

Notice Inviting e-Tender For

**Name of work: - SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF
AIRCONDITIONING SYSTEM FOR UPS ROOMS AT AIIMS HOSPITAL, BBSR.**

(File No.: AIIMS/BBSR/EE(AC&R)/55/2020)



**All India Institute of Medical Sciences
Engineering Branch, Bhubaneswar (Odisha)-751019
www.aiimsbhubaneswar.edu.in**

NIT No. : **AIIMS/BBSR/AC&R/CENTRAL AC/UPS/07/2020**

Estimated Cost : **₹ 67,35,803/-** (Sixty Seven Lakhs Thirty- five Thousand Eight Hundred Three Rupees Only)

Completion Period : **90 Days** (from the date of issue of work order)

“Certified that, this tender document contains 69 pages only”.

**Executive Engineer (AC & R)
AIIMS, Bhubaneswar**

Government of India, Ministry of Health & Family Welfare, AIIMS, Bhubaneswar

Name of Work	:	Name of work: - SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF AIRCONDITIONING SYSTEM FOR UPS ROOM AT AIIMS HOSPITAL, BBSR. File No.: AIIMS/BBSR/EE(AC&R)/55/2020
NIT No.	:	AIIMS/BBSR/AC&R/CENTRAL AC/UPS/07/2020

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ALL INDIA INSTITUTE OF MEDICAL SCIENCE, BHUBANESWAR

NOTICE INVITING e-TENDER

(a)	Name of Work	SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF AIRCONDITIONING SYSTEM FOR UPS ROOMS AT AIIMS HOSPITAL, BBSR.
(b)	Tender No.	AIIMS/BBSR/AC&R/CENTRAL AC/UPS/07/2020
(C)	Estimated Cost	₹ 67,35,803/- (Rupees Sixty Seven Lakhs Thirty- five Thousand Eight Hundred Three Only)
(e)	Earnest Money Deposit (EMD)	NIL
(f)	Performance Security (Bank Guarantee)	3 % of Tendered Cost.
(g)	Security Deposit	5% of the Final Value.
(h)	Tender documents will be Issued From	Download from Institute Website. (i.e. www.aiimsbubnaneswar.edu.in, www.tenderwizard.com/www.eprocedure.gov.in).
(i)	Last Date, Time & Place of Submission	On 25/05/2021 at 11:00 Hours through online.
(j)	Date, Time for opening of Tender (Technical Bid)	On 25/05/2021 at 15:30 Hours.

1. The time of submission of e-Tender is **25/05/2021 by 11:00 Hours**. The indenting Bidder must read the Terms & conditions of AIIMS, Bhubaneswar carefully. He/They should only submit his/her/their bid if he/she/they consider himself/themselves eligible and he/she/they is/are in possession of all the documents required.
2. Information and Instructions for bidders posted on website shall form part of bid document.
3. The Bid documents consisting of specifications, the schedule of quantities of various types of items to be executed and the set of terms & conditions of the contract & special conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website **www.aiimsbubnaneswar.edu.in** Or www.tenderwizard.com/AIIMSBBSR.

Executive Engineer (AC & R)
AIIMS, Bhubaneswar

INFORMATION AND INSTRUCTIONS TO BIDDERS FOR e-TENDERING

The Executive Engineer (AC&R) AIIMS, Bhubaneswar invites on behalf of Director, AIIMS, Bhubaneswar, Item Rate Tender in Two (02) Bid system (Technical & Financial) from eligible and reputed contractors of CPWD, AIIMS, any Central Govt., State Govt., PSU, Autonomous Body, Govt. Hospitals etc. having successfully completed works of similar nature as per eligibility criteria for the following work.

Ser. No.	Description	Details
(a)	NIT No.	AIIMS/BBSR/AC&R/CENTRAL AC/UPS/07/2020
(b)	Name of Work:	SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF AIRCONDITIONING SYSTEM FOR UPS ROOMS AT AIIMS HOSPITAL, BBSR.
(c)	Estimated Cost	₹ 67,35,803/- (Sixty Seven Lakhs Thirty- five Thousand Eight Hundred Three Rupees Only)
(d)	Earnest Money Deposit (EMD)	NIL
(e)	Period of Completion	90 Days (from the date of issue of work order)
(f)	Last date and time of online submission of tender	On 25/05/2021 at 11:00 Hours through online.
(g)	Time and date of online opening of Tender (Technical Bid)	On 25/05/2021 at 15:30 Hours.
(h)	Time and date of opening of Online Financial Bids	To be intimated later through website.

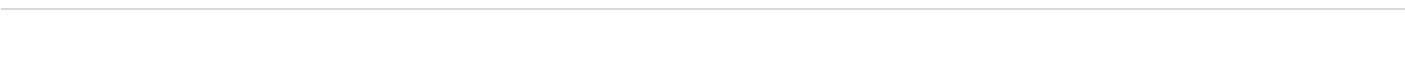
1. The intending bidder must read the terms and conditions of Tender document carefully. He/they should submit his/their bid if he considers himself eligible and he is in possession of all the certificates / documents required.
 2. Information and Instructions for bidders for e-tendering posted on website shall form part of bid document.
 3. The bid document consisting of NIT, plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from <http://www.tenderwizard.com/AIIMSBBSR> or www.aiimsbhubaneswar.edu.in free of cost.
 4. For e-tendering of this tender, AIIMS has engaged e-portal maintained by M/s ITI Limited, Bhubaneswar. Intending bidders shall have to register with M/s ITI Limited, Bhubaneswar to participate in the tendering process. For details kindly visit website <http://www.tenderwizard.com/AIIMSBBSR> or contact **Shri SANJEEB MAHAPATRA (Mobile No. 7377708585)**. If needed they can be imparted training on online bidding process as per details available on the website.
 5. The intending bidders must have valid class-III digital signature to submit the bid.
-

6. The bid can be submitted only after depositing e-tender Processing Fee in favour of ITI Limited and uploading the mandatory scanned documents as specified within the period of bid submission.
 7. Bidder(s) must ensure to quote rate of each item. The column meant for quoting rate in figures appears in dark yellow colour and the moment rate is entered, it turns sky blue. In addition to this, while selecting any of the cells a warning appears that if any cell is left blank the same shall be treated as "0". Therefore, if any cell is left blank and no rate is quoted by the bidder, rate of such item shall be treated as "0" (ZERO). After submission of the bid online the contractor can re-submit revised bid any number of times but before last time and date of submission of bid as notified.
 8. After submission of bid online, it can be revised any number of times before specified time on last date of submission of bid. While submitting the revised bid, bidder can revise the rate of one or more item(s) any number of times (he need not re-enter rate of all the items) but before last time and date of submission of bid as notified.
 9. Financial bids shall be opened online only for bidders for whom EMD undertaking and other mentioned documents are found in order and who are found to be eligible to bid for work. On opening date, the bidder can login and see the bid opening process. After opening of bids, he will receive the competitor bid sheets.
 10. If the contractor is found ineligible after opening of bids, his bid shall become invalid.
 11. If any discrepancy is noticed between the eligibility documents as uploaded at the time of submission of bid and hard copies as submitted physically by the bidder, the bid shall become invalid.
 12. ***The Bidder(s) shall have to submit original instrument/document(s) and self-certified copies of all the scanned and uploaded documents on same day of opening of tender in the office of Tender Opening Authority. List of mandatory Eligibility Documents to be scanned and uploaded within the period of bid submission: -***
 - (a) Performa for Earnest Money Deposit declaration (Appendix" C") duly completed and signed by the bidder.
 - (b) Appendix 'A to C' duly filled in (Pages 13 & 14 ref.) and signed with stamp.
 - (c) Certificates of Work Experience & Completion Certificate of Similar Work from Client not below the Rank of Executive Engineer or equivalent, as mentioned in Ser. No. - 4, Page No. - 8 refer under Eligibility Criteria.
 - (d) Certificate of Registration for GST and acknowledgement, up to date filed return if required.
 - (e) Copies of PAN Sheet.
 - (f) Copies of Balance Sheets.
 - (g) Copy of Affidavit. (As per page no 52)
 - (h) Copies of ESI Registration (enclose latest challan copy)
 - (i) Copies of EPF Registration (enclose latest challan copy)
 - (j) The Bidder(s) should have their Registered Office/Branch in Bhubaneswar. If not, an Office should be opened in Bhubaneswar within 15 (**Fifteen**) Days of the issue of LoA. Details of Address Proof of Office located at Bhubaneswar should be given to EE(AC&R).
 - (k) Declarations to be given by the Tenderer(s) (as per Page 07.).
 - (l) Each page of the e-tender documents should be duly signed with seal otherwise the bid shall become invalid.
-

