as the case may be.

(iv) Gas or water pipe shall not be used as protective conductor (earth medium).

TABLE - I

Maximum number of PVC insulated 650/1100 V grade aluminium/copper conductor cable conforming to IS:694-1990

Nominal cross sectional area of conductor in Sqmm.	20mm		25mm		32mm		38mm		51mm		64mm	
	S	B	S	B	S	B	S	B	S	B	S	B
1	2	3	4	5	6	7	8	9	10	11	12	13

1.50	5	4	10	8	18	--	--	--	--	--	--
					12						
2.50	5	3	8	8	12	--	--	--	--	--	--
					10						
4	3	2	6	5	10	8	--	--	--	--	--
6	2	--	5	4	8	7	--	--	--	--	--
10	2	--	4	3	5	5	8	6	--	--	--
16	--	--	2	2	3	3	6	5	10	7	12
25	--	--	--	--	3	2	5	3	8	6	9
35	--	--	--	--	--	--	3	2	6	5	8
50	--	--	--	--	--	--	--	--	5	3	6
70	--	--	--	--	--	--	--	--	4	3	5

Note:

1. The above table shows the maximum capacity of conduits for a simultaneous drawing in of cables.

2. The columns headed 'S' apply to runs of conduit which have distance not exceeding 4.25 m between draw in boxes and which do not deflect from the straight by an angle of more than 15 degrees columns headed 'B' apply to runs of conduit which deflect from the straight by an angle of more than 15 degrees.

3. Conduit sizes are the nominal external diameter.

TABLE - II

Girder Clips or clamps

(Clause 2.2.2(iv))

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~~

| Size of conduit | Width | Thickness |
|-----------------|-------|-----------|
|-----------------|-------|-----------|

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(i) 20mm	19mm	0.9mm (20 SWG)
(ii) 25mm	19mm	0.9mm (20 SWG)
(iii) 32mm and above	25mm	1.2mm (18 SWG)

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## **CHAPTER: III**

### **TESTING OF INSTALLATION**

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#### **3.0 SCOPE**

This chapter describes the details of tests to be conducted in the completed AIR-CONDITIONING installations, before commission.

#### **3.1 GENERAL**

##### **3.1.1 Tests**

On completion of installation, the following tests shall be carried out:

1. Insulation resistance test.
2. Polarity test of switch.
3. Earth continuity test.
4. Earth electrode resistance test.

##### **3.1.2 Witnessing of tests**

Testing shall be carried out for the completed installations, in the presence of and to the satisfaction of the Consultant by the contractor. All test results shall be recorded and submitted to the Department.

##### **3.1.3 Test instruments**

All necessary test instruments for the tests shall be arranged by the contractor if so required by the Consultant.

#### **3.2 INSULATION RESISTANCE**

3.2.1 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 earthed concentric wiring, all lamps in position, or both poles of the installation otherwise electrically connected together, a direct current pressure of not less than twice the working pressure, provided it need not exceed 500 volts for medium voltage, circuits, where the supply is derived from a three wire D.C. or a polyphane A.C.system the neutral pole of which is connected to

earth either directly or through added resistance, the working pressure shall be deemed to that which is maintained between the phase conductor and the neutral.

3.2.2 The insulation resistance shall also be measured between all the conductors connected to one pole, or phase conductor of the supply, and all the conductors conned to the neutral, or to the other pole or phase conductors of the supply with all the lamps in position, and switches in off position, and its value shall be not less than that specified in sub clause 3.1.3.

3.2.3 The insulation resistance in mega ohms measured as above shall not less than 12.5 mega ohms for the wiring with PVC insulated cable subject to a minimum of 1 megaohm.

3.2.4 Where a whole installation is being tested, a lower value than that given by the formula, subject to a minimum of 1 megaohm, is acceptable.

3.2.5 A preliminary and similar test may be made before the lamps etc. are installed, and in this event the insulation resistance to earth should not be less than 25 megaohms for the wiring with PVC insulated cables, subject to a minimum of 2 megaohms.

3.2.6 The term outlet includes every point along with every swtich except that a switch com  
bined with a socket outlet, appliance or lighting fitting is regarded as one outlet.

3.2.7 Control rheostats, heating and power appliances and electric signs may, if required, be disconnected from the circuit during the test, but in that event the insulation resistance between the case or frame work, and all live parts of each rheostat, appliance and sign shall be not less than that specified in the relevant Indian Standard Specifications, or where there  
is no such Specification, shall be not less than one megaohm.

### 3.3 POLARITY TEST OF SWITCH

3.3.1 In a two wire installation a test shall be made to verify that all the switches in every circuit have been fitted in the same conduits throughout, and such conductor shall be labeled or marked for connection to the phase conductor or to the non-earthed conductors of the supply.

3.3.2 In a three wire or a four wire installation, a test shall be made to verify that every non linked single pole switch is fitted in a conductor which is labeled, or marked for connection to one of the phase conductors of the supply.

3.3.3 The installation shall be connected to the supply for testing the terminals of all switches shall be tested by a test lamp, one lead of which is connected to the earth. Glowing of test lamp to its full brilliance, when the switch is in 'ON' position irrespective of appliance in position or not, shall indicate that the switch is connected to the right polarity.

#### 3.4 TESTING OF EARTH CONTINUITY PATH

The earth continuity conductor, including metal conduits and metallic envelopes of cables in all cases, shall be tested for electric continuity. 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.

#### 3.5 MEASUREMENT OF EARTH ELECTRODE RESISTANCE

3.5.1 Two auxilliary earth electrode, besides the test electrode, are placed at suitable distance from the test electrode (see figure). A measured current is passed between the electrode 'A' to be tested and an auxilliary current electrode 'C' and the potential difference

between the electrode 'A' and auxilliary potential B' is measured. The resistance of the test electrode 'A' is then given by;

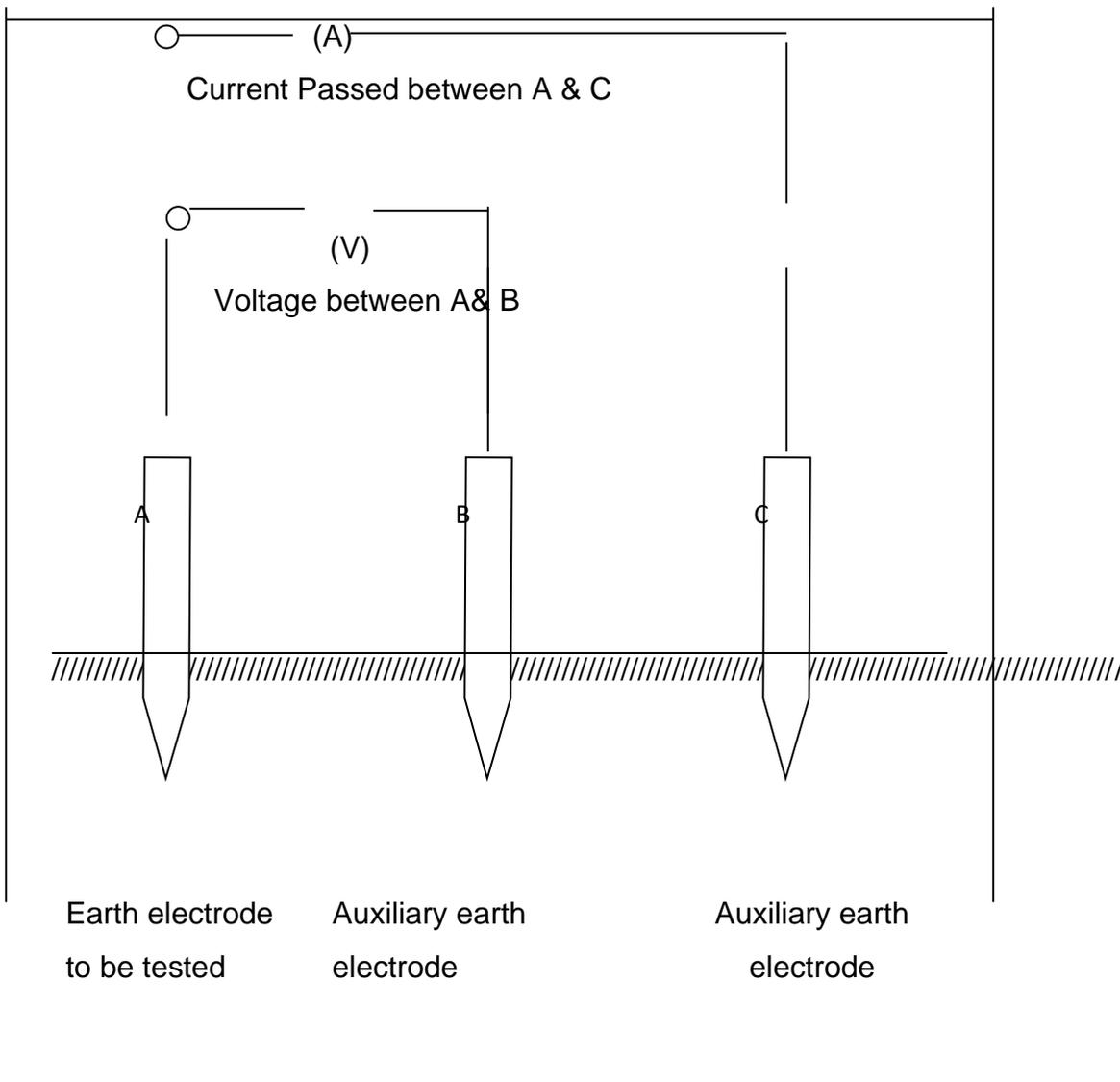
$$R = \frac{V}{I}$$

Where,

R = Resistance of the test electrode in ohms.

V = Reading of the voltmeter in volts.

I = Reading of the ammeter in amps



### 3.5.2

(i) Stray currents flowing in the soil may produce serious errors in the measurement of earth resistance. To eliminate this, a hand driven generator is used.

(ii) If the frequency of the supply of a hand driven generator coincides with the frequency of stray current, there will be wandering of the instrument pointer. An increase or decrease of generator speed will cause this to disappear.

