

TENDER FOR
Proposed Air Conditioning Work for
UCO BANK,
SARGASAN BRANCH & ATM,
SARGASAN.

Date of issuing of tender : 17 - 04 - 2025 to 23 - 04 - 2025.

Date of receiving back : 23 - 04 - 2025 up to 5.00 pm at the General
duly filled in tenders Administration Department, UCO Bank (Z. O.),
Ahmedabad.

Date and Time of opening : 23 - 04 - 2025 at 05.30 p.m. at the General
the tenders received Administration Department, UCO Bank (Z. O.),
Ahmedabad.

Tender issued To :

OWNER

UCO BANK
ZONAL OFFICE,
UCO BHAVAN, ASHRAM ROAD,
AHMEDABAD - 380 006.

MESSRS VIRAT V. THAKORE ARCHITECTS, URBAN DESIGNERS AND VALUERS

‘SHEEL’, 98/1, SAMASTA SOCIETY, NARAYANNAGAR ROAD, AHMEDABAD - 7, Tele Fax : 26621815 Ph : 26601814

NOTICE OF INVITATION TO TENDER

Sealed tenders on item rate basis are invited from enlisted contractors for Air Conditioning work at UCO Bank (Sargasan Branch & ATM), Sargasan.

Estimated Cost of Work : Rs. 2,45,000.00

Earnest Money : Rs 2,400.00 by crossed demand draft dischargeable / payable at Ahmedabad and drawn in favour of UCO Bank (Zonal Office), Ahmedabad.
(THOSE VENDORS WHO ARE REGISTERED UNDER MSME ACT. NEED NOT PAY EARNEST MONEY DEPOSIT)

Time of Completion : 21 days

Time, Date and place of submission of Tender : On or before 5.00 pm, 23rd April, 2025 to General Administration Department, UCO Bank (Z. O.), Ahmedabad.

Time and Date of opening of Tender : 05.30 p. m., Wednesday, 23rd April, 2025.

The Bank will not be bound to accept the lowest tender and reserves the right to accept or reject any or all the tenders without assigning any reason whatsoever.

UCO Bank (Zonal Office)
UCO Bhavan, Ashram Road,
Ahmedabad - 380 006.

To,
The Asst. General Manager,
UCO Bank (Zonal Office),
UCO Bhavan, Ashram Road,
Ahmedabad - 380 001.

Sub : Proposed Electrical work and Data cabling work for UCO Bank (Sargasan Branch & ATM), Sargasan.

Sir,

I / We the undersigned have carefully gone through and clearly understood the plans, specifications, schedule of quantities, general conditions and conditions of appendix for the above mentioned work and having VISITED & EXAMINED THE SITE of the proposed work, do hereby tender to execute and complete the entire work in accordance with the priced bill of quantities and / or as given in the specifications of each works attached hereto.

It is understood that the lowest or any tender will not necessarily be accepted and that you are not bound to assign any reason of the same.

I/ We agree to keep our offer open for six months from the date of opening.

Having examined the drawings, schedule of quantities relating to the proposed Tender for furniture work and having visited and examined the site of the proposed works and having acquired the tender invited by you. We the undersigned hereby offer to execute, complete and maintain the proposed work in strict accordance with the specifications described in the Tender at the item rates quoted by us in the Tender for the sum Rs

We undertake to complete and deliver the total work within 21 days from the date of issue of work order from you

We have enclosed herewith crossed demand draft bearing No : _____ dtd : _____
for Rs 2,400.00 favouring UCO Bank (Z.O.), Ahmedabad and drawn on _____
towards earnest money deposit and understand that this earnest money paid by us shall be forfeited by you in
case of our failure in commencing the work within three days of issue of work order.

Name and address of the contractor

Signature & Stamp of Contractor

Place :

Date :

ARTICLES OF AGREEMENT

ARTICLES OF AGREEMENT made the _____ day of _____ 2025 between UCO Bank (Zonal Office), Ahmedabad (here in after called the OWNER) on One part whose registered office is situated at UCO Bhavan, Ashram Road, Ahmedabad and (here in after called the CONTRACTORS) of the other part (whose registered office is situated at)

Whereas the Owner is desirous of carrying out various types of electrical work and data cabling work for UCO Bank (Sargasan Branch & ATM), Sargasan and has caused Drawings and Bills of Quantities showing and describing the work to be done, to be prepared by or under the direction of M/S. VIRAT V. THAKORE, Architects Urban Designers, and Valuers, 'Sheel', 98/1, Samasta Society, Narayannagar Road, Ahmedabad - 380 007.

And whereas the Contractor has supplied the owner with a fully priced copy of the said bills of quantities (which copy is herein after referred to as "The Contract Bills") and whereas the said drawings (herein after referred to as "the contract drawings") and the contract bills have been signed by or on behalf of the parties here to : and whereas the contractor has deposited the sum of Rs. _____ (Rupees _____ Only) with the Architect/ owner for the due performance of this Agreement.

NOW IT IS HEREBY AGREED AS FOLLOWS :

1. For the construction herein after mentioned the Contractor will upon and subject to the conditions annexed carry out and complete the work shown upon the Contract Drawings and described by or referred to in the Contract Bills and in the said Conditions.
2. The owner will pay the Contractor the sum of Rs. _____ (Rupees _____ Only) herein after referred to as " THE CONTRACT SUM" or such other sum as shall become payable hereunder at the times and in the manner specified in the said Conditions.
3. The term the Architect in the said Conditions shall mean the said VIRAT V. THAKORE or in the event of his death or ceasing to be the Architect for the purpose of this Contract, such other person as the owner shall nominate for that purpose, not being a person to whom the Contractor shall object for reasons considered to be sufficient by an arbitrator appointed in accordance with the said Conditions. Provided always that no person subsequently appointed to be the Architect under this contract shall be entitled to disregard or overrule any Certificate or opinion or decision or approval or instruction given or expressed by the Architect for the time being.
4. The said Condition and appendix there to shall be read and construed as forming part of this Agreement, and the parties here to shall respectively abide by, submit themselves to the conditions and perform the agreement on their parts respectively in such conditions contained.

As witnesses our hands this _____ day of _____ 20____
signed by the said in the _____ Owner
presence of

Witness :

Name :

Address :

Signed by the said _____ Contractor
in the presence of

Witness :

Name :

Address :

GENERAL RULES AND INSTRUCTIONS FOR THE GUIDANCE OF TENDERERS

1. Tenders are hereby invited on behalf of UCO Bank (Zonal Office), Ahmedabad for electrical work and data cabling work to be executed at UCO Bank (Sargasan Branch & ATM), Sargasan an estimated cost of Rs. 2,45,000.00.
2. Contract documents consisting of the electrical layout, complete specifications, the schedule of quantities of the various classes of work to be done, and the set of conditions of contract to be complied with by the persons whose tenders may be accepted, is forwarded herewith.