13. The Technical Bid(s) shall be opened first by the Committee on 25/05/2021 by 15:30 Hours. The opening of Financial Bid(s)(whose Technical Bid found to be eligible) will be intimated later through web site. After the evaluation of the Bid(s) AIIMS, Bhubaneswar will award the contract to the Lowest Evaluated Responsive Tenderer. Conditional Bid(s) will be treated as unresponsive and will be rejected.

14. Information & Instruction for Contractor will form a Part of NIT.

Executive Engineer (AC & R)
AIIMS, Bhubaneswar



DECLARATIONS TO BE GIVEN BY THE TENDERER(S)

It is to certify that: -

(a) I /We have gone through GCC of CPWD up to latest correction as available on website of CPWD/www.tenderwizard.com / www.aiimsbhubaneswar.nic.in or in the office of Superintendent Engineer and I/We agree with the terms and conditions of it and understood that it will form part of the agreement.

Date: _____

Signature of the Tenderer(s)

(b) "I, S/o Shri resident of hereby certify that none of my Relative(s) as defined in Paragraph 14 of CPWD W-6 is/are employed in AIIMS, Odisha. In case at any stage, it is found that the information(s) given by me/us is/are false/incorrect, AIIMS shall have the absolute right to take any action as deemed fit without any prior intimation to me".

Date: _____

Signature of the Tenderer(s)

NOTE: - (To be certified by all the partners in case of partnership firms, by all the directors in case of companies).

(c) "I/We undertake and confirm that eligible similar Work(s) has/have not been got executed through another contractor on back to back basis. Further, it is stated that, if such a violation comes to the notice of Department, than I/We shall be debarred for bidding in AIIMS in future forever. Also, if such a violation comes to the notice of AIIMS, Bhubaneswar before date of start of work, the Superintending Engineer shall be free to forfeit the entire amount of Performance Guarantee".

Date: _____

Signature of the Tenderer(s)

GENERAL RULES & DIRECTIONS AND GENERAL CONDITIONS

The Executive Engineer (AC&R) AIIMS, Bhubaneswar invites on behalf of Director, AIIMS, Bhubaneswar, Item Rate Tender in Two (02) Bid system (Technical & Financial) from eligible and reputed contractors of CPWD, AIIMS, any Central Govt., State Govt., PSU, Autonomous Body, Govt. Hospitals etc. having successfully completed works of similar nature as per eligibility criteria for the following work.

1. **Name of Work: SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF AIRCONDITIONING SYSTEM FOR UPS ROOM AT AIIMS HOSPITAL, BBSR**
 2. The work is estimated to cost of ₹ 67,35,803/- (**Sixty-Seven Lakhs Thirty- five Thousand Eight Hundred Three Rupees Only**). The estimate, however, is given merely as a rough guide.
 3. Intending Bidder(s) is/are eligible to submit the bid provided he has definite proof from the appropriate authority, which shall be to the satisfaction of the competent authority of having satisfactorily completed similar works. The similar work means **SITC of HVAC Machineries & Refrigeration Accessories/ VRF/Dx System of Centralised Air conditioning including Air Ventilation System and associated Electrical Works.**
 4. Copy of work order(s) & respective satisfactory completion certificate(s) must be furnished by the bidder in Technical Bid in support of eligibility.
 5. **Eligibility Criteria.** Intending Bidder(s), who fulfil following requirement shall be eligible to apply: -
 - (a) Three (03) similar completed works each of value **not less than 40%** (i.e. for ₹ 26,94,321/-) of estimated cost put to tender or Two (02) similar completed works each of value **not less than 60%** (i.e. ₹ 40,41,482/-) of estimated cost put to tender or one (01) similar completed work of value **not less than 80%** (i.e. ₹ 53,88,642/-) of estimated cost put to tender in **last 07 (Seven) Years ending 31st March 2021.**
 - (b) The Bidder should have registration up to date Employee Provident Fund (EPF) Commissioner and Employee State Insurance (ESI) Corporation.
 - (c) The bidder should have positive net worth and should not have incurred loss in last 03 (Three) Years ending i.e. by **31st March 2021**, duly certified by Chartered Accountant.
 - (d) The experience of similar work should be from Central Govt., State Govt., PSU, Autonomous Body, Govt. Hospitals.
 - (e) Agreements shall be drawn with the successful bidder(s) for item/items on prescribed format. Bidder(s) shall quote their rates as per various terms and conditions of the said form which will form part of the agreement.
 - (f) The bid document consisting of plans, specifications, the schedule of quantities of the various type of items to be executed and the set of terms & conditions of the contract to be complied with and other necessary documents.
 - (g) Conditional Bids shall not be considered and will be out-rightly rejected at the very first instance.
 - (h) **Average Annual Financial**, the turnover during the last 3 years, ending **31st March 2021** should be at least 30% of the estimated cost (i.e. ₹ 20,20,741/-)
-

6. **Preparation & Submission of Tender through Online.**

The Tender should be submitted in 02 (Two) parts i.e. Technical Bid and Financial Bid Respectively. The Technical Bid should be sent by the Bidder(s) through online as **“Technical Bid” for Name of work: SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF AIRCONDITIONING SYSTEM FOR UPS ROOM AT AIIMS HOSPITAL, BBSR.**

7. **Earnest Money Deposit.** There will be no Earnest Money Deposit. The bidder has to submit the Performa for Earnest Money Deposit declaration (**Appendix” C”**) duly completed and signed attached in page 15 of the Tender Document.

8. **Performance Bank Guarantee.** The successful contractor will be required to furnish a **Performance guarantee of 03% (Three Percent) of Contract Value after receiving notification of award in the form of Fixed Deposit Receipt or Bank Guarantee from any Nationalized Bank duly pledged in the name of the "All India Institute of Medical Sciences, Bhubaneswar"** which shall be kept valid for a period of 60 days beyond completion of all the contractual obligations. The Performance Guarantee can be forfeited by order of this Institute in the event of any breach or negligence or non—observance of any condition of contract or for unsatisfactory performance or non-observance of any condition of the contract. After recording of the completion certificate for the work by the competent authority, the performance guarantee shall be returned to the contractor, without any interest. In case the contractor fails to deposit the said Performance Guarantee within the period including the extension period if any, he/she will be debarred for a period as decided by the Engineer In charge.

9. Intending Bidder(s) is/are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their bids, the means of access to the site and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The bidder(s) shall be responsible for arranging and maintaining at his/their own cost, all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidder(s) implies that he/they has/have read this notice and all other contract documents and has/have made himself/herself/themselves aware of the scope and specifications of the work to be done and of conditions.

10. The Tender paper/documents can be seen/downloaded from Official website & submitted through on-line. For any query, Executive Engineer (AC& R), Phone: 9437317123, AIIMS, Bhubaneswar, may be contacted.

11. The Director, AIIMS, Bhubaneswar does not bind itself to accept the lowest or any other bid and reserves to itself the authority to reject any or all the bids received without the assignment of any reason. All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidder shall be summarily rejected.

12. Canvassing whether directly or indirectly, in connection with bidders is strictly prohibited and the bids submitted by the contractors who resort to canvassing will be liable to rejection.