3.5.3 At the time of test, the test electrode shall be separated from the earthing system.

3.5.4 The auxiliary electrodes shall be of 13mm diameter mild steel rod driven upto 1m into the ground.

3.5.5 All the three electrodes shall be so placed that they are independent of the resistance area of each other. If the test electrode is in the form of a rod, pipe or plate, the auxiliary current electrode 'C' shall be placed at least 30m away from it, and the auxiliary potential electrode 'B' shall be placed mid-way between them.

3.5.6 Unless three consecutive readings of test electrode resistance agree, the test shall be repeated by increasing the distance between electrodes A and C upto 50m and each time placing the electrode B midway between them.

3.5.7 On these principles, 'Megger Earth Tester' containing a direct reading ohm-meter, a hand driven generator and auxiliary electrodes are manufactured for direct reading of earth resistance of electrodes.

## 3.6 TEST CERTIFICATE

On completion of an electrical installation (or an extension to an installation) a certificate shall be furnished by the contractor, countersigned by the certified supervisor under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as given in Appendix 'A' in addition to the test certificate required by the Local Electric Supply Authorities.

## CHAPTER-IV

## **MCB TYPE DISTRIBUTION BOARDS**

4.1 (i) MCBDB's may be of single phase, 3 phase (horizontal type) suitable for feeding single phase loads, or 3 phase (vertical type) suitable for feeding single phase as well as 3 phase loads as specified. These shall be complete with accessories, but without MCBs which shall be specified as a separate item in the tender documents.

(ii) The current ratings and the number of ways shall be as specified. Blanking plates shall be provided to close unused ways.

(iii) DB with integral incomer

Where it is proposed to install the controlling MCCB/ELCB/MCB, the total number of outgoing MCBs will be reduced by one or two numbers corresponding to SP or SP&N at the incoming, since the total number of ways are fixed in MCBDBs. Bus bars in such units shall also be correspondingly shorter. The inter connections shall be done between the incomer and outgoings as part of the DB in the works.

(iv) MCBDBs shall be of surface/flush mounting pattern according to the requirement of their location and shall be suitable to accommodate MCB's and ELCB at incoming as well as outgoing in single pole or multipole configuration as required.

(v) MCBDB's shall be dust and vermin proof conforming to IP 42 and shall be fabricated out of CRCA sheet steel. 1.2 mm thick with stove enamelled paint finish.

(vi) MCBDB's shall have removable type end plates with knock outs at the bottom and top.

(vii) Only the knobs of the MCBs shall protrude out of the front covers through openings neatly machine made for the purpose.

(viii) The bus bars used shall be solid electrolytic copper of appropriate sections.

(ix) DIN bar(s) shall be provided for mounting the MCBs.

## **4.2 PRE-WIRED MCB DISTRIBUTION BOARDS**

(i) Prewired MCBDBs shall be provided only where specified.

(ii) The complete board shall be factory fabricated and shall be duly prewired in the works, ready for installation at site.

(iii) The board shall be of wall mounted cubical type construction, fabricated out of 1.2 mm thick sheet steel with stove enamelled paint finish.

(iv) The board shall also be provided with a loose wire box ( if mentioned in the scope of work ) as a compartment for the complete width and, depth of the board and of minimum height of 125 mm in case of TPN DB's and 100 mm in case of SPN BD's.

(v) The board shall be provided with a hinged cover of 1.6mm thick sheet steel in the front. Only the knobs of the MCBs shall protrude out of the front covers through openings neatly machine made for the purpose.

(vi) Knock out holes at the bottom and detachable plate with knock out holes at the top of the board shall be provided.

(vii) The board shall be complete with the following accessories.

(a) 200A copper bus bar(s)

(b) Neutral link

(c) Common earth bar

(d) Din bar for mounting MCBs

(e) Elemex type terminal connectors suitable for incoming and outgoing cables.

(f) A set of indication lamps with HRC cartridge fuses for each phase of the incoming supply.

(g) Earthing stud(s).

(viii) The board shall be fully prewired with single core PVC insulated copper conductors/insulated solid copper links and terminated on to extended type terminal connectors, suitable for connections to the sizes of the respective conductors.

(ix) All incoming and outgoing wiring to the prewired MCBDB's shall be terminated only in the Elemex type extended terminal connectors to be provided within the DB. The terminal connectors shall therefore be so provided as to facilitate easy cable connections and subsequent maintenance.

(x) A common copper earth bar shall be provided within the loose wire box. The common neutral bar as well as the terminal connectors shall however be provided within the main compartment just below the loose wire box.

#### 4.3 MINIATURE CIRCUIT BREAKERS (MCB's)

(i) 'Light' series 10 KA Breaking Capacity shall be used only for normal 'lighting' circuits.

(ii) 'Power' series 10 KA Breaking Capacity MCB's shall be invariably used for motor loads helogen lamp fittings, sodium/mercury discharge lamps and all 'power' circuits.

(iii) Ratings (Amps as well as KA), number of poles, type as MCB or isolator, etc. shall be as specified in the tender documents.

## **CHAPTER : V**

### **MEDIUM VOLTAGE CABLING**

#### 5.0 Scope

5.1 The scope of work shall cover supply, laying, connecting, testing and commissioning of low and medium voltage power and control cabling.

#### 5.2 Standards

5.2.1 The following standards and rules shall be applicable:

- 1) IS:1554 PVC insulated electric cables (heavy duty)
- 2) IS:1753 Aluminium conductors for insulated cables
- 3) IS:961 Recommended current ratings for cables.

4) Indian electricity act and rules. All codes and standards mean the latest. Where not specified otherwise the installation shall generally follow the Indian Standard Codes of Practice or the British Standard Codes of Practice where Indian Standards are not available.

#### 5.3 Cables

5.3.1 All cables shall be 1100 volt grade PVC insulated, sheathed with or without steel armouring as specified and with an outer PVC protective sheath. Cables shall have high conductivity stranded aluminium or copper conductors and cores colour coded to the Indian Standards.

5.3.2 All cables shall be new without any kinds or visible damage. The manufacturers name, insulating material, conductor size and voltage class shall be marked on the surface of the cable at every 600mm centres.

#### 5.4 Installation

5.4.1 Cables shall be laid in the routes marked in the drawings. Where the route is not marked, the contractor shall mark it out on the drawings and also on the site and obtain the approval of the Architect/Consultant before laying the cable. Procurement of cables shall be on the basis of actual site measurements and the quantities shown in the schedule of work shall be regards as a guide only.

5.4.2 Cables, running indoors shall be laid on walls, ceiling, inside shafts or trenches. Single cables laid shall be fixed directly to walls or ceiling and supported at not more

than 500mm. Where number of cables are run, necessary perforated cable trays shall be provided wherever shown. Perforated trays shall be mild steel or aluminium as specified in the schedule of work and supported on mild steel frame work as shown on drawings or as approved. Cables laid in built up trenches shall be on steel supports. Plastic identification tags shall be provided at every 30m.

5.4.3 Cables shall be bent to a radius not less than 12 (twelve) times the overall diameter of the cable or in accordance with the manufacturer's recommendations whichever is higher.

5.4.4 In the case of cables buried directly in ground, the cable route shall be parallel or perpendicular to roadways, walls etc. cables shall be laid on an excavated, graded trench, over a sand or soft earth cushion to provide protection against abrasion. Cables shall be protected with brick or cement tiles as shown on drawings. Width of excavated trenches shall be as per drawings. Backfill over buried cables shall be with a minimum earth cover of 600mm. The cables shall be provided with cables markers at every 35 meters and at all loop points.

5.4.5 The general arrangement of cable laying is shown on drawings. All cables shall be full runs from panel to panel without any joints or splices. Cables shall be identified at end terminations indicating the feeder number and the Panel/Distribution board from where it is being laid. All cable terminations for conductors upto 4 sqmm may be insertion type and all higher sizes shall have tinned copper compression lugs. Cable terminations shall have necessary brass glands. The end terminations shall be insulated with a minimum of six half lapped layers of P.V.C. tapes. Cable armouring shall be earthed at both ends.

## 5.5 Testing

5.5.1 MV cables shall be tested upon installation with a 500V Meggar and the following readings established

- 1) Continuity on all phases
- 2) Insulation Resistance

- (a) between conductors
  - (b) all conductors and ground
- All test readings shall be recorded and shall form part of the completion documentation.

## **SECTION : VI**

### **EARTHING**

#### 6.0 Scope

6.1 The scope of work shall cover earthing stations, laying aluminium/copper earth strips and connecting the power panels, DBs and switch boards.

#### 6.2 Standards

6.2.1 The following standards and rules shall be applicable:

- 1) IS:3043-1966 Code of Practice for earthing.
- 2) Indian Electricity Act and Rules.

6.2.2 All codes and standards mean the latest. Where not specified otherwise the installation shall generally follow the Indian Standard Code of Practice or the British Standard Codes of Practice in the absence of Indian Standards.

#### 6.3 Plate Earthing Station

6.3.1 The substation earthing shall be with copper plate earthing station unless otherwise specified.

6.3.2 The earthing station shall be as shown on the drawing. The earth resistance shall be maintained with a suitable soil treatment.

6.3.3 The resistance of each earth station should not exceed 2 ohms.

6.3.4 The earth lead shall be connected to the earth plate through copper/brass bolts.

#### 6.4 Pipe Earthing Station

6.4.1 The earth station shall be as shown on the drawing and shall be used for equipment earth grid. The earth electrode shall be 2.5 meter long 40mm dia galvanized steel pipe. The earth resistance shall be maintained with a suitable soil treatment.

6.4.2 The resistance of each earth station should not exceed 5 ohms.

6.4.3 The earth lead shall be fixed to the pipe with a clamp and safety set screws. The clamps shall be permanently accessible.

#### 6.5 Earth leads and connections

6.5.1 Earth lead shall be bare copper or aluminium or galvanised steel as specified with sizes shown on drawings. Copper leads shall have a phosphor content of not over 0.15 percent. Aluminium and galvanised steel buried in ground shall be protected with bitumen and hessian wrap or polythene faced hessian and bitumen coating. At road crossings necessary hume pipes shall be laid. Earth lead run on surface of wall or ceiling shall be fixed on saddles or wall so that the strip is atleast 8mm away from the wall surface.