The site for the work is available for inspection.
3. Duly filled in Tender document along with Earnest money deposit amounting to Rs. 2,400.00 in the form of Crossed Bank Draft only drawn in favour of UCO Bank, Zonal Office, Ahmedabad, placed in a sealed cover super scribed "Tender for electrical work of UCO Bank (Sargasan Branch & ATM), Sargasan and addressed to the General Administration Department, UCO Bank (Z. O.), Ahmedabad will be received up to 5.00 pm, **Wednesday, 23rd April, 2025** and will be opened at 5.30 p. m. on **Wednesday, 23rd April, 2025**.
4. The time allowed for the carrying out of the work will be 21 days from the day of receiving written orders to commence work or date of getting possession of site, whichever is later.
5. The contractors should quote in figures as well as in words the rate, and amount tendered by them. The amount for each item should be worked out and the requisite totals given.
6. The contractor, whose tender is accepted will be required to furnish security deposit @ 2.00 % of the accepted tender amount (inclusive of the earnest money paid earlier) for the due fulfillment of his contract.
7. The EMD of the contractor whose tender is accepted, shall be forfeited in full incase he does not remit the Initial Security Deposit within the stipulated period or start the work by the stipulated date mentioned in the award letter.
8. The acceptance of a tender will rest with the General Administration Department, UCO Bank (Z. O.), Ahmedabad which does not bind itself to accept the lowest tender, and reserves to itself the authority to reject any or all of the tenders received without the assignment of a reason. All tenders in which any of the prescribed conditions are not fulfilled or are incomplete in any respect are liable to be rejected.

The bank reserves the right to accept the tender in full or in part and the tenderer shall have no claim for revision of rates or other conditions if his tender is accepted in parts.
9. Canvassing in connection with tenders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection.
10. All rates shall be quoted on the proper form of the tender alone.
11. An item rate tender containing percentage below / above will be summarily rejected. However, where a tenderer voluntarily offers a rebate for payment within a stipulated period, this may be considered.
12. On acceptance of the tender, the name of the accredited representative(s) of the contractor who would be responsible for taking instructions from the Employer/Architects shall be communicated to the Employer.
13. Special care should be taken to write the rates in figures as well as in words and the amounts in the figures only, in such a way that interpolation is not possible. The total amount should be

written both in figures and in words. Incase of figures, the words “Rs.” should be written before the figure of rupees and words “P” after the decimal figures , e. g. Rs. 2.15p. & incase of words, the word “Rupees” should precede and the word “Paise” should be written at the end, unless the rate is in whole rupees and followed by the words “only” it should invariably be up to two decimal places. While quoting the rate in schedule of quantities, the word “only” should be written closely following the amount and it should not be written in the next line.

14. **The rates quoted in the tender shall include all charges of scaffolding, lift, any tools and plants Railway freight, labour conditions a fluctuation in the rates, excise duty, sales tax and any other taxes or expenditure for carrying out the work but exclude the GST. The GST at the prevailing rate shall be calculated separately and added in the final bill by the contractor.**
15. The tender for works shall remain open for acceptance for a period of three month from the date of opening of tenders. If any tenderer withdraws his tender before the said period, then the Bank shall be at liberty to forfeit Earnest Money paid along with the tender.
16. The tender for the work shall not be witnessed by a contractor or contractors who himself/themselves has/have tendered or who may and had/have tendered for the same work. Failure to observe this condition would render tenders of the contractors tendering as well as witnessing the tender liable to summary rejection.
17. It will be obligatory on the part of the tenderer to tender and sign the tender documents for all the component parts and that, after the work is awarded, he will have to enter into an agreement for each component with the Competent Authority in the Bank.

GENERAL CONDITIONS OF CONTRACT

Except where provided for in the description of the individual items in the schedule of quantities and in the specifications and conditions laid down hereinafter and in the drawings, the work shall be carried out as per standard specifications and under the direction of Employer / Architect.

1. Interpretation

In constructing these conditions, the specifications, the schedule of quantities, tender and agreement, the following words shall have the meaning herein assigned to them except where the subject or context otherwise requires.:

- i) Employer :The term Employer shall denote UCO Bank (Z. O.), Ahmedabad with their head office at UCO Bhavan, Ashram Road, Ahmedabad.
- ii) Architect/Consultants : The term Architects shall mean M/s. Virat V. Thakore, 'Sheel', 98/1, Samasta Society, Narayannagar Road, Ahmedabad -380 007 or in the event of his/their ceasing to be the Architects for purpose of this contract such other person/s as the Employer shall nominate for the purpose. The Architect with the approval of the Bank may engage a local Architect/ Consulting Engineer for supervision and co-ordination of the work at the site. He will be considered a representative of the Architect. The Bank may also engage a Project Management Consultant for the supervision of the work. He will be designated by the term P. M. C. and work as Employer's agent at the site.
- iii) Contractor : The term contractor shall mean _____
(Name and address of the contractor) and his / their heirs, legal representatives, assigns and successors.
- iv) Site : The site shall mean the site where the works are to be executed.
- v) Drawings : The work is to be carried out in accordance with drawings specifications, the schedule of quantities and any further drawings which may be supplied or any other instruction, which may be given by the employer during the execution of the work.

All drawings relating to work given to the contractor together with a copy of schedule of quantities are to be kept at site and the Employer/Architects/PMC shall be given access to such drawings or schedule of quantities whenever necessary.

Incase any detailed drawings are necessary contractor shall prepare such detailed drawings and/or dimensional sketches therefore and have it confirmed by the Employer/Architects/PMC as case may be prior to taking up such work.

The contractor shall ask in writing for all clarifications on matters occurring anywhere in drawings, specifications and schedule of quantities or to additional instructions at-least 3 days ahead from the time when it is required for implementation so that the Employer may be able to give decision thereon.

- vi) "The Works" shall mean the work or works to be executed or done under this contract.
- vii) "Act of Insolvency" shall mean any act as such as defined by the Presidency Towns Insolvency Act or in Provincial Insolvency Act or any amending statutes.
- viii) "The Schedule of Quantities" shall mean the schedule of quantities as specified and forming part of this contract.
- ix) "Priced Schedule of Quantities" shall mean the schedule of quantities duly priced with the accepted quoted rates of the contractor.