13. The Director, AIIMS, Bhubaneswar reserves to himself/herself the right of accepting the whole or any part of the bid and the bidder shall be bound to perform the same at the rate quoted.

14. The contractor(s) shall not be permitted to bid for works in the AIIMS, Bhubaneswar responsible for award and execution of contracts, in which his/their near relative is posted as an officer in any

capacity between the grades of Superintending Engineer and Assistant Engineer (both inclusive). He/They shall also intimate the name of person(s) who are working with him/them in any capacity or are subsequently employed by him/them and who are near relatives to any gazetted officer in the AIIMS, Bhubaneswar. Any breach of this condition by the contractor(s) would render him liable to be removed from the approved list of contractors of this Department.

15. No Engineer of gazetted rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the prior permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or engagement in the contractor's service.
 16. The bid for the works shall remain open for acceptance for a period of **90** days from the date of opening of bids.
 17. This notice inviting bid shall form a part of the contract document. The successful bidder/contractor, on acceptance of his bid by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of "The Notice Inviting bid, all the documents including additional conditions, specifications and drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and rate quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto.
 18.
 - (a) **Security Deposit equal to 05% of the Final Value will be deducted from the Bills of the Contractor.**
 - (b) **The Income Tax as applicable shall be deducted from the Bill unless exempted by the Income Tax Department.**
 - (c) **The quoted Rates shall be inclusive of GST.**
 - (d) **Labour CESS @ 01% will be deducted from the Bill.**
 - (e) **Water charges @ 1% of the gross bill amount will be deducted if water supply is taken from AIIMS departmentally.**
 - (f) **Electrical charges as per actual meter reading shall be deducted from the bill. If connection is taken directly without installation of meter with prior permission from Executive Engineer (Electrical), then amount as per the usage shall be deducted from the gross bill amount as suggested by Executive Engineer (Electrical).**
 19. All the work shall be completed within **90 (Ninety)** Days from the date of issue of work Order by the Institute. All the aspects of safe installation shall be the exclusive responsibility of the Contractor. If the contractor fails to complete the work on or before the stipulated date, then a penalty at the Rate of **1.5% per month of delay** to be computed on per day basis of the total order value shall be levied subject to maximum of **10% of the total order value**.
 20. **List of Documents to be submitted along with the Technical Bid.**
 - (a) Performa for Earnest Money Deposit declaration (Appendix" C") (page no-15).
 - (b) Page No-13 & 14 (Appendix A & B) duly filled in.
 - (c) Certificates of Work Experience & Completion Certificate of Similar Work from Owner.
 - (d) Certificate of Registration for GST and acknowledgement of up to date filed return if required.
 - (e) All documents as per Ser. No. 12 (a) to (I) (Page - 05 refers).
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21. **Goods and Services Tax (GST).**

- (a) **GENERAL REMARKS ON TAXES & DUTIES:** In view of GST Implementation from 1st July 2017, all taxes and duties including Excise Duty, CST/VAT, Service tax Entry Tax and other indirect taxes and duties have been submerged in GST. Accordingly, reference of Excise Duty, service Tax, VAT, Sales Tax, Entry or any other form of indirect Tax except of GST mentioned in the bidding document shall be ignored.
- (b) Bidders are required to submit copy of the GST Registration certificated while submitting the bids wherever GST (CGST & SGST/UTGST or IGST) is applicable.
- (c) "GST shall mean Goods and services Tax charged on the supply of material(s) and services. The term 'GST' shall be construed to include the integrated Goods and Services Tax (Hereinafter referred to as "IGST") or central Goods and Services Tax (hereinafter referred to as "CGST") or State Goods and services Tax (Hereafter referred to as "SGST") or union Territory Goods and services Tax (hereinafter referred to as "UTGST").
- (d) Quoted price/rate(s) should be inclusive of all taxes and duties, except GST (i.e. IGST or CGST and SGST /UTGST applicable in case of interstate supply or intra state supply respectively and cess on GST if applicable) on the final service. However, GST rate (including cess) to be provided in the respective places in the price Bid. Please note that the responsibility of payment of GST (CGST & SGST or IGST or UTGST) lies with the supplier of Goods/services (service provider) only. Supplier of Goods/Service (Service provider) providing taxable service shall issue an invoice/Bill, as the case may be as per rules/regulation of GST. Further, returns and details required to be filled under GST laws & rules should be timely filed by supplier of Goods /services (Service provider) with requisite details.
- (e) The contractor(s) must be submitted GST Challan copy in original duly signed with stamp of firm, against this work before releasing Security Deposit (SD) money.

22. The Agency shall be solely responsible for compliance to the provisions of various Labour and industrial laws, such as, wages, allowances, compensations, EPF, Bonus. Gratuity, ESI etc. relating to personnel deployed by it at AIIMS, Bhubaneswar site or for any accident caused to them and the institute shall not be liable to bear any expense in this regard. The Agency shall make payment of wages to workers engaged by it by the stipulated date irrespective of any delay in settlement of its bill by AIIMS, Bhubaneswar for whatever reason. The Agency shall also be responsible for the insurance of its personnel. The Agency shall specifically ensure compliance of various Laws / Acts, including but not limited to with the following and their re-enactments / amendments / modifications: -

- (a) The Payment of Wages Act 1936.
- (b) The Employees Provident Fund & MP Act, 1952.
- (c) The Contract Labour (Regulation) Act, 1970.
- (d) The Payment of Bonus Act, 1965.
- (e) The Payment of Gratuity Act, 1972.
- (f) The Employees State Insurance Act, 1948.
- (g) The Employment of Children Act, 1938.
- (h) The Motor Vehicle Act, 1988.
- (j) Minimum Wages Act, 1948.

23. **Termination of Contract.** AIIMS, Bhubaneswar would have the right to terminate the contract, in case the work performance is not up to the standard, or in case there is any violation of AIIMS, Bhubaneswar rules & regulations, or if there is any lapse in compliance of any labour legislation, or if

there is any incident of indiscipline on the part of the Tenderer or his staff and the agreement may be terminated. The decision of AIIMS, Bhubaneswar's management in this regard would be final and binding on the Tenderer. In such an event, AIIMS, Bhubaneswar shall have the right to engage any other tenderer to carry out the task.

24. **Arbitration.** The Arbitration shall be held in accordance with the provision of the Arbitration and conciliations Act, 1996 and the venue of arbitration shall be at Bhubaneswar. The decision of the Arbitrator shall be final and binding on the both parties.
25. **Dispute Settlement.** It is mutually agreed that all differences and disputes arising out of or in connection with this agreement shall be settled by mutual discussions and negotiations if such disputes and differences cannot be settled and resolved by discussions and negotiations then the same shall be referred to the sole Arbitrator appointed by the Director, AIIMS, BHUBANESWAR whose decision shall be final and binding on both the parties. The contract shall be governed by laws and procedures established by Govt. of India, within the framework of applicable legislation and enactment made from time to time concerning such commercial dealings/ processing.
26. The Lowest Bidder will be decided as per the Commutation Rates quoted by the Bidder for individual item.
27. Mode of Payment:
(a) The 100% payment will be released after due verification of final bill by Engineering-in-Charge or his representative after completion of work. The deduction of 5% towards security deposit and other deduction towards taxes as per Government of India/AIIMS rule will be made from the bill. No provision is given for RA bill payment in this contract.
(b) It will be mandatory for the bidders to indicate their bank account number and other relevant e-payment details so that payment could be made through RTGS/ Other mechanism.
28. GST and other Taxes as applicable shall be recovered/ paid from the contractor's bill as per Govt. of India/AIIMS Rules.
29. **Vendor shall submit following documents after execution of given work:**
(a) Work Completion Certificate
(b) Testing & Commissioning Certificate
(c) Material Test Certificate
(d) Warranty/Guarantee Certificate
(f) Colour Photos for Executed work on glossary paper
(g) Non-Objection Certificate (NOC) against this work execution.
(h) GST return up to date Voucher.
(i) Bank Account Details