6.5.2 All earth strip shall be jointed as follows:

Copper Copper rivetting with 80mm fish plate and brazing

Alluminium Riveting with 2 Nos. 100mm long bimetal fish plates using copper rivets

Galvanised Steel Lap welding with 50mm minimum lap

6.5.3 All strips shall be run on walls/beams with 6mm thick galvanised steel earth saddles at 500mm centre to centre.

#### 6.6 Equipment Earthing

6.6.1 All apparatus and equipment transmitting or utilising power shall be earthed in the following manner. Copper earth wires shall be used where copper wires are specified. Alluminium wires may be used where alluminium phase wires are specified unless otherwise indicated in the schedule of work.

#### 6.6.2 Power transmission apparatus

Metallic conduit shall not be accepted as an earth continuity conductor. A separate insulated/bare earth continuity conductor of size 50% of the phase conductor subject to the minimum and maximum shall be provided.

Copper Alluminim Galvanised Steel

|                |     |     |     |
|----------------|-----|-----|-----|
| Minimum (sqmm) | 2.5 | 4.0 | 6   |
| Maximum (sqmm) | 65  | 100 | 200 |

The earth continuity conductor may be drawn inside the conduit in which case, it should be insulated.

6.6.3 Non-metallic conduit shall have an insulated earth continuity conductor of the same size as for metallic conduit. All metal junction and switch boxes shall have an inside earth stud to which the earth conductor shall be connected. The earth conductor shall be distinctly colored (green) for easy identification.

6.6.4 Armoured cables shall be earthed by 2 distinct earth connections to the armouring at both the ends and the size of connection being as for the metallic conduit.

6.6.5 In the case of unarmoured cable, an earth continuity conductor shall either be run outside along the cable or should form a separate insulated core of the cable.

6.6.6 3 Ph. power panels and distribution boards shall have 2 distinct earth connections of the size correlated to the incoming cable size. In case of 1 Ph. DB's a single earth connection is adequate. Similarly for 3 Ph and 1 Ph isolating switches there shall be 2 and 1 earth connections respectively, sizes being correlated to the incoming cable.

#### 6.6.7 Utilising Equipment

3 Ph. motors and other 3 Ph apparatus shall have 2 distinct earth connections of size equal to 50% of the connecting cable subject to the following:

|                | Copper | Alluminim | Galvanised Steel |
|----------------|--------|-----------|------------------|
| Minimum (sqmm) | 6.5    | 10        | 20               |
| Maximum (sqmm) | 65     |           | 100 200          |

6.6.8 For 1 Ph motors and 1 Ph apparatus, the single earth connections shall be provided of the above size. For all light fittings and fans a single earth connection with 2.5 sqmm copper or equivalent size shall be provided.

6.6.9 All street light poles shall have an earth stud and shall be connected to the cable armouring using 6.5 sqmm copper or equivalent unless shown otherwise. For street lighting poles planted in ground, 2.4 meter long 10 SWG bare copper wire shall be coiled and buried with every fourth pole in addition to connection to cable armouring.

6.6.10 An equipment earthing grid is established as shown on the drawings. All earth connections to all panels, DBs and equipment shall be connected to the nearest point of the earthing grid.

## 6.7 Testing

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

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

## **CHAPTER : VII**

### **MV SWITCHGEAR**

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## 7.0 Scope

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7.1 The scope of work shall cover the supply, installation, testing and commissioning of all power panels, incorporating, switch fuses, bus bars, and contactor interconnections, earthing etc. meeting the requirements shown in equipment schedule and the drawings.

## 7.2 Standards

7.2.1 The following standards and rules shall be applicable:

- 1) IS:2516-1972 Specification for AC circuit breakers.
- 2) IS:4047-1977 Specification for Heavy duty air breaker switch gear and fuses for voltage not exceeding 1000 V.
- 3) IS:1818-1972 Specification for AC isolator and earthing switches.
- 4) IS:3072-1975 Code of Practice for installation and maintenance of switch gear.
- 5) IS:3106-1966 Code of Practice for selection, installation and maintenance of fuses (Voltage not exceeding 650 V).
- 6) IS:4237-1967 General requirements for switch gear and control gear for voltage not exceeding 1000 V.
- 7) IS:2607-1976 Air break isolators for Voltages not exceeding 1000 V.
- 8) IS:8623-1977 Specification for factory built assemblies of switch gear and control gear for voltage upto and including 1000 V AC and 1200 V DC.
- 9) Marking and arrangement of switch gear bus bars main connections and auxillary wiring.
- 10) Indian Electricity Act and Rules.

All codes and standards mean the latest. Where not specified otherwise the installation shall generally follow the Indian Standard Codes of Practice or the relevant British Standard Codes of Practice in the absence of corresponding Indian Standards.

## 7.3 Circuit Breakers

7.3.1 Circuit breakers shall be air break horizontal draw out type fully interlocked and meeting the requirements of IS:2516 or BS:3659. Breakers shall be rated for a medium voltage of 600 V and rated full load amperes as indicated on drawings. Breaker shall be capable of making and breaking system short circuits specified.

7.3.2 Breakers shall be unless specified otherwise manually operated, complete with front-of-the-panel operating handle, isolating plug with safety shutters, mechanical ON/OFF indicator, silver plated arcing and main contacts, are chutes, trip free operating. Breakers shall be capable of being racked out into 'Testing', 'Isolator' and 'Maintenance' positions and kept locked in any position. Breakers for remote operation shall be motor operated spring charged.

#### 7.4 MCCB's

7.4.1 Moulded case circuit breakers shall be standard products of established manufacturers and shall conform to BS:3871. Breakers shall be rated for system short circuit levels and if unavoidable, backed up by HRC fuses. Breakers shall incorporate thermal and magnetic trips unless shown otherwise in the drawings.

#### 7.5 Switch Fuse Units & Disconnects

7.5.1 Switch fuse units shall have quick make, quick break silver plated preferably double break contacts with operating mechanism suitable for rotary operation in the case of cubicle mounting.

All switches shall be rated according to the equipment schedule or drawings and shall withstand the system prospective fault current let through. Cam operated rotary switches with adequate terminal adopters upto 25A are acceptable but for all higher rating switch fuse units shall be heavy duty type conforming to IS:4047.

7.5.2 Fuses shall be HRC cartridge type conforming to IS:2208 with a breaking capacity corresponding to system fault level. Fuses shall be link type with visible indication. Screw type diazed fuses are not acceptable for any ratings.

7.5.3 All disconnects shall consist of switch units quick make, quick break type with silver plated contacts. The switches shall preferably have double breaks. The switches shall preferably have sheet steel enclosures, which in turn is mounted on suitable angle iron frame work. In wet locations switches shall have cast iron enclosures. Disconnects shall have a minimum breaking capacity of 5KV at 415 Volts.

## 7.6 Instrument Transformers, Meters & Relays

7.6.1 Ammeters and Voltmeters shall have moving iron spring controlled dead beat elements in square-bezel flush type cases 96mm in size and suitable for switch board mounting. Meters shall conform to BS:89 and have grade 'A' accuracy. Scale ranges shall meet with the requirements or as indicated on the drawing or in the Schedule of quantities.

7.6.2 Electronic energy meters shall be two element switch board mounting type suitable for unbalanced loads. Meters should incorporate a KVA demand meter with an integration time of 30 minutes. In case of two incoming feeders, a summing CT shall be provided with the meter. Meters shall conform to BS:37. The energy meters for DG Set and Transformer shall be calibrated and got certified by the respective Electricity Authority.

## 7.7 Cubicle Boards

7.7.1 All boards shall be combination of 14 and 16 SWG sheet steel free standing, extensible, totally enclosed, dust tight, vermin proof cubicle, flush dead front and modular construction suitable for 3 phase 415V 4 wire 50 Hertz system. All boards shall be accessible from the front for the maintenance of switch fuses, bus bars, cable terminations, meters etc. Cables shall be capable of entering the board both from top as well as bottom. All panels shall be machine pressed with punched openings for meters etc. All sheet steel shall be rust inhibited through a process of degreasing, acid picking, phosphating etc. The panels shall be finished with two coats of synthetic enamel of approved colour over one coat of red oxide primer. Engraved plastic labels shall be provided indicating the feeder details, and capacity and danger signs.

7.7.2 The boards shall accommodate air insulated bus bars, air circuit breakers, switch fuse units with HRC fuses, starters, necessary meters, relays contracts etc. as required

and arranged in suitable tiers. All breakers and switch fuses shall be suitably derated taking into account specified ambient temperature and rulling temperature inside the cubicle.

7.7.3 The switch board shall be fully compartmentalised in vertical tiers housing the feeder switches in totally enclosed independent compartments. Each compartment shall be self sufficient with switch unit, fuses, contractors, relays, indicating lamps and an inter locked door with facility for padlocking. Each feeder must terminate in an independent labelled terminal block. Strips type terminal block accommodating several feeders together is not acceptable. Pressure clamp type terminals suitable for alluminium wires may be used upto switches of 25A and cable lugs for higher ratings. All terminations shall be shrouded in an approved manner. The entire enclosure shall meet with IS:2147/1962. Feeder connections shall be cut of solid insulated copper/alluminium wires or strips with bimetallic clamps wherever required. Internal wiring, bus bar markings etc. shall conform to IS:375/1963. Internal wiring shall have terminal ferrules. Main switch should be at an easily accessible height and the highest switch operating handle should not be over 1.75m from floor level. Cable glands need not form part of the switch board as the cost of glands will form part of the cable termination.

## 7.8 Bus Bars

7.8.1 Bus bars shall be three phase and neutral and of copper or alluminium or alluminium alloy as specified and shown on drawings and rated for a temperature specified, based on insulated conductor rating (IS:8084-1976). Neutral bars may be of one half the size of the phase bars.

The main horizontal bus bars shall be of uniform cross section and rated in accord with the incoming switch. e vertical bus bars for the feeder columns may be rated at 75% of aggregate feeder capacity and shall be uniform in size. Bus bars and interconnections shall be taped with PVC colour coded tape to prevent bar-to-bar accidental shorts.