2. Scope

The work consists of electrical work and data cabling work to be executed for UCO Bank (Sargasan Branch & ATM) Sargasan in accordance with the “drawings” and “Schedule of Quantities”. It includes furnishing all materials, labour, tools and equipment and management necessary for and incidental to the construction and completion of the work. All work, during its progress and upon completion, shall confirm to the lines, elevations and grades as shown on the drawings furnished by the Employer /Architects. Should any detail essential for efficient completion of the work be omitted from the drawings and specifications it shall be the responsibility of the contractor to inform the Employer/Architects and to furnish and install such detail with Employer’s/Architect’s concurrence, so that upon completion of the proposed work the same will be acceptable and ready for use.

Employer or his agent (PMC)/Architects may in their absolute discretion to issue further drawings and/or written instructions, details ,directions and explanations, which are, hereafter collectively referred to as “The Employer’s/Architect’s instructions” in regard to:

- a) The variation or modification of the design quality or quantity of works or the additions or omission or substitution of any work.
- b) Any discrepancy in the drawings or between the schedule of quantities and/or drawings and /or specification.
- c) The removal from the site of any defective material brought thereon by the contractor and the substitution of any material thereof.
- d) The demolition removal. and/or re-execution of any work executed by the contractors.
- e) The dismissal from the work of any persons employed thereupon.
- f) The opening up for inspection of any work covered up.
- g) The rectification and making good of any defects under clauses hereinafter mentioned and those arising during the maintenance period (retention period).

The contractor shall forthwith comply with and duly execute any work comprised in such Employer’s or his agent/Architect’s instructions, provided always that verbal instructions, directions and explanations given to the contractor’s or his representative upon the worries by the Employer or his agent/Architects shall ,if involving a variation, be confirmed in writing to the contractor/s within three days. No works for which rates are not specifically mentioned in the priced schedule of quantities, shall be taken up without written permission of the Employer or his agent/Architects. Rates of items not mentioned in the priced schedule of quantities shall be fixed by the employer in consultation with the Architects as provided in Clause “variation”. Regarding all factory made products for which ISI marked products are available, only products bearing ISI marking shall be used in the work.

3. Tenderer shall Visit the Site

Intending tenderer shall visit the site and make himself thoroughly acquainted with the local site condition, nature and requirements of the works, facilities of transport condition, effective labour and materials, access and storage for materials and removal of rubbish. The tenderer shall provide in their tender for cost of carriage, freight and other charges as also for any special difficulties and including police restriction for transport etc. for proper execution of work as indicated in the drawings. The successful tenderer will not be entitled to any claim of compensation for difficulties faced or losses incurred on account of any site condition which existed before the commencement of the work or which in the opinion of the Employer or his agent/Architects might be deemed to have reasonably been inferred to be so existing before commencement of work.

4. Tenders

The entire set of tender paper issued to the tenderer should be submitted fully priced and also signed on the last page together with seal of organization and initials on every page. Initial/signature will indicate the acceptance of the tender paper by the tenderer.

The schedule of quantities shall be filled in as follows :

- i) The “Rate” column to be legibly filled in ink in both English figures and English words.
- ii) Amount column to be filled in for each item and the amount for each sub head as detailed in the “Scheduled of Quantities”.
- iii) All corrections are to be initialed.
- iv) The “Rate Column” for alternative items shall be filled up.
- v) The “Amount” column for alternative items of which the quantities are not mentioned shall not be filled up.

No modifications, writings or corrections can be made in the tender papers by the tenderer, but may at his option offer his comments or modifications in a separate sheet of paper attached to the original tender papers.

The Employer reserves the right to reject the lowest or any tender and also to discharge any or all of the tenders for each section or to split up and distribute any item of work to any specialist firm or firms without assigning any reason.

The tenderers should note that the tender is strictly on the item rate basis and their attention is drawn to the fact that rates for each and every item should be correct, workable and self supporting .If called upon by the Employer/Architects detailed analysis of any or all the rates shall be submitted. The Employer/Architects shall not be bound to recognize the contractor’s analysis.

The works will be paid for as “measured work” on the basis of actual work done and not as “lump sum” contract, unless otherwise specified.

All item of work described in the schedule of quantities are to be deemed and paid as complete works in all respects and details including preparatory and finishing works involved, directly, related to and reasonably detectable from the drawings, specifications and schedule of quantities and no further extra charges will be allowed in this connection. In the case of lump-sum charges in the tender in respect of any item of works, the payment of such items of work will be made for the actual work done on the basis of lump-sum charges as will be assessed to be payable by the Employer/Architects.

The Employer has power to add to, omit from any work as shown in drawings or described in specifications or included in schedule of quantities and intimate the same in writing but no addition, omission or variation shall be made by the contractor without authorization from the Employer. No variation shall vitiate the contract.

The tenderer shall note that his tender shall remain open for consideration for a period of three months from the date of opening of the tender.

5. Agreements

The successful contractor may be required to sign agreement as may be drawn up to suit local conditions and shall pay for all stamps and legal expenses, incidental thereto.

6. Government and Local Rules

The contractor shall confirm to the provisions of all local Bye-laws and Acts relating to the work and to the Regulations etc., of the Government and Local Authorities and of any company with whose system the structure is proposed to be connected . The contractor shall give all notices required by said Act, Rules, Regulations and Bye-laws etc. and pay all fees payable to such authority/authorities for execution of the work involved. The cost, if any, shall be deemed to have included in his quoted rates, taking into account all liabilities for licenses, fee for

footpath encroachment and restorations etc, and shall indemnify the Employer against such liabilities and shall defend all actions arising from such claims or liabilities.

7. Quantity of Work to be Executed

The quantities shown in the schedule of quantities are intended to cover the entire new structure indicated in the drawings but the Employer reserves the right to execute only a part or the whole or any excess thereof without assigning any reason therefore.

8. Other Persons Engaged by the Employer

The employer reserves the right to execute any part of the work included in this contract or any work which is not included in this contract by other Agency or persons and contractor shall allow all reasonable facilities and use of his scaffolding for the execution of such work. The main contractor shall extend all cooperation in this regard.

9. Earnest Money and Security Deposit

The tenderer will have to deposit an amount of Rs. 2,400.00 in the form of Bank Draft drawn in favour of UCO Bank (Z.O.), Ahmedabad at the time of submission of tender as an Earnest Money. The Employer is not liable to pay any interest on the Earnest Money. The Earnest Money of the unsuccessful tenderers will be refunded without any interest soon after the decision to award the work is taken or after the expiry of the validity period of the tender.