Executive Engineer (AC & R)
AIIMS Bhubaneswar

FORM FOR DETAILS OF ALL WORKS OF SIMILAR CLASS COMPLETED DURING THE LAST 07 (SEVEN) YEAR

S . N	Name of work/ project	locat ion	Owner or Sponsor ing Organiz ation	Cost of work in lakhs	Date of Comme ncemen t as per Contra ct	Stipulate d date of Completi on	Actual date of Comple tion	Litigation/Ar bitration pending/in progress with details	Remarks
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
1									
2									
3									
4									
5									
6									

(Authorized Signature of the Bidder with Seal)

FORM FOR DETAILED INFORMATION BY BIDDER

Name of Firm/Contractor/Supplier	:
Complete Address and Telephone Number	:
Name of Proprietor/Partner/Managing Director/Director	:
Phone Number	:
Mobile Number	:
e-Mail ID	:
Name and address of service centre nearby Bhubaneswar	:
Whether the firm is a registered Firm (Yes/No. Attach Copy of Certificate)	:
PAN Number. (enclose the attested copy of PAN Card)	:
GST Number (enclose the attested copy of GST Certificate)	:
Whether the firm has Uploaded the Bank Draft/Pay Order/ Banker's Cheque of Earnest Money Deposit (EMD).	:
Whether the Firm/Agency is signed each and every page of Tender/NIT	:
EPF No. (Enclose the attested copy of EPF Registration Certificate)	:
ESI Code.	:
Any other information, if necessary.	:

(Authorized Signature of the Bidder with Seal)

PERFORMA FOR EARNEST MONEY DEPOSIT DECLARATION

Whereas, I/We.....(Name of Agency).....have submitted bids
for.....
.....

I/We hereby submit following declaration in lieu of submitting Earnest Money Deposit

1. If after opening of the tender, I/We withdraw or modify my/our bid during the period of validity of tender (including extended validity of the tender) specified in the tender documents.

Or

2. If after the award of work, I/We fail to sign the contractor to submit Performance Guarantee before the deadline defined in the tender document.

I/We shall be suspended for One year and shall not be eligible to bid for AIIMS Tender from the date of issue of suspension order.

Name:

(Full signature of the bidder with Firm's seal)

Place: _____

Dated: _____

All India Institute of Medical Sciences
Engineering Branch, Bhubaneswar (Odisha)-751019 www.aiimsbhubaneswar.edu.in

Percentage Rate Tender / Item Rate Tender & Contract for Works

E-Tender for the work of: SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF AIRCONDITIONING SYSTEM FOR UPS ROOMS AT AIIMS HOSPITAL, BBSR.

To be submitted online by:

- (a) Time and date of online Opening of Technical Bids. : **25/05/2021 (15:30 Hours).**
- (b) Time and date of opening of Online Financial Bids. : **To be intimated later through website.**

T E N D E R

I/We have read and examined the notice inviting tender, schedule along with Appendices 'A' to 'C' as per Specifications applicable, Drawings & Designs, General Rules and Directions, Conditions of Contract, Clauses of Contract, Special Conditions, Schedule of Rate & other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

If I/We, fail to furnish the prescribed Performance Guarantee within prescribed period, I/We agree that the said Director, AIIMS, Bhubaneswar or his successors, in office shall without prejudice to any other right or remedy, be at liberty to debar me for 01 (One) year. Further, if I/We fail to commence work as specified, I/We agree that Director, AIIMS, Bhubaneswar or the successors in office shall without prejudice to any other right or remedy available in law, be at liberty to suspend me for one year. The said performance guarantee shall be a guarantee to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in the tender form. Further, I/We agree that in case of non-submission of Performance Guarantee as aforesaid, I/We shall be debarred for participation for one year in the tendering process of the work.

I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of AIIMS, Bhubaneswar, then I/We shall be debarred for tendering in AIIMS, Bhubaneswar in future forever. Also, if such a violation comes to the notice of AIIMS, Bhubaneswar before date of start of work, the Administrative Officer shall be free to forfeit the entire amount of Performance Guarantee.

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

Dated: * _____

Signature of Contractor(s)
with full Postal Address

Witness: *

Address: *

(* To be filled in by the Contractor.)

Occupation: *

SPECIAL CONDITIONS

1. Site Visit :

Bidders are strongly advised to inspect and assess the site conditions and its surroundings at their own cost and satisfy themselves before submitting their bids. The prospective bidders are advised to depute their technical experts with authorization letter to visit, assess and examine the conditions, requirements, nature & quantum of work and locations of installations which may be necessary for the purpose of bidding and submit a realistic offer for the successful execution of the work. In general, they shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A Bidder shall be deemed to have full knowledge of the site whether he/she inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed. Bidders shall submit a realistic offer for the execution of the work at their own cost without any liability on AIIMS, Bhubaneswar. Submission of a bid by a bidder implies that he/she has read the Tender document and has made himself / herself aware of the terms & conditions and scope and specifications of the work to be done and local conditions and other factors having a bearing on the execution of work.

2. Electricity for erection of cable, T&P etc at site shall be arranged by Vendor(s).
3. Contractor(s) has/have to ensure safety and provide adequate supervision/precautions.
4. During working at site, some restrictions may be imposed by Engineer-in-Charge/Security staff of Corporation or Local Authorities regarding safety and security etc., the contractor(s) shall be bound to follow all such restrictions/instruction & nothing extra shall be payable on this account & no claim for delay on this account shall be entertained.
5. The tender shall be based on Conditions of Contract and tenderers are required to quote their own rates against each item in schedule of quantities (B.O.Q), which is enclosed. All rates shall remain firm for the contract period/extended contract period.
6. If the contractor fails to proceed with the work within the stipulated time as specified from the date of issue of work order to proceed with the work, The Competent Authority shall forfeit the earnest money deposited (EMD) by him along with the tender.
7. All the works to be carried out in accordance with latest CPWD/BIS Specifications & also followed by the I.E. rules and as per the directions of Engineer-in-charge.

8. Packing:

The supplier shall provide such packing of the goods, as is required to prevent their damages or deterioration during the transit to their final destination as indicated in the contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit.

9. Drawing and Specifications:

A copy of tender documents and all relevant drawings and specifications viz. Indian standards, latest CPWD specifications etc. shall be made available at site if & when asked for reference.

10. **Cost of Tests:**

The cost of preparing samples and carrying out tests for quality of material or workmanship will be borne by the contractor except for such exclusions as are specifically mentioned in the specifications laid down in contract. The cost of all test carried out by Laboratories directed by the Engineer-In-Charge will be borne by the contractor.

11. The work shall be carried out strictly as per the attached technical specifications, relevant IS specifications.
12. The contractor has to get approved all the material from the Engineer-in-Charge before its actual use at site of work.
13. The scope of work includes all minor building works required for execution work such as cutting of wall etc. and making good the same. Nothing extra will be paid to contractor for the same.
14. The watch and ward of material and installation shall rest on the part of contractor during execution of work and till handing over of the same after completion of work in accordance with schedule of work.
15. The contractor will take care of the building etc. while handling / installing the equipment to avoid damages to the building. If any damages occur during execution of work, it shall be made good by contractor without any extra cost.
16. Existing materials on good condition may be used after joint inspection by Engineer-in charge & AIIMS representatives & vendor.
17. Dismantling of non-used materials to be deposited at Engineering Dept. by the Firm.
18. For all items of said work; CPWD specifications with correction slips up to the date of receipt of tender shall be followed. For the items which are not covered under CPWD specifications; the special conditions /B.I.S. specifications shall apply. In this regard the decision of Engineer-in- charge shall be final & binding.
19. Wherever any reference is made of any Indian Standard, it shall be taken as reference to the latest edition with all amendments / revision issued thereto up to the date of receipt of tenders.
20. On account of security consideration, there could be some restrictions on the working hours, movement of vehicles for transportation of materials. The contractor shall be bound to follow all such restrictions and adjust the program for execution accordingly, for which nothing extra shall be paid.
21. The work shall be carried out in a manner complying in all respects with the requirements of relevant bye laws of the local bodies, Labour Laws, minimum wages act, workmen compensation act and other statutory laws enact by Central Govt. as well as State Govt.
22. No residential accommodation shall be provided to any of the staff engaged by the contractor. The contractor shall not be allowed to erect any temporary set up for staff in the campus.
23. No claims of the labours shall be entertained by the Department including that of providing employment, regularization of services etc.
24. All T&P, ladders/Hydra etc, Electrical instruments for execution of internal electrification work, required for execution of the work shall be arranged by the contractor.