Each bus bar shall be directly and easily accessible on removal of the front cover. Bus bars shall be totally enclosed, shrouded and supported on non-hygroscopic insulator blocks to withstand thermal and dynamic overloads during system short circuits. An earth bus of size 50% of the phase subject to the following maximum and minimum shall be provided. Individual switch components shall be connected with the earth bus through copper or aluminium or galvanized steel strip size as shown. All wire connections to bars shall be through lugs, bolts and nuts and spring washers.

|         | Copper   | Alluminium | Galvanized Steel |
|---------|----------|------------|------------------|
| Minimum | 6.5 sqmm | 10 sqmm    | 16 sqmm          |
| Maximum | 65 sqmm  | 120 sqmm   | 200 sqmm         |

The minimum size of earth bar in a board shall however be 15 x 3 Cu or 25 x 3 Al. or equivalent.

## 7.9 Isolators

7.9.1 Isolators shall be fixed on wall on self supported angle iron frame work as required and mounted as near to the motor as possible. Where several motors are installed, isolators if required shall be provided at a central location on a common frame work.

7.9.2 Painting, earthing and lables shall be provided as generally indicating for MV switch gear.

## 7.10 Earthing

7.10.1 All switch panels shall be provided with an earth bar as specified.

7.10.2 Earthing of the switch boards shall be through the equipment earthing system provided in the building with two earth connection as shown.

## 7.11 Installation

7.11.1 All panels shall be supported on MS channel incorporated in the panel during the fabrication. all such supports shall be prime coated with two finish coats after completion of the work all panels shall be touched up for damaged painting.

7.11.2 All panels shall be megged phase to phase and phase to neutral using a 1000V meggar with all outgoing feeders in closed position. The meggar value should not be less than 2.5 megohms between phases and 1.5 megohms between phases and neutral.

7.11.3 Fabrication drawings of all panels shall be approved by the Consulting Engineers before fabrication.

#### 7.12 Testing & Inspections

7.12.1 All switch boards shall be factory inspected before finishing and dispatch.

7.12.2 Certificate for all routine and type tests for circuit breakers in accordance with the IS:2516-1963 shall be finished. In addition, all panels shall be megged phase to phase and phase to neutral, using a 1000V meggar with all switch gear in closed position. The meggar value should not be less than 2.5 megohms between phases and 1.5 megohms between phase and neutral.

## **TECHNICAL SPECIFICATIONS FOR ELECTRICAL WORKS**

### **CHAPTER: I GENERAL**

12. All works shall be carried out as per accepted standard and as per IS: Specifications.

13. All materials, fittings, accessories etc. for use in electric installation shall be as per approved list of material attached, unless otherwise specified. In the case of materials for which no specific make is approved or specified the same shall conform to relevant Indian Standard Specification and/or shall be approved by the Engineer in Charge.
14. In general, circuit wiring is to be done in separate conduits and not in point wiring conduits.
15. Wiring shall be done only in steel conduit system.
16. 2x1.5 Sqmm (22/0.3mm) multi stranded denotes 2 wires of 1.5 Sqmm. (22/0.3mm) multi stranded and so on for other sizes.
17. In case where metric size/rating materials is/are not available, equivalent British size/rating shall be permitted to be used with the written approval of the Consultant.
18. In point wiring for light points where bulkhead is provided in place of ceiling rose/batten holder, Rs.16.00 per point to be deducted ( - ).
19. Blanking plates shall be provided in the MCB distribution board in the blank unused ways, where MCBs are not provided, no extra payment to be allowed for the same, and if blanking plate not provided Rs.3/- per plate (per way) to be deducted from the rates of MCB enclosures ( - ).
20. The rates given in this schedule, are for the finished work covering cost of all materials, labour, royalties, lease rent, wastage temporary work, hire charges of tools and plant, equipment and machinery required to complete the work, overhead charges and profit etc. unless specified otherwise.
21. In case of any contradiction in the provision of the specifications and Schedule of rate, the provision of the latter would take precedence.
22. In booking dimensions, the order shall be consistent and generally in the sequence of length, width and height or depth or thickness.
13. The following tolerance shall be permitted in measurement unless stated otherwise. Any work done extra over the specified dimensions shall be ignored. Tolerances for areas and cubic contents are applicable only for Civil Works associated with the electrical work:
  - (a) Dimension shall be measured to the nearest 0.05 M.

- (b) Areas shall be worked out in the nearest 0.01 Sqm.
- (c) Cubic contents shall be worked out to the 0.01 Cum.

14. The agency carrying out the work shall certify that the work has been carried out as per statutory or other regulations in force and prescribed specifications.

15. The materials and labour involved shall be described and it shall be stated that the materials used are of approved make of the Board and as per list attached to the agreement/NIT etc.

16. The provision of scaffolding or ladder or any tools and plants required shall be deemed to be included in the item, unless otherwise stated.

17. Cutting through walls and floors lifting up floor boards and refixing cutting out plaster and making good all the work disturbed, notching or drilling holes through joists etc. shall be deemed to be included with the item of work.

18. The work shall be strictly carried out in accordance with the detailed layout plan of Electrical installation unless otherwise necessary to be altered due to site conditions during the course of execution.

19. Completion plans for the installation carried out shall be furnished.

20. Method and type of wiring shall be fully described and measured separately, it shall be classified according to the size and types of cables used.

21. Concealed conduit work and surface conduit work shall also be classified and described separately the former shall include embedding the conduit and allied fitting in walls, floors etc. during constructions or cutting chases, or both and making good as necessary.

22. Point wiring shall include all work necessary in complete wiring of any length via a switch :

- (a) Ceiling rose or connector (in case of ceiling and exhaust fan points or stiff pendent).
- (b) Ceiling rose (in case of pendent points except stiff pendent points).
- (c) Lamp holder (in case of wall brackets, batten points bulk head fittings and similar other fittings).

- (d) Call bell or Buzzer (in this case the words "Via the switch" shall be read as "Via the bell push or ceiling rose" as the case may be.
  - (e) Upto Electric Clock outlet.
  - (f) Upto socket outlet.
- 22.1 When there is only one point on the distribution circuit (one way), the same shall be measured in two parts as circuit wiring according to the definition of the circuit wiring and the other as "Points" according to the above definition for "Points".
- 22.2 The following shall be deemed to be included in the Point Wiring.
- (a) Rigid steel conduit/rigid PVC non-metallic conduit/ casing and capping/batten as the case may be, accessories for the same and wiring cables from controlling switch or any other type of switch to the point with ferrule numbering.
  - (b) Switch and ceiling rose or connector or batten holder with special and suitable round block for neatly housing the connector as required.
  - (c) In case of wall brackets, bulkhead fitting and similar fittings, cable as required upto the Lamp Holder.
  - (d) Bushed conduit or porcelain tubing when cables pass through wall etc.
  - (e) Earth wire from 3 pin socket point to the common earth including connection to the pin of 3/5 pin socket outlet except earth wire from the first tapping of live wire to the sub distribution board.
  - (f) All PVC/Wooden/Metal blocks switch boards and boxes sunk or surface type, with suitable covering, (Phenolic laminated sheet) including those required for mounting fan regulator but excluding those under the distribution board and main control switch.
  - (g) All fixing accessories such as clips, nails, screws, phil plug, rawl plug, wooden plug etc. as required.
  - (h) Joint for junction boxes and connecting the same as required.
  - (i) Connections to ceiling rose or connector, socket outlet, lamp holder, fan regulator etc.
  - (j) Socket outlets as specified.

- (k) Inter connection wiring between points on the same circuits in same switch box or from another.
- (l) Connector as required for looping of wiring for two or more wires wherever required.
- (m) Pendants, if provided shall be paid extra.
- (n) All the switches, socket, plate, boxes, blank plate and regulator to be modular plate type.

22.3 The mechanical protection provided to the wiring coming within 1.5 Mtr. from floor level upto switch board shall be deemed to have been included in the item of work. Method of installation and making good the damages shall be described in the specification.

22.4 The common earth continuity conductor shall be described stating material size and method of installation.

23.3 Any junction box provided for extending the wiring beyond the point referred to shall not be treated as the nearest tapping point.

## **CHAPTER: II**

### **METALLIC CONDUIT WIRING SYSTEM**

#### **2.0 SCOPE**

This chapter covers the detailed requirements for wiring work in metallic conduits. This chapter covers both surface and recessed types of works.

#### **2.1 APPLICATION**

(i) Recessed conduit is suitable generally for all applications. Surface conduit work may be adopted in places like workshops, plant rooms, pump rooms, wiring above false ceiling/below false flooring and at locations where recessed work may not be possible to be done. The type of work viz. surface or recessed shall be as specified in the respective works.

(ii) Flexible conduits may only be permitted for inter connections between switch gear, DB's and conduit terminations in wall.

## 2.2 MATERIALS

### 2.2.1 Conduits

- (i) All rigid conduit pipes shall be of steel and be ISI marked. The wall thickness shall be not less than 1.6mm (16 SWG) for conduits upto 32mm dia and not less than 2mm (14 SWG) for conduits above 32mm dia. These shall be solid drawn or reamed by welding and finished with galvanized or stove enamelled surface.
- (ii) The maximum number of PVC insulated cables conforming to IS:694-1990 that can be drawn in one conduit is given sizewise in Table-1 and the number of cables per conduit shall not be exceeded. Conduit sizes shall be selected accordingly in each run.
- (iii) No steel conduit less than 20mm in diameter shall be used.

### 2.2.2 Conduit accessories

- (i) The conduit wiring system shall be complete in all respects including their accessories.
- (ii) All conduit accessories shall be of threaded type and under no circumstances pin grip type or clamp grip type accessories shall be used.
- (iii) Bends couplers etc. shall be solid type in recessed type of works and may be solid or inspection type as required, in surface type of works.
- (iv) (a) Saddles for surface conduit work on wall shall not be less than 0.55mm (24 gauge) for conduits upto 25mm dia and not less than 0.9mm (20 gauge) for largest diameter. The corresponding widths shall be 19mm and 25mm.  
(b) The minimum width and the thickness of girder clips used for fixing conduits to steel joists, and clamps shall be as per Table-II.