The successful tenderer to whom the contract is awarded will have to deposit as Initial Security Deposit a further sum to make up 2% of the value of the accepted tender including the Earnest money. The Initial Security Deposit will have to be paid within 3 days from the date of acceptance of tender, failing which the Employer at his discretion may revoke the letter of acceptance and forfeit the Earnest Money Deposit furnished along with the tender. The Initial Security Deposit will be refunded to the contractor without any interest within fourteen days after the issue of the certificate of virtual completion by architect. Apart from the Initial Security Deposit made as above, Retention Money shall be deducted from progressive running bills @ 8% of the gross value of each running bill. The retention amount will be refunded to the contractor within 14 days after completion of Defects Liability period. Provided that he satisfactorily carries out all the work and attends to all defects in accordance with the conditions of the contract .No interest is allowed on retention money.

10. Contractor to Provide Everything Necessary.

The contractor shall provide everything necessary for the proper execution of the work according to the intent and meaning of the drawings, schedule of quantities and specifications taken together whether the same may or may not be particularly shown or described therein provided that the same can reasonably be inferred there from and if the contractor finds any discrepancies therein he shall immediately and in writing, refer the same to the Employer/Architects/PMC whose decision shall be final and binding.

The contractor shall supply, fix and maintain at his own cost , for the execution of any work, all tools, tackles, machineries and equipments and all the necessary centering, scaffolding, staging, planking, timbering, strutting, shoring, pumping, fencing, boarding, watching and lighting by night as well as by day required not only for the proper execution and protection of the said work but also for the protection of the public and safety of any adjacent roads, streets, walls, houses, buildings, all other erections, matters and things and the contractor shall take down and remove any or all such centering, scaffolding, planking ,timbering ,strutting, shoring etc., as occasion shall be required or when ordered so to do, and shall fully reinstate and make good all matters and things disturbed during the execution of works to the satisfaction of the Employer/Architects.

The contractor shall at all times give access to workers employed by the Employer or any men employed on the buildings and to provide such parties with proper sufficient and if required, special scaffolding, hoists and ladders and provide them with water and lighting and leave or make any holes, grooves, etc, in any work, where directed by the employer as may be required to enable such workmen to lay or fix pipes, electrical wiring, special fittings etc. The quoted rates of the tenderers shall accordingly include all these above mentioned contingent works.

11. Extension of Time & Progress Chart.

1. **Extension of Time :** If in the opinion of the Employer/Architects/PMC the works be delayed (a) by reason of any exceptionally inclement weather, or (b) by reason of instructions from the Employer in consequence of proceedings taken or threatened by or disputes, with adjoining or neighboring owners or (c) by the works, or delay, of other contractors or tradesmen engaged or nominated by the Employer and not referred to in the specification or (d) by reason of authorized extra and additions or (e) by reason of any combination of workmen or strikes or lock out affecting any of the building trades or (f) from other causes which the Employer may consider being beyond the control of the contractor, the Employer at the completion of the time allowed for the contract shall make fair and reasonable extension of time for completion in respect there fore .In the event of the Employer failing to give possession of the site upon the day specified above the time of completion shall be extended suitably.

Incase of such strikes or lockouts, as are referred to above, the contractor shall, immediately give the Employer, written notice thereof. Nevertheless, the contractor shall use his best endeavors all that to prevent delay, and shall do all that may be reasonably required, to the satisfaction of the employer to proceed with the works and on his doing so that it will be ground of consideration by the Employer for an extension of time as above provided. The decision of the Employer as to the period to be allowed for an extension of time for completion hereunder (which decision shall be final and binding on the contractor) shall be promulgated at the conclusion of such strike or lock out and the employer shall then, in the event of an extension being granted, determine and declare the final completion date. The provision in clause 15 with respect to payment liquidated damages shall, in such case, be read and construed as if the extended date fixed by the Employer were substituted for and the damage shall be deducted accordingly.

2. **Progress of Work:** During the period of execution the contractor shall maintain proportionate progress on the basis of Programmed Chart submitted by the contractor before commencement of work and agreed to by the Employer/Architects. Contractor should also include planning for procurement of scarce material well in advance and reflect the same in the Programmed Chart so that there is no delay in completion of the project.

12. Liquidated Damages

Should the work be not completed to the satisfaction of the Employer/Architects within the stipulated period, the contractor shall be bound to pay to the Employer a sum of **Rs 342.00** per day by way of liquidated damages and not as penalty during which the work remains uncompleted or unfinished after the expiry of the completion date.

Storage of materials: The contractor shall arrange for the proper storage and adequate protection of the materials etc, and other work that may be executed on the site including the tools and materials of sub-contractors and remove same on completion.

13. Clearing Site and Setting out Works

The site shown on the plan shall be cleared of all obstructions, surplus materials and rubbish of all kinds on completion of all works.

The contractor shall set out the works and shall be responsible for the true and perfect setting out of the work and for the correctness of the positions, levels, dimensions and alignment of all parts thereof. If at any time, any error shall appear during the progress of any part of the work, the contractor shall at his own expenses rectify such error, if called upon to the satisfaction of the Employer. The contractor shall further set out the works to the alternative positions at the site until one is finally approved and the rates quoted in his tender should include for this and no extra on this account will be entertained.

14. Access to representatives of owner and architect

Any authorized representative of the Employer shall at all reasonable times have free access to the works and/or to the workshops, factories or other places where materials are being prepared or constructed for the work and also to any place where the materials are lying or from where they are being obtained, and the contractor shall give every facility to the Bank or their representatives necessary for inspection and examination and test of the materials and workmanship. Except the representatives of the Employer no person shall be allowed at any time without the written permission of the Employer.

15. Materials, Workmanship, Samples, Testing of Materials

All the works specified and provided for in the specifications or which may be required to be done in order to perform and complete any part thereof shall be executed in the best and most workmanlike manner with materials of the best and approved quality of the respective kinds in accordance with the particulars contained in and implied by the specifications and as represented by the drawings or according to such other additional particulars, and instructions as may from time to time be given by the Employer/Architects during the execution of the work, and to their entire satisfaction.

During the inclement weather the contractor shall suspend the work as the Employer/Architects may direct and shall protect from injury all work when in course of execution. Any damage (during constructions) to any of the work for any reasons due to rain, storm, or neglect of contractor shall be rectified by the contractor in an approved manner at no extra cost.

16. Removal of Improper Work

The Employer shall during the progress of the work have power to order in writing from time to time the removal of the works which in opinion of the Employer/Architects are not in accordance with specification or instructions or any work executed with materials or workmanships not in accordance with the drawings and specifications or instructions. In case the contractor refuses to comply with the order the Employer shall have the power to employ and pay other agencies to carry out the work and all expenses consequent thereon or incidental thereto as certified by the Employer/Architects shall be borne by the contractor or may be deducted from any money due to or that may become due to the contractor. No certificate which may be given by the Architects shall relieve the contractor from his liability in respect of unsound work or bad materials.