25. Staff employed by the contractor should be well behaved, polite & courteous. Any complaint against staff should be taken very seriously and such staff should be removed by the contractor immediately from the site and replacement shall be provided immediately.
26. All dismantled material will be removed from site by contractor after verification of measurement of the same by concern JE.
27. The contractor shall make all safety arrangement required for the labour engaged by him at his own cost. All consequences due to negligence or due to lapse of security/safety or otherwise shall remain with the contractor. AIIMS Bhubaneswar will not be responsible for any mishap, injury, accident or death of the contractor's staff. No claim in this regard shall be entertained / accepted by the AIIMS Bhubaneswar. Also, Contractor is responsible to the damage caused to any man/material/ Govt. property by his or his labour during execution of work and this should be rectified by the contractor at his own cost.
28. Chases, holes & drilling works etc. shall be done using power operated tools in the cost of Contract. No extra will be paid for the same.
29. For non-compliance or partial compliance of satisfactory execution of items, the Engineer-in-charge reserves his rights to levy compensation in accordance with the scale of non-conformity and the period for which this non-conformity continues. However, the total amount of this compensation for the whole contract shall not exceed 10% of the tendered value of this contract. This shall be without prejudice to other remedies available to Engineer-in-charge under this contract to take action against the contractor(s).
30. The materials used for carrying out the work shall be of best locally available quality and the contractor has to carry out the necessary testing of the material as ordered by the Engineer-in-Charge for its conformity and all testing charges shall be borne by the contractor.
31. In the case of discrepancy between the schedule of quantities, the Specifications and/or the Drawings, the following order of preference shall be observed: -
 - (a) Description of schedule of quantities (B.O.Q).
 - (b) General rules & Directions and General Conditions/ Special Conditions/CPWD Specifications.
 - (c) Indian standards specifications/BIS.
 - (d) Any reference made to any Indian standards specifications in these documents, shall imply to the latest version of that standard, including such revisions/amendments as issued by the Bureau of Indian Standards up to last date of receipt of tenders. The contractor shall keep at his own cost all such publications of relevant Indian Standards applicable to the work at site.
 - (e) If there are varying or conflicting provisions made in any one document forming Part of contract, Engineering In-charge shall be deciding authority and regard to the intention of the document, his decision shall be final and binding on the Contractor.

Executive Engineer (AC & R)
AIIMS Bhubaneswar

SIGNATURE OF THE CONTRACTOR

SCOPE OF WORK

Project Objectives :

The proposed project shall be of UPS Rooms air-conditioning within the campus of AIIMS (All India Medical Science), Bhubaneswar. The project objective include energy efficiency, centralized grouped location of services installation to ensure easy maintenance, state of the art technology, fast track installation and compliance to all statutory regulations. Any facility not mentioned in this scope, but which is vital to “**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF AIRCONDITIONING SYSTEM FOR UPS ROOMS AT AIIMS HOSPITAL, BBSR**” are assumed to be included in the scope of work.

DESIGN BASE REPORT & TECHNICAL SPECIFICATION :

1.1 INTRODUCTION

A central HVAC system shall be designed to provide year round thermal environmental control for the proposed Development at Bhubaneswar.

1.2 LOCATION

Site Location	:	Bhubaneswar
Geographic Location	:	28.27 Deg. N 85.84 Deg E
Altitude	:	58 m above mean sea level

1.3 OUTDOOR DESIGN CONDITIONS

Based on the data available in ISHRAE Hand Book for Bhubaneswar, outdoor design conditions for Bhubaneswar have been considered as follows:

Summer

Dry Bulb Temperature	:	100 Deg.F (37.8 Deg. C)
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Monsoon

Wet Bulb Temperature	:	83.0 Deg F (28.3 Deg. C)
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Winter

Dry Bulb Temperature	:	56 Deg.F (13.3 Deg. C)
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1.4 INSIDE DESIGN CONDITIONS & VENTILATION REQUIREMENT FOR AC AREAS

Based on discussions and past experience of similar projects, indoor design conditions & minimum fresh air quantities considered in different areas are as follows:

Sl No.	Area/Functional Space	Temperature °C	Relative Humidity Percent	Minimum Total Air Changes per Hour	Minimum Air Changes of Outdoor Air per Hour	Air Pressure in Relation to Surrounding Area
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Operating theatres	18-24	45-55	25	5	Positive
ii)	Cath labs	20-22	30-60	15	3	Positive
iii)	Delivery rooms	20-22	30-60	25	5	Positive
iv)	Recovery room, ICU, Treatment rooms	20-24	30-60	6	2	Equal
v)	Endoscopy, Bronchoscopy	20-24	30-60	12	2	Negative
vi)	Patient rooms	24±1	30-60	6	2	Equal
vii)	Toilets	—	—	—	10	Negative
viii)	Protective environment rooms (Immuno suppressed patients)	24±1	30-60	12	2	Positive
ix)	Isolation room (for patients with infectious disease)	24±1	30-60	12	2	Negative
x)	Corridors	—	—	2	2	Negative
xi)	X-ray/Radiology	20-24	30-60	15	3	Positive
xii)	Laboratories (Other than biochemistry and serology)	22-24	30-60	6	2	Negative
xiii)	Biochemistry and serology labs and pharmacy	22-24	30-60	6	2	Positive
xiv)	Admission/Waiting rooms	22-24	30-60	6	2	Negative
xv)	Diagnostic/Treatment OPD	22-24	30-60	12	2	Negative
xvi)	Sterilizer room	22-26	30-60	10	—	Negative
xvii)	Sterilizer storage	22-26	30-50	4	2	Positive

1.5 MECHANICAL VENTILATION SYSTEM

Following standards shall be adopted for mechanical ventilation of the specific areas: Toilets: 15 ACPH exhaust with equivalent draw of conditioned air from adjacent areas. Under cut of 25-40 mm shall be provided in the main entrance door to the Toilet for achieving the desired result.

Pantry : 2 ACPH exhaust, with equivalent draw of conditioned air from adjacent areas.

Under cut of 25 mm shall be provided for the pantry doors for achieving the desired result.

Store : 6 ACPH

Plant room spaces : 20 ACPH

Table 7 Guidelines for Filter Efficiency Requirement in Health Care Facilities
(Clause 8.1.1)

Sl No.	Category	Area/Designation	Filter Efficiency	
			Filter Bed 1	Filter Bed 2
(1)	(2)	(3)	(4)	(5)
i)	Category 1	a) Orthopaedic OT b) Bone marrow transplant OT c) Organ transplant OT	3 to 10 micron particles 70 percent efficiency	0.3 to 1 micron particles 95 percent efficiency (HEPA at outlets)
ii)	Category 2	a) General OT delivery rooms b) ICU, patient care rooms c) Treatment rooms d) Diagnostic areas	3 to 10 micron particles 70 percent efficiency	0.3 to 1 micron particles 85 percent efficiency
iii)	Category 3	a) Laboratories b) Sterile storage	0.3 to 1 micron particles 75 percent efficiency	Not required
iv)	Category 4	a) Food preparation b) Laundry c) Admin, etc	3 to 10 micron particles 70 percent efficiency	Not required

Estimated Heat Load

Sr No	Conditioned Space	Area (ft2)	TR	CFM
1	Basement (-1) Hospital Building	435	18.25	12008
2	ER-2 (S2 Ground floor) Hospital Building.	300	11.63	7561
3	ER-3 (S3 Ground floor) Hospital Building.	300	11.60	7561
4	4 th floor Hospital Building	481	9.82	6154
5	Ground floor Medical College	227	11.40	7488
6	Ground floor (Admin Building)	503	3.33	1639

Machine Selection

We have selected DX and VRF system for the proposed project.