### 2.2.3 Outlets

- (i) The switch box or regulator box shall be made of metal on all sides, except on the front. In case of welded mild steel sheet boxes, the wall thickness shall not be less than 1.2mm (18 gauge) for boxes upto a size of 20cm X 30cm and above this size 1.6mm

(16 gauge) thick MS boxes shall be used. The metallic boxes shall be duly painted with anticorrosive paint before erection as per Specifications.

- (ii) GI earth terminal with stud and 2 G.I. washers shall be provided in each MS box for termination of protective conductors and for connection to socket outlet/metallic body of fan regulator etc.
- (iii) A metal strip shall be welded/screwed, to the metal box as support if tumbler type of control switches, sockets and/or fan regulators are to be fixed therein.
- (iv) Clear depth of the box shall not be less than 50/60 mm and this shall be increased suitably to accommodate mounting of fan regulators in flush pattern.
- (v) The fan regulators can also be mounted on the switch box covers, if so stipulated in the tender specifications, or if so directed by the Engineer- in-Charge.
- (vi) Except where otherwise stated, 3mm thick phenolic terminated sheets shall be fixed on the front with brass screws, or aluminum alloy/cadmium plated iron screws as approved by the Consultant.

## 2.3 INSTALLATION

### 2.3.1 Common aspects for recessed and surface conduit works

- (i) Conduit Joints
  - (a) The conduit work of each circuit or section shall be completed before the cables are drawn in.
  - (b) Conduit pipes shall be jointed by means of screwed couplers and screwed accessories only. Threads on conduit pipes in all cases shall be between 13mm to 19mm long sufficient to accommodate pipes to full threaded portion of couplers or accessories.
  - (c) Cut ends of conduit pipes shall have no sharp edges, nor any burrs left to avoid damage to the insulation of the conductors while pulling them through such pipes.
  - (d) The Consultant, with a view to ensuring that the above provision has been carried out, may require that the separate lengths of conduit etc. after they have been prepared, shall be submitted for inspection before being fixed.

(e) No bare threads portion of conduit pipe shall be allowed unless such bare threaded portion is treated with anticorrosive pipe servative or covered with approved plastic compound.

(ii) Bends in conduit

(a) All necessary bends in the system, including diversion, shall be done either by neatly bending the pipes without cracking with a bending radius of not less than 7.5cm or alternatively, by inserting suitable solid or inspection type normal bends, elbows or similar fittings, or by fixing cast iron inspection boxes, whichever is most suitable.

(b) No length of conduit shall have more than the equivalent of four quarter bends from outlet to outlet.

(c) Conduit fittings shall be avoided as far as possible on conduit system exposed to weather. Where necessary, solid type fittings shall be used.

(iii) Outlets

(a) All outlets such as switches, wall sockets etc. may be either flush mounting type, or of surface mounting type, as specified in the Additional Specifications.

(iv) Painting after erection

After installation, all accessories of conduit pipes, fittings, switch and regulator boxes etc. shall be painted.

### 2.3.2 Additional requirements for surface conduit work

(i) Painting before erection

The outer surface of conduit including all bends, unions, tees, junction boxes, etc. forming part of the conduit system, shall be adequately protected against rust when such system is exposed to weather, by being painted with 2 coats of red oxide paint applied before they are fixed.

(ii) Fixing conduit on surface

(a) Conduit pipes shall be fixed by saddles, secured to suitable approved plugs with screws in an approved manner at an interval of not more than one metre, but on

either side of the couplers or bends of similar fittings, saddles shall be fixed at a distance of 45 cm from the centre of such fittings.

(b) Where conduit pipes are to be laid along the trusses steel joists etc. the same shall be secured by means of saddles or girder clips or clamps as required by the Consultant.

(c) In long distance straight run of conduit, inspection type couplers at reasonable intervals shall be provided, or running threads with couplers and jamnuts shall be provided.

(iii) Fixing outlet boxes

Only a portion of the switch box shall be sunk in the wall, the other portion being projected out for suitable entry of conduit pipes into the box.

### 2.3.3 Additional requirements for recessed conduit work

(i) Making chase

(a) The chase in the wall shall be neatly made, and of ample dimensions to permit the conduit to be fixed in the manner desired.

(b) In the case of buildings under construction, the conduits shall be buried in the wall before plastering, and shall be finished neatly after erection of conduit.

(c) In case of exposed brick/rubble masonry work, special care shall be taken to fix the conduit and accessories in position along with the building work.

(ii) Fixing conduits in chase

(a) The conduit pipe shall be fixed by means of staples, J-hooks or by means of saddles, not more than 60cm apart, or by any other approved means of fixing.

(b) All threaded joints of conduit pipes shall be treated with some approved preservative compound to secure protection against rust.

(iii) Fixing conduits in 'RCC work'

(a) The conduit pipes shall be laid in position and fixed to the steel reinforcement bars by steel binding wires before the concreting is done. The conduit pipes shall be fixed firmly to the steel reinforcement bars to avoid their dislocation during pouring of cement concrete and subsequent tamping of the same.

(b) Fixing of standard bends or elbows shall be avoided as far as practicable, and all curves shall be maintained by bending the conduit pipe itself with a long radius which will permit

easy drawing in of conductors.

(c) Location of inspection/junction boxes in RCC work should be identified by suitable means to avoid unnecessary chipping of the RCC slab subsequently to locate these boxes.

(iv) Fixing inspection boxes

(a) Suitable inspection boxes to the minimum requirement shall be provided to permit inspection and to facilitate replacement of wires, if necessary.

(b) These shall be mounted flush with the wall or ceiling concrete. Minimum 65mm depth junction boxes shall be used in roof slabs and the depth of the boxes in other places shall be as per IS:2667-1977.

(c) Suitable ventilating holes shall be provided in the inspection box covers.

(v) Fixing switch boxes and accessories

Switch boxes shall be mounted flush with the wall. All outlets such as switches, socket outlets etc. shall be flush mounting type, unless otherwise specified in the Additional Specifications.

(vi) Fish wire

To facilitate subsequent drawing of wires in the conduit. GI fish wire of 1.6mm/1.2mm (16/18 SWG) shall be provided alongwith the laying of the recessed conduits.

(vii) Bunching of cables

(a) Cables carrying direct current may, if desired, be bunched whatever their polarity, but cables carrying alternating current, if installed in metal conduit shall always be bunched so that the outgoing and return cables are drawn into the same conduit.

(b) Where the distribution is for single phase loads only, conductors for these phases shall be drawn in one conduit.

(c) In case of three phase loads, separate conduits shall be run from the distribution boards to the load points, or outlets as the case may be.

#### 2.3.4 Earthing requirements

(i) The entire system of metallic conduit work, including the outlet boxes and other metallic accessories, shall be mechanically and electrically continuous by proper screwed joints, or by double checknuts at terminations. The conduit shall be continuous when passing through walls or floors.

(ii) Protective (loop earthing) conductor(s) shall be laid along the runs of the conduit between the metallic switch boxes and the distribution boards/switch boards, terminated thereto. These conductors shall be of such size and material as specified. Depending upon their size and material, the protective earth conductors shall be either drawn inside the conduits along with the cables, or shall be laid drawn inside the conduits alongwith the cables, or shall be laid external to

the conduits. When laid external to the conduits, this shall be properly clamped with the conduit at regular intervals.

(iii) The protective conductors shall be terminated properly using earth studs, earth terminal block etc. as the case may be.

(iv) Gas or water pipe shall not be used as protective conductor (earth medium).

TABLE - I

Maximum number of PVC insulated 650/1100 V grade aluminium/copper conductor cable conforming to IS:694-1990

| Nominal cross sectional area of conductor in Sqmm. | 20mm |   | 25mm |   | 32mm |   | 38mm |   | 51mm |    | 64mm |    |
|----------------------------------------------------|------|---|------|---|------|---|------|---|------|----|------|----|
|                                                    | S    | B | S    | B | S    | B | S    | B | S    | B  | S    | B  |
| 1                                                  | 2    | 3 | 4    | 5 | 6    | 7 | 8    | 9 | 10   | 11 | 12   | 13 |

|      |    |    |    |    |    |    |    |    |    |    |    |
|------|----|----|----|----|----|----|----|----|----|----|----|
| 1.50 | 5  | 4  | 10 | 8  | 18 | -- | -- | -- | -- | -- | -- |
|      |    |    |    |    | 12 |    |    |    |    |    |    |
| 2.50 | 5  | 3  | 8  | 8  | 12 | -- | -- | -- | -- | -- | -- |
|      |    |    |    |    | 10 |    |    |    |    |    |    |
| 4    | 3  | 2  | 6  | 5  | 10 | 8  | -- | -- | -- | -- | -- |
| 6    | 2  | -- | 5  | 4  | 8  | 7  | -- | -- | -- | -- | -- |
| 10   | 2  | -- | 4  | 3  | 5  | 5  | 8  | 6  | -- | -- | -- |
| 16   | -- | -- | 2  | 2  | 3  | 3  | 6  | 5  | 10 | 7  | 12 |
| 25   | -- | -- | -- | -- | 3  | 2  | 5  | 3  | 8  | 6  | 9  |
| 35   | -- | -- | -- | -- | -- | -- | 3  | 2  | 6  | 5  | 8  |
| 50   | -- | -- | -- | -- | -- | -- | -- | -- | 5  | 3  | 6  |
| 70   | -- | -- | -- | -- | -- | -- | -- | -- | 4  | 3  | 5  |

Note:

1. The above table shows the maximum capacity of conduits for a simultaneous drawing in of cables.

2. The columns headed 'S' apply to runs of conduit which have distance not exceeding 4.25 m between draw in boxes and which do not deflect from the straight by an angle of more than 15 degrees columns headed 'B' apply to runs of conduit which deflect from the straight by an angle of more than 15 degrees.

3. Conduit sizes are the nominal external diameter.

TABLE - II

Girder Clips or clamps

(Clause 2.2.2(iv))

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Size of conduit	Width	Thickness
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|                      |      |                |
|----------------------|------|----------------|
| (i) 20mm             | 19mm | 0.9mm (20 SWG) |
| (ii) 25mm            | 19mm | 0.9mm (20 SWG) |
| (iii) 32mm and above | 25mm | 1.2mm (18 SWG) |

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CHAPTER: III

TESTING OF INSTALLATION

3.0 SCOPE

This chapter describes the details of tests to be conducted in the completed AIR-CONDITIONING installations, before commission.