17. The contractor shall comply with the provision of all labour legislation including the requirement of

- a) The payment of Wages Act
- b) Employer's Liability Act
- c) Workmen's Compensation Act
- d) Contract Labour (Regulation & Abolition) Act, 1970 and Central Rules 1971.
- e) Apprentices Act 1961.
- f) Minimum wages Act
- g) Any other Act or enactment relating thereto and rules framed there under from time to time.

The contractor shall keep the Employer saved harmless and indemnified against claims if any of the workmen and expenses as may be incurred by the Employer in connection with any claim that may be made by any workmen.

18. Dismissal of Workmen

The contractor shall on the request of the Employer immediately dismiss from works any person employed thereon by him, who may in the opinion of the Employer be unsuitable or incompetent or who may misconduct himself. Such discharges shall not be the basis of any claim for compensation or damages against the Employer or any of their officer or employee.

19. Assignment

The whole of the works included in the contract shall be executed by the contractor and the contractor shall not directly or indirectly transfer, assign or underlet the contract or any part, share or interest therein nor, shall take a new partner, without written consent of the Employer and no subletting shall relieve the contractor from the full and entire responsibility of the contract or from active superintendence of the work during their progress.

20. Damage to Persons and Property Insurance Etc

The contractor shall be responsible for all injury to the work or workmen to persons, animals or things and for all damages to the structural and/or decorative part of property which may arise from the operations or neglect of himself or of any sub-contractor or of any sub-contractor's employees, whether such injury or damage arise from carelessness, accident or any other cause whatsoever in any way connected with the carrying out of this contract. The clause shall be held to include inter-alia, any damage to buildings whether immediately adjacent

or otherwise, and any damage to roads, streets, footpaths or ways as well as damages caused to the buildings and the works forming the subject of this contract by rain, wind or other inclemency of the weather. The contractor shall indemnify the Employer and hold harmless in respect of any claim made in respect of injury or damage under any acts of compensation or damage consequent upon such claim.

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

The contractor shall effect the insurance necessary and indemnify the Employer entirely from all responsibility in this respect. The insurance must be placed with a company approved by the Employer and must be effected jointly in the name of the contractor and the Employer and the policy lodged with the later. The scope of insurance is to include damage or loss to the contract itself till this is made over in a complete state. Insurance is compulsory and must be effected from the very initial stage. The contractor shall also be responsible for anything which may be excluded from damage to any property arising out of incidents, negligence or defective carrying out of this contract.

The Employer shall be at liberty and is hereby empowered to deduct the amount of any damages, compensations, costs, charges and expenses arising or accruing from or in respect of any such claim or damages from any sums due or to become due to the contractor.

21. Insurance

Unless otherwise instructed the contractor shall insure the works and keep them insured until the virtual completion of the contract against loss or damage by fire and/or earthquake, flood. The insurance must be placed with a company approved by the Employer, in the joint names of the Employer and the contractor for such amount and for any further sum if called to do so by the employer, the premium of such further sum being allowed to the contractor as an authorized extra.

The contractor shall deposit the policy and receipt for premiums paid with the Employer within 5 days from the date of issue of work order unless otherwise instructed. In default of the contractor insuring as provided above, the Employer on his behalf may so insure and may deduct the premiums paid from any money due, or which may become due to the contractor. The contractor shall as soon as the claim under the policy is settled or the work reinstated by the Insurance Company should they elect to do so, proceed with due diligence with the completion of the works in the same manner as though as the fire has not occurred and in all respects under the conditions of the contract. The contractor in case of rebinding or reinstatement after fire shall be entitled to extension of time for completion as the Employer may deem fit.

22. Accounts Receipts & Vouchers

The contractor shall, upon the request of the Employer furnish them with all the invoices, accounts, receipts and other vouchers that may be required in connection with the works under this contract. If the contractor shall use materials less than what he is required under the contract, the value of the difference in the quantity of the materials he was required and that he actually used shall be deducted from his dues. The decision of Employer shall be final and binding on the contractor as to the amount of materials the contractor is required to use for any work under this contract.

23. Payments

No interim payments shall be made against the work executed. Only one and final bill shall be paid on completion of all works mentioned in the bills of quantity after making deduction of retention money as stated earlier and TDS as applicable.

24. Variation /Deviation

The price of all such additional items/non-tendered items will be worked out on the basis of rates quoted for similar items in the contract wherever existing or on engineering rate analysis based on prevalent fair prices of labour, material and other components as required. The tender rates, shall hold good for any increase or decrease in the tendered quantities.

25. Substitution

Should the contractor desire to substitute any materials and workmanship, he/they must obtain the approval of the Employer / Architects in writing for any such substitution well in advance.

26. Defects after Completion

The contractor shall make good at his own cost and to the satisfaction of the Employer all defects, shrinkage, settlements or other faults which may appear within 12 months after completion of the work. In default the Employer may employ and pay other persons to amend and make good such damages, losses and expenses consequent thereon or incidental thereto shall be made good and borne by the contractor and such damages, loss and expenses shall be recoverable from him by the Employer or may be deducted by the employer, in lieu of such amending and making good by the contractor, deduct from any money due to the contractor a sum equivalent to the cost of amending such work and in the event of the amount retained thus together with any expenses the Employer may have incurred in connection therewith.