Sl. No.	Description	Unit	Qty
	DX System		
1	Indoor Units - DX System		
	Ceiling Suspended High Sensi Ductable Units		
a	5 TR @ 3300 CFM for 400 KVA UPS Room @ +4 Lvl	NOS.	2
b	6 TR @ 3800 CFM for 500 KVA UPS Room @ Gr Lvl	NOS.	2
c	4 TR @ 2000 CFM for 60 KVA UPS Room @ Gr Lvl	NOS.	1
2	Outdoors Units - DX System		
	Supply, Installation, Testing & Commissioning Of Condensing Unit - HDU of following capacity with all accessories like Expansion Valves, Filter Dryers & Hand Shutoff Valves etc etc.		
a	5 TR	NOS.	3
b	8.5 TR	NOS.	2
	VRF System		
3	Indoor Units - VRF System		
	Ceiling Suspended High Sensi Ductable Units		
a	10 TR @ 6000 CFM for 800 KVA UPS Room @ -1 Lvl Basement	NOS.	2
b	12 TR @ 7600 CFM for 500 KVA UPS Room @ Gr Lvl ER 2	NOS.	1
c	12 TR @ 7600 CFM for 500 KVA UPS Room @ Gr Lvl ER 3	NOS.	1
4	Outdoors Units - VRF System		
a	12 HP for 800 KVA UPS Room @ -1 Lvl Basement	NOS.	2
b	16 HP for 500 KVA UPS Room @ Gr Lvl ER 2 Hospital Building	NOS.	1
c	16 HP for 500 KVA UPS Room @ Gr Lvl ER 3 Hospital Building	NOS.	1

Notes

- Primarily DX system has been proposed for the said application. However wherever the piping length is more, VRF system has been proposed.
- High sensi Ductable Indoor units has been proposed. All units will be ceiling suspended as there is no any space to install floor mounted machines.
- Conceptually each UPS room shall be catered through Ceiling suspended Ductable units.
- All machine will be of working only and there is no any standby machine. However multiple machine has been proposed wherever possible to have at least 50% system redundancy.
- In future, if management wants to go for standby machine, same configuration machines shall be installed.

Variable Refrigerant Flow System

1.0 SCOPE OF WORK

The Scope of this section comprises the supply, erection, testing and commissioning of Variable Refrigerant Volume Air conditioning unit, conforming to these Specifications and in accordance with requirements of drawings and of the bill of Quantities.

2.0 GENERAL

- The system selected is a modular system, with number of indoors connected to centrally located outdoor units, as per detail designing given in the tender.
- The outdoor units for all the system shall be air cooled type and mounted on terrace of the building. Indoor units in various areas shall be as per enclosed drawings / Bill of Quantities.
- All the VRF air conditioners shall be fully factory assembled, wired, internally piped & tested.
- The outdoor unit shall be pre-charged with first charge of R 410A or Eqv. CFC free refrigerant. Additional charge shall be added as per refrigerant piping at site.
- All the units shall be suitable for operation with 415 V + 10%, 50 Hz + 3%, 3 Phase supply for outdoor units & 220 V + 10%, 50 Hz + 3%, 1 Phase supply for in door units.
- The VRF system shall provide stable, trouble free & safe operation, with flexibility of operating desired indoor units.
- The outdoor units must be capable of delivering exact capacity proportional to the number of indoor units switched on & the heat load in the air-conditioned area.
- The proportional operation shall be achieved by varying speed of the compressor in the outdoor units / change in compressor configuration or capacity as per load.

3.0 SPECIFICATION OF OUTDOOR UNITS

- Outdoors units of the VRF system shall be compact air-cooled type.
- All the compressors of the outdoor units must be hermetically sealed type.
- Each module of outdoor unit must have minimum 1 # inverter compressor (Options I / Option II) per VRF Condensing Unit Module, suitable to operate at heat load proportional to indoor requirement / or by change in compressor configuration or capacity as per load. "Anti-Corrosive" treatment (Blue Fins) for Al fins of Condenser Coils is mandatory.
- The treatment should be suitable for areas of high pollution and salt laden air.
- Bidder has to furnish the rated / derated capacity of the Indoor units, considering the refrigerant piping of respective outdoor units.
- Back up operation, in case of failure of one of the compressors of outdoor unit, for single module outdoor units or failure of one of the modules in case of multiple module outdoor units shall be possible.
- The VRF outdoor unit shall always be supplying at least 33% of back up operation, of the full load capacity.
- The outdoor units shall be suitable to operate within an ambient temperature range of +5 Deg C to + 48 Deg C, in cooling mode.
- The entire operation of outdoor units shall be through independent remotes of indoor units.
- No separate Start/ Stop function shall be required.
- Inverter compressor / or equivalent system of the unit shall start first & at the minimum frequency / capacity, to reduce the inrush current during starting.

- Refrigerant control in the outdoor unit shall be through Electronic Expansion Valve.
- Complete refrigerant circuit, oil balancing/ equalizing circuit shall be factory assembled & tested.
- Noise level of outdoor units shall not exceed 65 dB (A) at a distance of 1.0 m from the unit.

Outdoor units shall be complete with following safety devices:

- High pressure switch
- Fan driver overload protector
- Over current relay
- Inverter Overload Protector
- Fusible Plug

Unit shall be supplied with

- Installation manual
- Operation Manual
- Connection Pipes
- Clamps

Units will use R-410 as Refrigerant / Equivalent Refrigerant gas.

4.0 SPECIFICATIONS FOR INDOOR UNITS

WALL MOUNTED DECORATIVE SPLIT INDOOR UNITS

- These units shall be suitable for wall mount with suitable supports to take care of operating weight of the unit, without causing any excessive vibration & noise.
- The cold air supplied by these units will be supplied to the area to be air conditioned.
- Each indoor unit must have electronic expansion valve operated by microprocessor thermostat based temperature control to deliver cooling/ heating as per the heat load of the room.
- The operating noise level of unit at the highest operating level shall not exceed 45 dB(A), at a distance of 1.5 m Unit must have Thermal Fuse for fan motor protection, in case of motor heating.
- The unit will be connected in series to a suitable outdoor unit & it must be possible to operate the unit independently, through corded/ cordless remote specified in the bill of quantities.
- The unit should be suitable for further connection to Intelligent Building Management System / Central Room Controller & it shall be possible to operate the unit through this IBMS system / Central Controller.

5.0 CONTROL SYSTEM FOR VRF AIR CONDITIONING SYSTEM WIRED

REMOTE CONTROLLER

- Wired remote controller shall be supplied as specified in the "Bill of Quantities"
- The controller must have large crystal display screen, which displays complete operating status.
- The digital display must allow setting of temperature with 1 Deg C interval.
- Remote shall be able to individually program by timer the respective times for operation start

and stop within a maximum of 72 hours

- Remote must be equipped with thermostat sensor in the remote controller that will make possible more comfortable room temperature control
- The remote shall be able to monitor room temperature & preset temperature by microcomputer & can select cool/ heat operation mode automatically.
- The remote must constantly monitor malfunctions in the system & must be equipped with a “self-diagnosis function” that let know by a message immediately when a malfunction occurs.
- It shall be possible to wire the remote up to 500 RMT.

WIRELESS REMOTE CONTROLLER

- Wireless remote controller shall be supplied as specified in the “Bill of Quantities”
- The same operation modes & settings as with wired remote controllers must be possible
- Compact light receiving unit to be mounted into wall or ceiling shall be included.