3.1 GENERAL

3.1.1 Tests

On completion of installation, the following tests shall be carried out:

1. Insulation resistance test.
2. Polarity test of switch.
3. Earth continuity test.
4. Earth electrode resistance test.

3.1.2 Witnessing of tests

Testing shall be carried out for the completed installations, in the presence of and to the satisfaction of the Consultant by the contractor. All test results shall be recorded and submitted to the Department.

3.1.3 Test instruments

All necessary test instruments for the tests shall be arranged by the contractor if so required by the Consultant.

3.2 INSULATION RESISTANCE

3.2.1 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 earthed concentric wiring, all lamps in position, or both poles of the installation otherwise electrically connected together, a direct current pressure of not less than twice the working pressure, provided it need not exceed 500 volts for medium voltage, circuits, where the supply is derived from a three wire D.C. or a polyphane A.C.system the neutral pole of which is connected to

earth either directly or through added resistance, the working pressure shall be deemed to that which is maintained between the phase conductor and the neutral.

3.2.2 The insulation resistance shall also be measured between all the conductors connected to one pole, or phase conductor of the supply, and all the conductors conned to the neutral, or to the other pole or phase conductors of the supply with all the lamps in position, and switches in off position, and its value shall be not less than that specified in sub clause 3.1.3.

3.2.3 The insulation resistance in mega ohms measured as above shall not less than 12.5 mega ohms for the wiring with PVC insulated cable subject to a minimum of 1 megaohm.

3.2.4 Where a whole installation is being tested, a lower value than that given by the formula, subject to a minimum of 1 megaohm, is acceptable.

3.2.5 A preliminary and similar test may be made before the lamps etc. are installed, and in this event the insulation resistance to earth should not be less than 25 megaohms for the wiring with PVC insulated cables, subject to a minimum of 2 megaohms.

3.2.6 The term outlet includes every point along with every swtich except that a switch com
bined with a socket outlet, appliance or lighting fitting is regarded as one outlet.

3.2.7 Control rheostats, heating and power appliances and electric signs may, if required, be disconnected from the circuit during the test, but in that event the insulation resistance between the case or frame work, and all live parts of each rheostat, appliance and sign shall be not less than that specified in the relevant Indian Standard Specifications, or where there
is no such Specification, shall be not less than one megaohm.

3.3 POLARITY TEST OF SWITCH

3.3.1 In a two wire installation a test shall be made to verify that all the switches in every circuit have been fitted in the same conduits throughout, and such conductor shall be labeled or marked for connection to the phase conductor or to the non-earthed conductors of the supply.

3.3.2 In a three wire or a four wire installation, a test shall be made to verify that every non linked single pole switch is fitted in a conductor which is labeled, or marked for connection to one of the phase conductors of the supply.

3.3.3 The installation shall be connected to the supply for testing the terminals of all switches shall be tested by a test lamp, one lead of which is connected to the earth. Glowing of test lamp to its full brilliance, when the switch is in 'ON' position irrespective of appliance in position or not, shall indicate that the switch is connected to the right polarity.

3.4 TESTING OF EARTH CONTINUITY PATH

The earth continuity conductor, including metal conduits and metallic envelopes of cables in all cases, shall be tested for electric continuity. 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.

3.5 MEASUREMENT OF EARTH ELECTRODE RESISTANCE

3.5.1 Two auxilliary earth electrode, besides the test electrode, are placed at suitable distance from the test electrode (see figure). A measured current is passed between the electrode 'A' to be tested and an auxilliary current electrode 'C' and the potential difference

between the electrode 'A' and auxilliary potential B' is measured. The resistance of the test electrode 'A' is then given by;

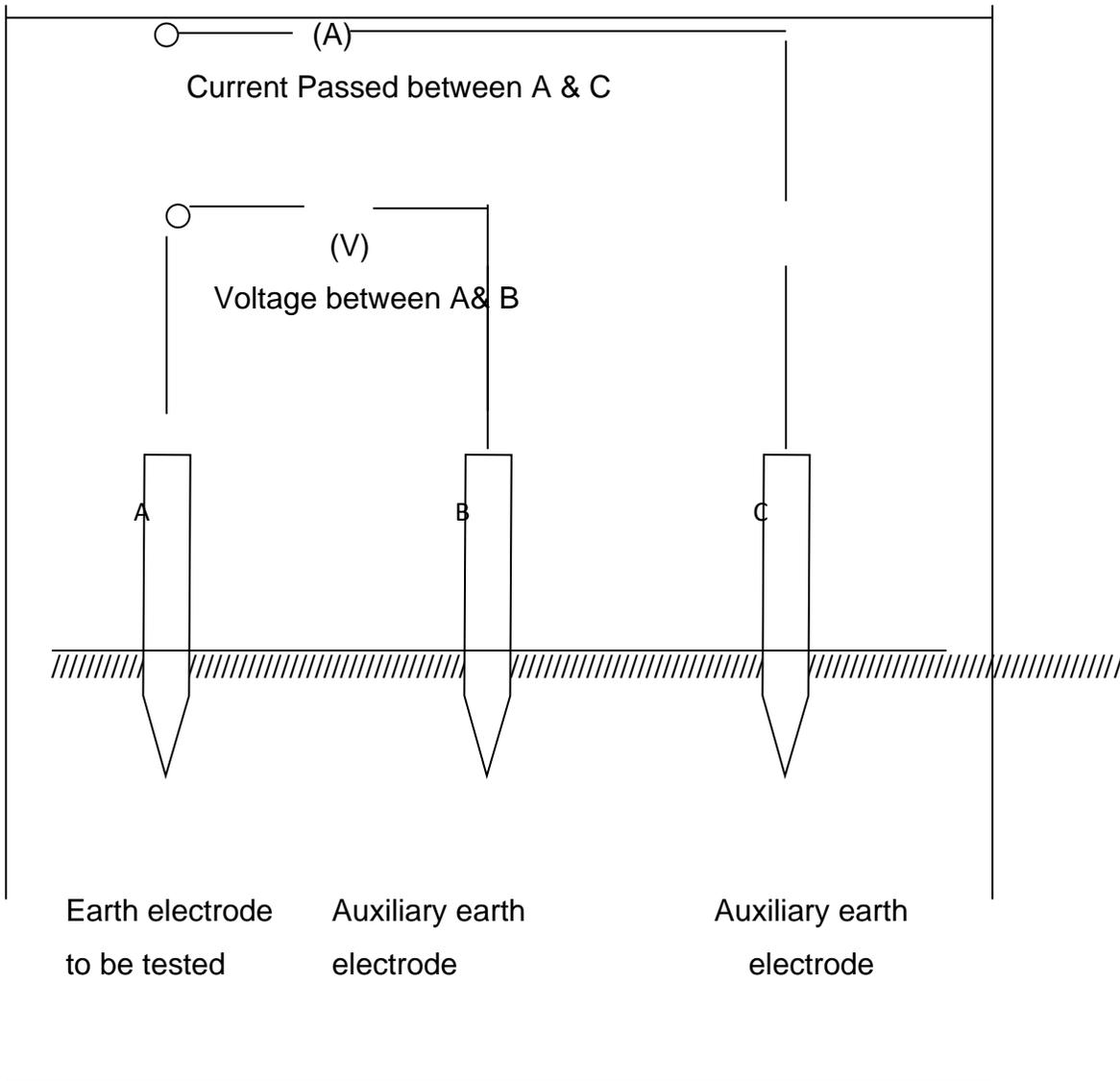
$$R = \frac{V}{I}$$

Where,

R = Resistance of the test electrode in ohms.

V = Reading of the voltmeter in volts.

I = Reading of the ammeter in amps



3.5.2

(i) Stray currents flowing in the soil may produce serious errors in the measurement of earth resistance. To eliminate this, a hand driven generator is used.

(ii) If the frequency of the supply of hand driven generator coincides with the frequency of stray current, there will be wandering of instrument pointer. An increase or decrease of generator speed will cause this to disappear.

3.5.3 At the time of test, the test electrode shall be separated from the earthing system.

3.5.4 The auxiliary electrodes shall be of 13mm diameter mild steel rod driven upto 1m into the ground.

3.5.5 All the three electrodes shall be so placed that they are independent of the resistance area of each other. If the test electrode is in the form of a rod, pipe or plate, the auxiliary current electrode 'C' shall be placed at least 30m away from it, and the auxiliary potential electrode 'B' shall be placed mid-way between them.

3.5.6 Unless three consecutive readings of test electrode resistance agree, the test shall be repeated by increasing the distance between electrodes A and C upto 50m and each time placing the electrode B midway between them.

3.5.7 On these principles, 'Megger Earth Tester' containing a direct reading ohm-meter, a hand driven generator and auxiliary electrodes are manufactured for direct reading of earth resistance of electrodes.

3.6 TEST CERTIFICATE

On completion of an electrical installation (or an extension to an installation) a certificate shall be furnished by the contractor, countersigned by the certified supervisor under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as given in Appendix 'A' in addition to the test certificate required by the Local Electric Supply Authorities.

CHAPTER-IV

MCB TYPE DISTRIBUTION BOARDS

4.1 (i) MCBDB's may be of single phase, 3 phase (horizontal type) suitable for feeding single phase loads, or 3 phase (vertical type) suitable for feeding single phase as well as 3 phase loads as specified. These shall be complete with accessories, but without MCBs which shall be specified as a separate item in the tender documents.

(ii) The current ratings and the number of ways shall be as specified. Blanking plates shall be provided to close unused ways.

(iii) DB with integral incomer

Where it is proposed to install the controlling MCCB/ELCB/MCB, the total number of outgoing MCBs will be reduced by one or two numbers corresponding to SP or SP&N at the incoming, since the total number of ways are fixed in MCBDBs. Bus bars in such units shall also be correspondingly shorter. The inter connections shall be done between the incomer and outgoings as part of the DB in the works.