27. Termination Of Contract by Employer

If the contract being a company go into liquidation whether voluntary or compulsory or being a firm shall be dissolved or being an individual shall be adjudicated insolvent or shall make an assignment or a composition for the benefit of the greater part, in number or amount of his creditors or shall enter into a Deed or arrangement with his creditors, or if the Official Assignee in insolvency, or the Receiver of the contractor in insolvency, shall repudiate the contract, or if a receiver of the contractor's firm appointed by the court shall be unable, within fourteen days after notice to him requiring him to do so, to show to the reasonable satisfaction of the employer that he is able to carry out and fulfill the contract, and if so required by the employer to give reasonable security therefore, or if the contractor shall suffer any payment under this contract to be attached by or on behalf of and of the creditors of the contractor, or shall assign, charge or encumber this contract or any payments due or which may become due to the contractor, there under, or shall neglect or fail to observe and perform all or any of the acts matters of things by this contract, to be observed and performed by the contractor within three clear days after the notice shall have been given to the contractor in manner hereinafter mentioned requiring the contractor to observe or perform the same or shall use improper materials or workmanship in carrying on the works, or shall in the opinion of the employer not exercise such due diligence and make such due progress as would enable the work to be completed within due time agreed up on, and shall fail to proceed to the satisfaction of the employer after three clear days notice requiring the contractor so to do shall have been given to the contractor as hereinafter mentioned, or shall abandon the contract, then and in any of the said cases, the Bank may not withstanding previous waiver determine the contract by a notice in writing to the effect as hereinafter mentioned, but without thereby effecting the powers of the employer of the obligations and liabilities of the contractor the whole of which shall continue in force as fully as if the contract, had not been so determined and as if the works subsequently executed had been executed by or on behalf of the contractor (without thereby creating any trust in favour of the contractor) further the employer or his agent, or servants, may enter upon and take possession of the work and all plants, tools, scaffolding, sheds, machinery, steam and other power, utensils and materials lying upon premises or the adjoining lands or roads and sell the same as his own property or may employ the same by means of his own servants and workmen in carrying on and completing the works or by employing any other contractors or other persons or person to complete the works, and the contractor shall not in any way interrupt or do any act, matter of thing to prevent or hinder such other contractors or other persons or person employed from completing and finishing or using the materials and plants for the works when the works shall be completed, or as soon thereafter as conveniently may be, the employer shall give notice in writing to the contractor to remove his surplus materials and plants and should the contractor fail to do so within a period of 14 days after receipt by him the employer may sell the same by Public Auction and shall give credit to the contractor for the amount so realized. Any expenses or losses incurred by the employer in getting the works carried out by other contractors shall be adjusted against the amount payable to the contractor by way of selling his tools and plants or due on account of work carried out by the contractor prior to engaging other contractors or against the Security Deposit.

28. Arbitration

All disputes or differences of any kind whatsoever which shall at any time arise between the parties hereto touching or concerning the works or the execution or maintenance thereof of this contract or the rights touching or concerning the works of the execution of maintenance thereof of this contract or the construction remaining

operation or effect thereof or to the rights or liabilities of the parties or arising out of or in relation thereto whether during or after determination foreclosure or branch of the contract(other than those in respect of which the decision of any person is by the contract expressed to be final and binding) shall after written notice by either party to the contract to the other of them and to the Employer hereinafter mentioned be referred for adjudication to a sole Arbitrator to be appointed as hereinafter provided.

For the purpose of appointing the sole Arbitrator referred to above the Employer will send within thirty days of receipt of the notice, to the contractor a panel of three names of persons who shall be presently unconnected with the organization for which the work is executed.

The contractor shall on receipt of the names as aforesaid, select any one of the persons name to be appointed as a sole Arbitrator and communicate his name to the Employer within thirty days of receipt of the names. The Employer shall thereupon without any delay appoint the said person as the Sole Arbitrator. If the contractor fails to communicate such selection as provided above within the period specified, the Competent Authority shall make the selection and appoint the selected person as the Sole Arbitrator.

If the Employer fails to send to the contractor the panel of three names as aforesaid within the period specified, the contractor shall send to the Employer a panel of three names of persons who shall be unconnected with either party. The Employer shall on receipt of the named as aforesaid select any one of the persons names and appoint him as the Sole Arbitrator .If the Employer fails to select the person and appoint him as the sole Arbitrator within 30 days of the receipt of the panel and inform the contractor accordingly, the contractor shall be entitled to appoint one of the persons from the panel as the Sole Arbitrator and communicate his name to the Employer.

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 as aforesaid.

The work under the Contract shall, however, continue during the arbitration proceedings and no payment due or payable to the contractor shall be withheld on account of such proceedings.

The Arbitrator shall be deemed to have entered on the reference on the date he issued notice to both the parties fixing the date of the first hearing.

The Arbitrator may from time to time, with the consent of the parties, enlarge the time for making and publishing the award.

The Arbitrator shall give a separate award in respect of each dispute or difference referred to him. The Arbitrator shall decide each dispute in accordance with the terms of the contract and give a reasoned award. The venue of arbitration shall be such place as may be fixed by the Arbitrator in his sole discretion.

The fees, if any, of the Arbitrator 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 who may direct to and by whom and in what manner, such costs or any part thereof shall be paid any may fix or settle and amount of costs to be so paid.

The award of the Arbitrator shall be final and binding on both the parties.

Subject to aforesaid the provisions of the Arbitration Act 1992 or any statutory modification or re-enactment thereof and the rules made there under and for the time being in force, shall apply to the arbitration proceeding under this clause.

The Employer and the contractor hereby also agree that arbitration under clause shall be a condition precedent to any right to action under the contract with regard to the matters hereby expressly agreed to be so referred to arbitration.

29. The contractor must make use of all the electrical points and accessories provided by the owner.

30. The quantities mentioned in the tender are provisional. Payment shall be made as per the actual work done at the site.

31. Contractor must furnish separate drawings showing the actual layout of the wiring and cabling laid underneath the floor (if any) and above the false ceiling showing different types of wires and cables in different colours.

A P P E N D I X

- | | | | |
|-----|---------------------------------------|---|--|
| 1. | Earnest Money Deposit | : | Rs. 2,400.00 |
| 2. | Initial Security Deposit (ISD) | : | 2 % of tender amount inclusive of earnest money Deposit to be refunded back without interest upon issuance of virtual completion certificate of work by architect. |
| 3. | Defects Liability Period | : | 12 months from the date of issue of virtual completion certificate and handing over the site to bank by contractor. |
| 4. | Date of commencement of work | : | Within three days of issue of Letter of Intent / Work Order or getting possession of site which ever is later. |
| 5. | Stipulated Period for completion | : | 21 days |
| 6. | Amount of Interim Certificate | : | Nil, Only one and final payment shall be made |
| 7. | Retention Money | : | 8 % of amount of each running bill. |
| 8. | Rate of liquidated damages | : | Rs. 342.00 per day |
| 9. | Terms of Rate | : | The rates shall be for supplying and installing electrical work and data cabling work at site and should be inclusive of all taxes including works contract tax if any but excluding GST which shall be paid by owner as applicable. |
| 10. | Period of validity of Tender | : | Three months from the date of opening tender. |
| 12. | Period of honouring final certificate | : | 15 working days from date of Architect's certificate. |
| 13. | Release of Retention Money | : | Payable without interest within 14 days after completion of defects liability period. |

SPECIFICATION:

SAFETY CONSIDERATIONS

Installation, start-up and servicing of the equipment can be hazardous due to system pressures, electrical components and locations of equipment (roofs etc.).

Only trained, qualified installers and service mechanics should install start-up and service this equipment. Trained service personnel should perform all operations except basic maintenance.

When working on the equipment, follow all safety codes. Use proper tools, tackles and necessary instruments. Use safety glasses, gloves, boots, valves and regulators etc. Be sure power to the equipment is off before performing maintenance or service.