UNITS SHALL BE SUPPLIED WITH FOLLOWINGS:

- a). Operation Manual
- b). Installation Manual
- c). Paper Pattern for installation
- d). Drain hose / Clamp metal / Insulation for fitting / Sealing Pads / Clamps / Screws

LCD MONITOR CENTRAL REMOTE CONTROLLER & POWER CONSUMPTION DISTRIBUTOR

- LCD Central remote controller shall be supplied as specified in the “Bill of Quantities”
- The controller must have LCD Touch screen, which displays complete operating status.
- The digital display must allow setting of temperature with 1 Deg C interval.
- Remote shall be able to individually program by timer the respective times for operation start and stop within a maximum of 1 Weeks’ time.
- The controller shall be able to monitor room temperature & preset temperature by microcomputer & can select cool/ heat operation mode automatically for all the indoor units.
- The remote must constantly monitor malfunctions in the system & must be equipped with a “self-diagnosis function” that let know by a message immediately when a malfunction occurs.
- It shall be possible to wire the remote up to 1000 RMT.
- Controller shall be compact light receiving unit to be mounted into wall
- Units shall be supplied with followings:
- Operation Manual
- Installation Manual
- Paper Pattern for installation
- All Kind of software if any

The Controller can give report in soft and hard copies for the indoor wise power consumed detail, the same shall be used for metering HVAC power consumption to shop holders.

6.0 HANDING OVER OF THE VRF SYSTEM

Following reading/ data shall be generated as a part of handing over of the VRF air conditioning system, apart from the handing over data for air side & indoor design conditions.

OUT DOOR UNITS

- Inlet temperature Discharge pipe temperature Suction pipe temperature Oil pressure
Condensing Pressure Evaporating Pressure Power supply voltage Inverter compressor frequency
Inverter current Fan operating current Total ODU current.

INDOOR UNITS

- Indoor unit operation – On/ off from remote Indoor unit operation – On/ off from thermostat
Remote control presser temperature Suction temperature Indoor liquid pipe temperature Indoor gas pipe temperature
- Electronic expansion valve opening Fan operating current

AIR DISTRIBUTION SYSTEM

1.0 GENERAL

Supply, fabrication, installation and testing of all galvanized steel/aluminum ducts & supply, installation, testing and balancing of all grilles, registers and diffusers, in accordance with these specifications and the general arrangement shown on the drawings.

Duct work shall mean all ducts, casings, dampers, access doors, joints, vanes, stiffeners, hangers, splitters and supports etc.

2.0 DUCT MATERIALS

The ducts shall be fabricated from galvanized steel sheets class VIII - Light coating of Zinc conforming to ISS: 277-1962 (REVISED) with accompanying Mill test Certificates. Galvanizing shall be of 120gms/sq.m. (total coating on both sides). In addition, if deemed necessary, samples of raw material, selected at random by owner's site representative shall be subject to approval and tested for thickness and zinc coating at contractor's expense.

In case of factory fabricated duct the G.I. raw material should be used in coil-form (instead of sheets) so as to limit the longitudinal joints at the edges only irrespective of cross-section dimensions

2.1 SPECIFICATIONS FOR FACTORY FABRICATED DUCTING

Unless otherwise specified here, the construction, erection, testing and performance of the ducting system shall conform to the SMACNA-1995 standards ("HVAC Duct Construction Standards-Metal and Flexible-Second Edition-1995" SMACNA)

Duct Connectors and Accessories

All transverse duct connectors (flanges / cleats) and accessories/related hardware are such as support system shall be zinc-coated (galvanized).

2.2 FABRICATION STANDARDS

All ductwork including straight sections, tapers, elbows, branches, show pieces, collars, terminal boxes and other transformation pieces must be factory-fabricated. Equivalency will require fabrication by utilizing the following machines and processes to provide the requisite quality of ducts and speed of supply. Coil lines to ensure location of longitudinal seams at comes / folded edges only to obtain the required duct rigidity and low leakage characteristics. No longitudinal seams permitted along any face side of the duct. All ducts, transformation pieces and fittings to be made on CNC profile cutlers for required accuracy of dimensions, location and dimensions of notches at the folding lines. All edges to be machine treated using lock formers, flanges and roller for fuming up edges. Sealant dispensing equipment for applying built-in sealant in Pittsburgh lock where sealing of longitudinal joints are specified will be used.

2.3 SELECTION OF G.I. GAUGE AND TRANSVERSE CONNECTORS

Duct Construction shall be in compliance with 2" (500Pa) w.g. static norms as per SMACNA. All transverse connectors shall be as per OEM 4-bolt slip-on flange system or equivalent of similar 4-bolt systems with built-in sealant if any to avoid any leakage additional sealant to be used. The specific class of transverse connector and duct gauge for a given duct dimensions will be 1" (250 Pa) pressure class. Non-toxic, AC - applications grade P.E. or PVC Casketing is required between all mating flanged joints. Gasket sizes should conform to flange manufacturer's specification.

2.4 DUCT CONSTRUCTION

2.4.1 The fabricated duct dimensions should be as per approved drawings and all connecting sections are dimensionally matched to avoid any gaps.

2.4.2 Dimensional Tolerances: All fabricated dimensions will be within 1.0 mm of specified dimension. To obtain required perpendicularity, permissible diagonal tolerances shall be 1.0 mm per meter

2.4.3 Each and every duct pieces should be identified by color coded sticker which shows specific part numbers, job name, drawing number, duct sizes and gauge.

2.4.4 Ducts shall be straight and smooth on the inside Longitudinal seams shall be airtight and at comers only, which shall be either Pittsburgh or Snap Button Punch as per SMACNA practice, to ensure air tightness.

2.4.5 Changes in dimensions and shape of ducts shall be gradual (between 1:4 and 1:7). Turning vanes or air splitters shall be installed in all bends and duct collars designed to permit the air to make the turn without appreciable turbulence.

2.5 FACTORY FABRICATED RECTANGULAR GSS DUCTING.

All ducts shall be fabricated from galvanized steel / aluminum of the following thickness, as indicated as below:

RECTANGULAR DUCT (LOW PRESSURE)

Smacna Standard

Dimensions of Ducts	Gauge G.I	Joints
Up to 600	26 (0.48mm)	C & SS
601 to 900	26 (0.48mm)	TDF
901 to 1200	24 (0.63mm)	TDF
1201 to 1800	22 (0.80mm)	TDF
1801 to 2250	20 (1.0mm)	TDF
2251 and above	18 (1.25mm)	TDF

IS Standard

Dimensions of Ducts	Gauge G.I	Aluminium
Up to 750	24 (0.63mm)	22 (0.80mm)
751 to 1500	22 (0.80mm)	20 (1.0mm)
1501 to 2250	20 (1.0mm)	16 (1.61mm)
2251 and above	18 (1.25mm)	14 (1.99mm)

Rectangular Ducts G. S. External Pressure 500 Pa

Duct Section Length 1.2 m (4 ft)

Maximum Duct Size	Gauge	Joint Type	Bracing Spacing
1-600 mm	24	C & SS	As per duct manufacturer
601-750 mm	24	4 Bolt Transverse Duct , Connector-E (TDC) with built in sealant	
751-1000 mm	22	4 Bolt TDC-E	
1001-1200 mm	22	4 Bolt TDC-H	
1201-1300 mm	22	4 Bolt TDC-J	
1301-1500 mm	22	4 Bolt TDC-J	
1501-1800 mm	20	4 Bolt TDC-J	
1801-2100 mm	20	4 Bolt TDC-J	
2101-2250 mm	20	4 Bolt TDC-J	
2251-2400 mm	18	4 Bolt TDC-J	
2401-2700 mm	18	4 Bolt TDC-J	

'C'-cleat; 'S'-S cleat; 'SS'-Standing S cleat; 'AI' -Angle Iron in mm

*Distance of reinforcement/bracing from each joint. Bracing material to be same as of material used for joining of duct sections.