(iv) MCBDBs shall be of surface/flush mounting pattern according to the requirement of their location and shall be suitable to accommodate MCB's and ELCB at incoming as well as outgoing in single pole or multipole configuration as required.

(v) MCBDB's shall be dust and vermin proof conforming to IP 42 and shall be fabricated out of CRCA sheet steel. 1.2 mm thick with stove enamelled paint finish.

(vi) MCBDB's shall have removable type end plates with knock outs at the bottom and top.

(vii) Only the knobs of the MCBs shall protrude out of the front covers through openings neatly machine made for the purpose.

(viii) The bus bars used shall be solid electrolytic copper of appropriate sections.

(ix) DIN bar(s) shall be provided for mounting the MCBs.

4.2 PRE-WIRED MCB DISTRIBUTION BOARDS

(i) Prewired MCBDBs shall be provided only where specified.

(ii) The complete board shall be factory fabricated and shall be duly prewired in the works, ready for installation at site.

(iii) The board shall be of wall mounted cubical type construction, fabricated out of 1.2 mm thick sheet steel with stove enamelled paint finish.

(iv) The board shall also be provided with a loose wire box (if mentioned in the scope of work) as a compartment for the complete width and, depth of the board and of minimum height of 125 mm in case of TPN DB's and 100 mm in case of SPN BD's.

(v) The board shall be provided with a hinged cover of 1.6mm thick sheet steel in the front. Only the knobs of the MCBs shall protrude out of the front covers through openings neatly machine made for the purpose.

(vi) Knock out holes at the bottom and detachable plate with knock out holes at the top of the board shall be provided.

(vii) The board shall be complete with the following accessories.

(a) 200A copper bus bar(s)

(b) Neutral link

(c) Common earth bar

(d) Din bar for mounting MCBs

(e) Elemex type terminal connectors suitable for incoming and outgoing cables.

(f) A set of indication lamps with HRC cartridge fuses for each phase of the incoming supply.

(g) Earthing stud(s).

(viii) The board shall be fully prewired with single core PVC insulated copper conductors/insulated solid copper links and terminated on to extended type terminal connectors, suitable for connections to the sizes of the respective conductors.

(ix) All incoming and outgoing wiring to the prewired MCBDB's shall be terminated only in the Elemex type extended terminal connectors to be provided within the DB. The terminal connectors shall therefore be so provided as to facilitate easy cable connections and subsequent maintenance.

(x) A common copper earth bar shall be provided within the loose wire box. The common neutral bar as well as the terminal connectors shall however be provided within the main compartment just below the loose wire box.

4.3 MINIATURE CIRCUIT BREAKERS (MCB's)

(i) 'Light' series 10 KA Breaking Capacity shall be used only for normal 'lighting' circuits.

(ii) 'Power' series 10 KA Breaking Capacity MCB's shall be invariably used for motor loads halogen lamp fittings, sodium/mercury discharge lamps and all 'power' circuits.

(iii) Ratings (Amps as well as KA), number of poles, type as MCB or isolator, etc. shall be as specified in the tender documents.

CHAPTER : V

MEDIUM VOLTAGE CABLING

5.0 Scope

5.1 The scope of work shall cover supply, laying, connecting, testing and commissioning of low and medium voltage power and control cabling.

5.2 Standards

5.2.1 The following standards and rules shall be applicable:

- 1) IS:1554 PVC insulated electric cables (heavy duty)
- 2) IS:1753 Aluminium conductors for insulated cables
- 3) IS:961 Recommended current ratings for cables.

4) Indian electricity act and rules. All codes and standards mean the latest. Where not specified otherwise the installation shall generally follow the Indian Standard Codes of Practice or the British Standard Codes of Practice where Indian Standards are not available.

5.3 Cables

5.3.1 All cables shall be 1100 volt grade PVC insulated, sheathed with or without steel armouring as specified and with an outer PVC protective sheath. Cables shall have high conductivity stranded aluminium or copper conductors and cores colour coded to the Indian Standards.

5.3.2 All cables shall be new without any kinds or visible damage. The manufacturers name, insulating material, conductor size and voltage class shall be marked on the surface of the cable at every 600mm centres.

5.4 Installation

5.4.1 Cables shall be laid in the routes marked in the drawings. Where the route is not marked, the contractor shall mark it out on the drawings and also on the site and obtain the approval of the Architect/Consultant before laying the cable. Procurement of cables shall be on the basis of actual site measurements and the quantities shown in the schedule of work shall be regards as a guide only.

5.4.2 Cables, running indoors shall be laid on walls, ceiling, inside shafts or trenches. Single cables laid shall be fixed directly to walls or ceiling and supported at not more

than 500mm. Where number of cables are run, necessary perforated cable trays shall be provided wherever shown. Perforated trays shall be mild steel or aluminium as specified in the schedule of work and supported on mild steel frame work as shown on drawings or as approved. Cables laid in built up trenches shall be on steel supports. Plastic identification tags shall be provided at every 30m.

5.4.3 Cables shall be bent to a radius not less than 12 (twelve) times the overall diameter of the cable or in accordance with the manufacturer's recommendations whichever is higher.

5.4.4 In the case of cables buried directly in ground, the cable route shall be parallel or perpendicular to roadways, walls etc. cables shall be laid on an excavated, graded trench, over a sand or soft earth cushion to provide protection against abrasion. Cables shall be protected with brick or cement tiles as shown on drawings. Width of excavated trenches shall be as per drawings. Backfill over buried cables shall be with a minimum earth cover of 600mm. The cables shall be provided with cables markers at every 35 meters and at all loop points.

5.4.5 The general arrangement of cable laying is shown on drawings. All cables shall be full runs from panel to panel without any joints or splices. Cables shall be identified at end terminations indicating the feeder number and the Panel/Distribution board from where it is being laid. All cable terminations for conductors upto 4 sqmm may be insertion type and all higher sizes shall have tinned copper compression lugs. Cable terminations shall have necessary brass glands. The end terminations shall be insulated with a minimum of six half lapped layers of P.V.C. tapes. Cable armouring shall be earthed at both ends.

5.5 Testing

5.5.1 MV cables shall be tested upon installation with a 500V Meggar and the following readings established

- 1) Continuity on all phases
- 2) Insulation Resistance

- (a) between conductors
 - (b) all conductors and ground
- All test readings shall be recorded and shall form part of the completion documentation.

SECTION : VI

EARTHING

6.0 Scope

6.1 The scope of work shall cover earthing stations, laying aluminium/copper earth strips and connecting the power panels, DBs and switch boards.

6.2 Standards

6.2.1 The following standards and rules shall be applicable:

- 1) IS:3043-1966 Code of Practice for earthing.
- 2) Indian Electricity Act and Rules.

6.2.2 All codes and standards mean the latest. Where not specified otherwise the installation shall generally follow the Indian Standard Code of Practice or the British Standard Codes of Practice in the absence of Indian Standards.

6.3 Plate Earthing Station

6.3.1 The substation earthing shall be with copper plate earthing station unless otherwise specified.

6.3.2 The earthing station shall be as shown on the drawing. The earth resistance shall be maintained with a suitable soil treatment.

6.3.3 The resistance of each earth station should not exceed 2 ohms.

6.3.4 The earth lead shall be connected to the earth plate through copper/brass bolts.

6.4 Pipe Earthing Station

6.4.1 The earth station shall be as shown on the drawing and shall be used for equipment earth grid. The earth electrode shall be 2.5 meter long 40mm dia galvanized steel pipe. The earth resistance shall be maintained with a suitable soil treatment.

6.4.2 The resistance of each earth station should not exceed 5 ohms.

6.4.3 The earth lead shall be fixed to the pipe with a clamp and safety set screws. The clamps shall be permanently accessible.

6.5 Earth leads and connections

6.5.1 Earth lead shall be bare copper or aluminium or galvanised steel as specified with sizes shown on drawings. Copper leads shall have a phosphor content of not over 0.15 percent. Aluminium and galvanised steel buried in ground shall be protected with bitumen and hessian wrap or polythene faced hessian and bitumen coating. At road crossings necessary hume pipes shall be laid. Earth lead run on surface of wall or ceiling shall be fixed on saddles or wall so that the strip is atleast 8mm away from the wall surface.

6.5.2 All earth strip shall be jointed as follows:

Copper Copper rivetting with 80mm fish plate and brazing

Alluminium Riveting with 2 Nos. 100mm long bimetal fish plates using copper rivets

Galvanised Steel Lap welding with 50mm minimum lap

6.5.3 All strips shall be run on walls/beams with 6mm thick galvanised steel earth saddles at 500mm centre to centre.

6.6 Equipment Earthing

6.6.1 All apparatus and equipment transmitting or utilising power shall be earthed in the following manner. Copper earth wires shall be used where copper wires are specified. Alluminium wires may be used where alluminium phase wires are specified unless otherwise indicated in the schedule of work.

6.6.2 Power transmission apparatus

Metallic conduit shall not be accepted as an earth continuity conductor. A separate insulated/bare earth continuity conductor of size 50% of the phase conductor subject to the minimum and maximum shall be provided.

Copper Alluminim Galvanised Steel

Minimum (sqmm)	2.5	4.0	6
Maximum (sqmm)	65	100	200

The earth continuity conductor may be drawn inside the conduit in which case, it should be insulated.

6.6.3 Non-metallic conduit shall have an insulated earth continuity conductor of the same size as for metallic conduit. All metal junction and switch boxes shall have an inside earth stud to which the earth conductor shall be connected. The earth conductor shall be distinctly colored (green) for easy identification.

6.6.4 Armoured cables shall be earthed by 2 distinct earth connections to the armouring at both the ends and the size of connection being as for the metallic conduit.

6.6.5 In the case of unarmoured cable, an earth continuity conductor shall either be run outside along the cable or should form a separate insulated core of the cable.

6.6.6 3 Ph. power panels and distribution boards shall have 2 distinct earth connections of the size correlated to the incoming cable size. In case of 1 Ph. DB's a single earth connection is adequate. Similarly for 3 Ph and 1 Ph isolating switches there shall be 2 and 1 earth connections respectively, sizes being correlated to the incoming cable.