INSTALLATION:

PRE-DELIVERY INSPECTION

This applies to the condensing and indoor units both.

1. Open packing carefully ensuring unit in 'upright' position.
2. Check the unit thoroughly for dents, paint discrepancies, fins damage, pinching of tubes etc. Check coil / copper tubes for any dents, pinching or cuts, especially near tube sheets. Ensure all parts / components, electrical wiring and connections are visibly in order.
3. Rotate fan / blower for any bearing or touching noise.
4. Check and test fans / blower as per the rated supply for Indoor and Outdoor if possible.
5. Check coil and piping for leaks.
6. If any damage is found, rectify / take the necessary action and repack the unit in 'upright' position.

RIGGING

These units are designed to be handled by forklift trucks or crane. Use the unit skid for placing on terrace the forks of the lift-truck or by using crane.

PLACEMENT

Outdoor Units are shipped mounted on wooden members & Indoor unit packed in carton box. These should be removed only when the unit is in its final position.

LOCATION AND MOUNTING:

A. CONDENSING UNIT

Location

Locate the unit so that airflow through the condenser coil is unrestricted. Provide clearance for wiring and piping. There should be ample space for service requirements.

Install the outdoor unit in well-ventilated space. The unit should be installed in a location so as to minimize refrigerant and drain pipe length.

Mounting

The unit should be mounted to prevent corrosion of sheet steel base on

(a) Prefabricated angle iron frame, and minimum 200 mm raised PCC blocks

These should be designed to take care of vibratory operating loads.

Placement area must be level and strong enough to support operating weight of the unit. Check that the unit is mounted level to ensure proper oil return to compressor.

Units mounted on walls must be provided with a platform having space for service (if otherwise not easily accessible for service).

B. INDOOR UNIT

Location

These units are designed especially for applications where units & piping are above the false ceiling.

Locate unit ensuring adequate space for supply / return air, service purposes and connections.

The location of the unit should be such that there is no ingress of fresh air as this would cause condensation / sweating. Location should be near a drain point for easy drainage, and in a location to simplify refrigerant piping.

Pipe Routing

Liquid line should be suitable for flare connection & Suction line is suitable for brazed connection. Adaptors are given on Suction line & Discharge line in outdoor Unit for refrigerant charging and evacuation operations. Flare connections are provided because they allow easy connection / disconnection / reuse without additional piping / brazing work.

Indoor units have connection suitable for brazing in suction line and quick lock valve in liquid line. Start refrigerant piping from outdoor unit first and connect indoor unit last. Run the piping along walls / floors or on wooden beading with saddle / clamps and boxed up for protection. Clamp and run pipes neatly and straight using unlamented good copper tubing.

The pipes should run as straight as possible, avoiding unnecessary turns and bends. for other length, pipe sizes. Extra refrigerant charge for extra pipe length should be considered. If brazing is done to connect two tube lengths, it should be carried out using proper flux and brazing rod (7.25% Phosphorus, rest copper) with a constant purge of nitrogen through the piping to maintain a clear system.

All connections must be leak tight.

Clamping

Clamping is necessary to prevent vibrations from being transmitted. When passing the pipes through walls, opening should be sealed to minimize vibration transmission. Some slack in pipes between structure & unit should be left.

Insulation

Insulate Suction & liquid line properly. This is necessary safety. Use tubular foam of for liquid line and for Suction line. As specified in Insulation specs.

FIELD ELECTRICAL CONNECTIONS:

Do the field wiring as per wiring diagram. Never bypass any electrical protections provided in the unit. Recommended wire size for main power supply cable is 4 core 6 mm² Copper.

Unbalanced 3 -phase supply voltage

Never operate unit when supply voltage unbalance is more than 2%.

% Voltage unbalance = (Max. voltage deviation from avg. voltage) / (avg. voltage) x 100

PRE-PRESSURE TEST:

However, in case of leaks in the refrigerant circuit or breaking of joints etc., the valves have to be back seated and the entire system of indoor and outdoor units with piping has to be pressure tested, evacuated and charged.

After pressurizing the system, do the following:

SOAP TEST:

Apply soap solution at all flare connections and brazing point. If bubbles appear at some points, then tighten the flare nut or braze the leaking points (after releasing the gas from the system). No bubbles should finally appear.

PRESSURE DECAY TEST:

After soap test, note the pressure and leave the system pressurized for 30 minutes. Note the pressure again. There should be no pressure decay, recheck for leaks, remove them and do the pressure decay test again.

CHECK PRIOR TO START-UP:

Do not attempt to start the unit following steps have been completed:

1. Check that unit is properly located and mounted.
2. Check that piping has been done as per the recommended practice.
3. Check that the insulation is adequately sized and properly applied on the piping.
4. Check that condensate drain pipe has been properly installed and insulated.
5. Be sure there are no refrigerant leaks.
6. Check the refrigerant standing pressure with a pressure gauge connected on the liquid valve gauge port. Check if the charge is complete with R-22 charged.
7. Check tightness of all electrical connections.
8. Check the protective device (MCB or fuse switch) from which the supply is given to the unit.
9. Electrical power supply must agree with unit nameplate rating. Check that field wiring electrical switches and voltage stabilizers (in the case of low voltage power supply) are properly sized for the unit. Check and ensure that 3-phase voltage unbalance is less than 2%.

START-UP AND OPERATION:

Actual start-up / full-fledged testing should be done only under supervision of a qualified person.

1. Make main power connections. If reverse phase indication is there on the Display Panel, then interchange two of the phases. Make sure display panel shows healthy supply.
2. Switch on the ON/OFF switch of the controls; the unit will start on its previous setting.
3. In this Wiring 'HP' & 'LP' are in series when either of two is removed wire from the electrical panel. Compressor, Evaporator Blower fan will go off simultaneously. '& Display Panel will show 'HP/LP'. Please check to ensure its HP and LP working.
4. Run unit according to Remote Control features as described.

SPECIFICATIONS

VARIABLE REFRIGERANT FLOW (VRF) SYSTEM:

The system shall be air-cooled, direct expansion type central air conditioning system consisting of one Variable Refrigerant Flow Condensing unit (Outdoor Unit) and one or more Evaporator (indoor) units. The condensing unit shall be located on the building terrace ensuring unobstructed airflow.

The evaporating units are selected to suit the cooling load of the area to be air conditioned.

The condensing unit shall be capable of assessing the requirement of liquid refrigerant volumetric flow of each evaporating unit at all times by means of a sophisticated sensors & microprocessor controller and generating the required total volume of refrigerant liquid for supply to each evaporator units.