6.6.7 Utilising Equipment

3 Ph. motors and other 3 Ph apparatus shall have 2 distinct earth connections of size equal to 50% of the connecting cable subject to the following:

	Copper	Alluminim	Galvanised Steel
Minimum (sqmm)	6.5	10	20
Maximum (sqmm)	65		100 200

6.6.8 For 1 Ph motors and 1 Ph apparatus, the single earth connections shall be provided of the above size. For all light fittings and fans a single earth connection with 2.5 sqmm copper or equivalent size shall be provided.

6.6.9 All street light poles shall have an earth stud and shall be connected to the cable armouring using 6.5 sqmm copper or equivalent unless shown otherwise. For street lighting poles planted in ground, 2.4 meter long 10 SWG bare copper wire shall be coiled and buried with every fourth pole in addition to connection to cable armouring.

6.6.10 An equipment earthing grid is established as shown on the drawings. All earth connections to all panels, DBs and equipment shall be connected to the nearest point of the earthing grid.

6.7 Testing

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

- 1) Each earthing station
- 2) Earthing system as a whole

- 3) Earth continuity conductors

CHAPTER : VII

MV SWITCHGEAR

7.0 Scope

7.1 The scope of work shall cover the supply, installation, testing and commissioning of all power panels, incorporating, switch fuses, bus bars, and contactor interconnections, earthing etc. meeting the requirements shown in equipment schedule and the drawings.

7.2 Standards

7.2.1 The following standards and rules shall be applicable:

- 1) IS:2516-1972 Specification for AC circuit breakers.
- 2) IS:4047-1977 Specification for Heavy duty air breaker switch gear and fuses for voltage not exceeding 1000 V.
- 3) IS:1818-1972 Specification for AC isolator and earthing switches.
- 4) IS:3072-1975 Code of Practice for installation and maintenance of switch gear.
- 5) IS:3106-1966 Code of Practice for selection, installation and maintenance of fuses (Voltage not exceeding 650 V).
- 6) IS:4237-1967 General requirements for switch gear and control gear for voltage not exceeding 1000 V.
- 7) IS:2607-1976 Air break isolators for Voltages not exceeding 1000 V.
- 8) IS:8623-1977 Specification for factory built assemblies of switch gear and control gear for voltage upto and including 1000 V AC and 1200 V DC.
- 9) Marking and arrangement of switch gear bus bars main connections and auxillary wiring.
- 10) Indian Electricity Act and Rules.

All codes and standards mean the latest. Where not specified otherwise the installation shall generally follow the Indian Standard Codes of Practice or the relevant British Standard Codes of Practice in the absence of corresponding Indian Standards.

7.3 Circuit Breakers

7.3.1 Circuit breakers shall be air break horizontal draw out type fully interlocked and meeting the requirements of IS:2516 or BS:3659. Breakers shall be rated for a medium voltage of 600 V and rated full load amperes as indicated on drawings. Breaker shall be capable of making and breaking system short circuits specified.

7.3.2 Breakers shall be unless specified otherwise manually operated, complete with front-of-the-panel operating handle, isolating plug with safety shutters, mechanical ON/OFF indicator, silver plated arcing and main contacts, are chutes, trip free operating. Breakers shall be capable of being racked out into 'Testing', 'Isolator' and 'Maintenance' positions and kept locked in any position. Breakers for remote operation shall be motor operated spring charged.

7.4 MCCB's

7.4.1 Moulded case circuit breakers shall be standard products of established manufacturers and shall conform to BS:3871. Breakers shall be rated for system short circuit levels and if unavoidable, backed up by HRC fuses. Breakers shall incorporate thermal and magnetic trips unless shown otherwise in the drawings.

7.5 Switch Fuse Units & Disconnects

7.5.1 Switch fuse units shall have quick make, quick break silver plated preferably double break contacts with operating mechanism suitable for rotary operation in the case of cubicle mounting.

All switches shall be rated according to the equipment schedule or drawings and shall withstand the system prospective fault current let through. Cam operated rotary switches with adequate terminal adopters upto 25A are acceptable but for all higher rating switch fuse units shall be heavy duty type conforming to IS:4047.

7.5.2 Fuses shall be HRC cartridge type conforming to IS:2208 with a breaking capacity corresponding to system fault level. Fuses shall be link type with visible indication. Screw type diazed fuses are not acceptable for any ratings.

7.5.3 All disconnects shall consist of switch units quick make, quick break type with silver plated contacts. The switches shall preferably have double breaks. The switches shall preferably have sheet steel enclosures, which in turn is mounted on suitable angle iron frame work. In wet locations switches shall have cast iron enclosures. Disconnects shall have a minimum breaking capacity of 5KV at 415 Volts.

7.6 Instrument Transformers, Meters & Relays

7.6.1 Ammeters and Voltmeters shall have moving iron spring controlled dead beat elements in square-bezel flush type cases 96mm in size and suitable for switch board mounting. Meters shall conform to BS:89 and have grade 'A' accuracy. Scale ranges shall meet with the requirements or as indicated on the drawing or in the Schedule of quantities.

7.6.2 Electronic energy meters shall be two element switch board mounting type suitable for unbalanced loads. Meters should incorporate a KVA demand meter with an integration time of 30 minutes. In case of two incoming feeders, a summing CT shall be provided with the meter. Meters shall conform to BS:37. The energy meters for DG Set and Transformer shall be calibrated and got certified by the respective Electricity Authority.

7.7 Cubicle Boards

7.7.1 All boards shall be combination of 14 and 16 SWG sheet steel free standing, extensible, totally enclosed, dust tight, vermin proof cubicle, flush dead front and modular construction suitable for 3 phase 415V 4 wire 50 Hertz system. All boards shall be accessible from the front for the maintenance of switch fuses, bus bars, cable terminations, meters etc. Cables shall be capable of entering the board both from top as well as bottom. All panels shall be machine pressed with punched openings for meters etc. All sheet steel shall be rust inhibited through a process of degreasing, acid picking, phosphating etc. The panels shall be finished with two coats of synthetic enamel of approved colour over one coat of red oxide primer. Engraved plastic labels shall be provided indicating the feeder details, and capacity and danger signs.

7.7.2 The boards shall accommodate air insulated bus bars, air circuit breakers, switch fuse units with HRC fuses, starters, necessary meters, relays contracts etc. as required

and arranged in suitable tiers. All breakers and switch fuses shall be suitably derated taking into account specified ambient temperature and rulling temperature inside the cubicle.

7.7.3 The switch board shall be fully compartmentalised in vertical tiers housing the feeder switches in totally enclosed independent compartments. Each compartment shall be self sufficient with switch unit, fuses, contractors, relays, indicating lamps and an inter locked door with facility for padlocking. Each feeder must terminate in an independent labelled terminal block. Strips type terminal block accommodating several feeders together is not acceptable. Pressure clamp type terminals suitable for alluminium wires may be used upto switches of 25A and cable lugs for higher ratings. All terminations shall be shrouded in an approved manner. The entire enclosure shall meet with IS:2147/1962. Feeder connections shall be cut of solid insulated copper/alluminium wires or strips with bimetallic clamps wherever required. Internal wiring, bus bar markings etc. shall conform to IS:375/1963. Internal wiring shall have terminal ferrules. Main switch should be at an easily accessible height and the highest switch operating handle should not be over 1.75m from floor level. Cable glands need not form part of the switch board as the cost of glands will form part of the cable termination.

7.8 Bus Bars

7.8.1 Bus bars shall be three phase and neutral and of copper or alluminium or alluminium alloy as specified and shown on drawings and rated for a temperature specified, based on insulated conductor rating (IS:8084-1976). Neutral bars may be of one half the size of the phase bars.

The main horizontal bus bars shall be of uniform cross section and rated in accord with the incoming switch. e vertical bus bars for the feeder columns may be rated at 75% of aggregate feeder capacity and shall be uniform in size. Bus bars and interconnections shall be taped with PVC colour coded tape to prevent bar-to-bar accidental shorts.

Each bus bar shall be directly and easily accessible on removal of the front cover. Bus bars shall be totally enclosed, shrouded and supported on non-hygroscopic insulator blocks to withstand thermal and dynamic overloads during system short circuits. An earth bus of size 50% of the phase subject to the following maximum and minimum shall be provided. Individual switch components shall be connected with the earth bus through copper or aluminium or galvanized steel strip size as shown. All wire connections to bars shall be through lugs, bolts and nuts and spring washers.

	Copper	Alluminium	Galvanized Steel
Minimum	6.5 sqmm	10 sqmm	16 sqmm
Maximum	65 sqmm	120 sqmm	200 sqmm

The minimum size of earth bar in a board shall however be 15 x 3 Cu or 25 x 3 Al. or equivalent.

7.9 Isolators

7.9.1 Isolators shall be fixed on wall on self supported angle iron frame work as required and mounted as near to the motor as possible. Where several motors are installed, isolators if required shall be provided at a central location on a common frame work.

7.9.2 Painting, earthing and lables shall be provided as generally indicating for MV switch gear.

7.10 Earthing

7.10.1 All switch panels shall be provided with an earth bar as specified.

7.10.2 Earthing of the switch boards shall be through the equipment earthing system provided in the building with two earth connection as shown.

7.11 Installation

7.11.1 All panels shall be supported on MS channel incorporated in the panel during the fabrication. all such supports shall be prime coated with two finish coats after completion of the work all panels shall be touched up for damaged painting.

7.11.2 All panels shall be megged phase to phase and phase to neutral using a 1000V meggar with all outgoing feeders in closed position. The meggar value should not be less than 2.5 megohms between phases and 1.5 megohms between phases and neutral.

7.11.3 Fabrication drawings of all panels shall be approved by the Consulting Engineers before fabrication.

7.12 Testing & Inspections

7.12.1 All switch boards shall be factory inspected before finishing and dispatch.

7.12.2 Certificate for all routine and type tests for circuit breakers in accordance with the IS:2516-1963 shall be finished. In addition, all panels shall be megged phase to phase and phase to neutral, using a 1000V meggar with all switch gear in closed position. The meggar value should not be less than 2.5 megohms between phases and 1.5 megohms between phase and neutral.