Factory-assembled Outdoor condensing unit should be with hermetically sealed scroll / twin rotary type fixed speed compressor in combination with compressor having Inverter type Refrigerant flow control technology, air cooled draw through type condenser coil of copper tubes mechanically bonded to aluminum fins, low noise axial fan (not more than 60dB), safety and high/low pressure cut outs, weather proof housing constructed from galvanized powder coated steel, an efficient oil separation system for stable operation with long refrigerant piping,

Vendor to furnish the details of expected oil carry over/return system.

Condensing Unit (Outdoor Unit)

The condensing unit shall be capable of assessing the requirement of liquid refrigerant volumetric flow of each evaporating unit at all times by means of a sophisticated microprocessor controller and generating the required total volume of refrigerant liquid for supply to the evaporator units.

The condensing unit shall be a factory-assembled unit housed in a sturdy weatherproof casing constructed from rust proof galvanized powder coated steel panels. The noise level of the unit shall not be more than 70dB (A) measured horizontally 1 m away and 1.5 m above base level.

The compressors shall be hermetically sealed scroll type and inverter driven variable speed type, capable of changing the capacity in accordance to the cooling load requirement.

The condenser coils shall be constructed out of copper tubes mechanically bonded to aluminum fins. The surface of the condenser coil shall be coated with suitable chemical coating to prevent deterioration due to coastal climate.

All necessary safety devices shall be provided to ensure safe operation of the system.

Unit should be equipped with a highly efficient oil separation system to ensure stable operation with long refrigerant piping.

The VRF condensing unit shall be located in open on a terrace with adequate clearance from nearby objects to ensure unobstructed air flow and easy approach for maintenance.

Indoor Units (Evaporating Units):

Each unit shall be selected as the requirement of the cooling load and interior layout in the respective space to be air-conditioned. The unit shall be equipped with an electronic expansion valve, which can communicate with the VRF controller in the condensing unit. Wall /Ceiling suspended evaporator unit having 3 or 4 rows deep cooling coil, low noise centrifugal supply air fan with external static pressure capacity up to 40 mm, insulated casing, insulated drain tray, easy to clean return air filter low noise and vibration free operation.

The cassette unit should be serviceable from bottom & should have built-in drain pump having maximum drain lift of 60cm. Each unit will have a fresh air port to draw fresh air through connected flexible duct opened to atmosphere.

Each unit shall be equipped with electronic expansion valve, cord/cordless type Remote Control to maintain & set room temperature & other parameters. Option of centralized, individual & group control should also be provided.

The fan shall of the dual suction multi blade type and statically and dynamically balanced to ensure low noise and vibration free operation.

Each indoor unit shall be equipped with corded / cordless local control unit for setting the operating parameters. The address of the indoor unit shall be set automatically in case of individual and group control. Option of centralized control should also be achievable.

Controls shall be provided to maintain the set room temperature within close tolerance limits.

Air Cooled Type DX (Non-VRF) Units:

The condensing unit shall consist of compressor, condenser coil & fan, refrigerant piping, refrigerant controls, local control panel, control wiring etc., all assembled in a weather proof powder coated cabinet in compact layout.

Cabinet shall be fabricated out of heavy gauge galvanized sheet steel properly formed for closet fit and structural rigidity. All access panels shall be so constructed as to be quickly and easily removable. All sheet metal surface shall be finished in baked enamel paint or powder coating. Cabinet shall be fully insulated for acoustic insulation.

Air-cooled condenser coil shall be made from copper tubes and aluminum fins bonded to the tubes. Condenser fans shall be propeller type. The entire air-cooled condensing unit shall have sheet metal housing suitable for outdoor installations.

Compressor shall be of the hermetic scroll type or rotary type, with suction and discharge valves, gas cooled motor, horizontal or vertical shaft balanced and mounted on vibration absorbers to provide quiet, free floating operation. Compressor shall be provided with overload protection and single phasing protection.

Interconnecting Refrigerant Piping & Wiring:

The refrigerant piping interconnecting to indoor & outdoor units shall be of copper and shall be joined by brazed type joints. Refrigerant pipes shall be insulated as per specification. Wiring interconnecting

the indoor and outdoor unit shall be done with PVC insulated copper conductor flexible wires of appropriate rating.

The set of two refrigeration lines and the wires shall be bundled together.

All pipe supports/clamps shall be painted with red oxide primer followed by 2 coats of synthetic enamel finish paint.

The piping and wiring shall be laid such that it does not spoil the aesthetics of the premises, and is safe, secure and approachable for repair/replacement.

Supports & Brackets

The equipment's shall be properly supported with brackets, hangers, platforms, base frame etc. depending upon the type, location and capacity of the unit.

The supports shall be GI slotted angle and GI threaded rods. The outdoor condensing units shall be properly supported on MS duly painted with anti-corrosive rubber paint frame work / platform with anti-vibration rubber pads on PCC blocks or properly grouted to the RCC Slab / brick walls using bracket.

The ceiling suspended evaporator indoor units shall be supported using anchor fasteners and GI threaded suspension rods. The wall-hung evaporators shall have GI stenciled back plate for mounting the unit, grouted to the wall / beam using anchor fasteners.

Drain Piping

The drain piping shall be made out of rigid UPVC pipes of 10 Kg/cm² class. The piping shall be supported by clamping on MS angle 25mm x 3mm running continuously below the pipe.

The drain pan shall be connected to rigid UPVC pipe by braided UPVC flexible pipe with appropriate adapters. All pipes support/clamps shall be painted with red oxide primer followed by two coats of synthetic enamel finish paint.

Piping Insulation

All Refrigerant piping shall be insulated with 19 mm Thick Closed cell elastomeric Nitrile Rubber Insulation. Drain piping shall be insulated with 6mm Thick Nitrile Rubber or Polystyrene Insulation.

Insulating material in tube form shall be sleeved on the pipes. On piping, slit opened tube from insulating material shall be placed over the pipe and adhesive shall be applied as suggested by the manufacturer. Adhesive must be allowed to tack dry and then press surface firmly together starting from butt end and working towards centre.

Measurement of Insulation

Piping insulation will be measured as per length of the pipes.

STANDARDS

The following standards shall be applicable for equipment

- a) IS : 4283 Hot air fans
- b) IS : 8272 Industrial cooling fans (man coolers)
- c) IS : 1391 Room Air conditioners
- d) IS : 8148 Packaged Air conditioners
- e) IS : 2997 Air circulator type electrical fan and regulator
- f) IS : 1169 Electrical pedestal type fans and regulators
- g) IS : 374 Electrical ceiling type fan and regulator