NOTE:

- DUCT USING LOCK FORMER MACHINE AT SITE SHALL NOT BE ACCEPTED.
- MS FLANGES SHALL BE USED FOR DUCTS FOR THE AHU HAVING HEPA FILTERS.

HANGERS FOR DUCT

Duct Size(mm)	Spacing(M)	Size of Slotted / MS angle(mm x mm)	Size of rod dia (mm)
Up to 750	2.4	1.6 mm	
	thick slotted	rail 8	
751 to 1500	2.4	40 x 3 10	
1501 to 2250	2.0	50 x 3 12	
2251 to above	2.0	50 x 3 12	

Ducts above 750 mm wide to be provided with MS angle supports.

Additional hangers shall be provided in ducts near smoke/fire damper connections.

All ducts shall be fabricated and installed in workman like manner, conforming to relevant

2.6 INSTALLATION

2.6.1 During the construction, the contractor shall temporarily close duct openings with sheet metal covers to prevent debris entering ducts and to maintain opening straight and square, as per direction of

Engineer-In-Charge.

2.6.2 Great care shall be taken to ensure that the duct work does not extend outside and beyond height limits as noted on the drawings.

2.6.3 All duct work shall be of high quality approved galvanized sheet steel guaranteed not to crack or peel on bending or fabrication of ducts. All joints shall be air tight and shall be made in the direction of air flow.

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

2.6.5 All air turns of 45 degrees or more shall include curved metal blades or vanes arranged so as to permit the air to make the abrupt turns without an appreciable turbulence. Turning vanes shall be securely fastened to prevent noise or vibration.

2.6.6 The duct work shall be varied in shape and position to fit actual conditions at building site. All changes shall be subjected to the approval of the Engineer -In-Charge. The contractor shall verify all measurements at site and shall notify the Engineer-In-Charge of any difficulty in carrying out his work before fabrication.

2.6.7 Sponge rubber or approved equal gaskets of 6 MM maximum thickness shall be installed between duct flanges as well as between all connections of sheet metal ducts to walls, floor columns, heater casings and filter casings. Sheet metal connections shall be made to walls and floors by means of wooden member anchored to the building structure with anchor bolts and with the sheet screwed to them.

2.6.8 Flanges bracings and supports are to be sourced from the duct manufacturer. Accessories such as damper blades and access panels are to be of materials of appropriate thickness and the finish similar to the adjacent ducting, as specified.

2.6.9 Joints, seams, sleeves, splitters, branches, takeoffs and supports are to be as per duct details as specified, or as decided by Engineer-In-Charge.

2.6.10 Joints requiring bolting or riveting may be fixed by Hexagon nuts and bolts, stove bolts or buck bolts, rivets or closed center top rivets or spot welding. Self-tapping screws must not be used. All jointing material must have a finish such as cadmium plating or Galvanized as appropriate.

2.6.11 Fire retarding flexible joints is to be fitted to the suction and delivery of all fans. The material is to be normally double heavy canvass or as directed by Engineer-In-Charge. On all circular spigots the flexible materials are to be screwed or clip band with adjustable screws or toggle fitting. For rectangular ducts the material is to be flanged and bolted with a backing flat or bolted to mating flange with backing flat.

2.6.12 The flexible joints are to be not less than 75 MM and not more than 250 MM between faces. The duct work should be carried out in a manner and at such time as not to hinder or delay the work of the other agencies especially the boxing or false ceiling contractors.

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

2.6.14 The work shall meet with the approval of Consultant/customer in charge in all its parts and details. All necessary allowances and provisions shall be made by the Contractor for beams, pipes, or other obstructions in the building, whether or not the same are shown on the drawings. Where necessary to avoid beams or other structural work, plumbing or other pipes, and conduits, the ducts shall be transformed, divided or curved to one side (the required cross sectional area being maintained) all as per the site requirement. If a duct cannot be run as shown on the drawings, the contractor shall install the duct between the required points by any path available in accordance with other services and as per approval of consultant/customer in charge.

All ductwork shall be independently supported from building construction. All horizontal ducts shall be rigidly and securely supported, in an approved manner, with trapeze hangers formed of galvanized steel rods and galvanized steel angle / channel or a pair of brackets, connected by galvanized steel rod under ducts. The spacing between supports should be not greater than 2.0 meter. All vertical ductwork shall be Supported by structural members on each floor slab. Duct supports may be through galvanized steel insert plates left in slab at the time of slab casting. Galvanized steel cleat with a hole for passing the hanger rods shall be welded to the plates. Trapeze hanger formed of galvanized steel rods shall be hung through these cleats. Wherever use of metal insert plates is not feasible, duct support shall be through dash/anchor fastener driven into the concrete slab by electrically operated gun. Hanger rods shall then hang through the cleats or fully threaded galvanized rods can be screwed into the anchor fasteners.

Ducting over furred ceiling shall be supported from the slab above or from beams after obtaining approval of Consultant / customer in charge. In no case shall any duct be supported from false ceiling hangers or be permitted to rest on false ceiling. All metal work in dead or furred down spaces shall be erected in time to occasion no delay to other contractor's work in the building. All ducts shall be totally free from vibration under all conditions of operation. Whenever ductwork is connected to fans, air handling units or blower coil units that may cause vibration in the ducts, ducts shall be provided with a flexible connection, located at the unit discharge. Flexible connections shall be constructed of fire retarding flexible heavy canvas sleeve at least 10cm long securely bonded and bolted on both sides.

Sleeve shall be made smooth and the connecting ductwork rigidly held by independent supports on both sides of the flexible connection. The flexible connection shall be suitable for pressure at the point of installation. Duct shall not rest on false ceiling and shall be in level from bottom. Taper pieces shall taper from top.

2.7 DOCUMENTATION TO MEASUREMENTS

For each drawing, all supply of ductwork must be accompanied by computer-generated detailed bill of material indicating all relevant duct sizes, dimensions and quantities. In addition, summary sheets are also to be provided showing duct areas by gauge and duct size range as applicable.

Measurement sheet covering each fabricated duct piece showing dimensions and external surface area along with summary of external surface area of duct gauge-wise.

All duct pieces to have a part number, which should correspond to the serial number, assigned to it in the measurement sheet. The above system will ensure speedy and proper site measurement, verification and approvals.

2.8 TESTING

After duct installation, a part of duct section (approximately 20% of total ductwork) may be selected at random and tested for leakage. The procedure for leak testing should be followed as per SMACNA- "HVAC Air Duct Leakage Test Manual: (First Edition).

The entire air distribution system shall be balanced to supply the air quantity as required in various areas

and the final balance of air quantity through each outlet shall be submitted to the engineer-in-charge for approval. Measured air quantities at fan discharge and at various outlets shall be identical to or less than 5% in excess of those specified and quoted. Branch duct adjustments shall be permanently marked after air balancing is completed so that these can be restored to their correct position if disturbed at any time.

3.0 DAMPERS

Dampers shall be opposed blade type of robust construction and tight fitting. They shall be made of G.S. steel minimum 16 g thick and shall have brass bushes. The design, method of handling and control shall be suitable for the location and service required.

Dampers shall be provided with suitable links, levers and quadrants as required for their proper operation control or setting. Devices shall be made robust, easily operable and accessible. Every damper shall have an indicating device clearly showing the damper position at all times. Handles will be provided with extended arms to account for insulation thickness.

Dampers shall be placed in ducts and at every branch supply or return air duct connection, whether or not indicated on the drawings, for the proper volume control and balancing of the system. Cost of dampers & vanes shall be included in the cost of ducts.

4.0 FLEXIBLE DUCT CONNECTION

The Flexible Connection should be made of TF quality fire retardant double canvas or imported fabric of fiberglass weave having silicone rubber coating, as mentioned in the schedule of quantities. Flexible connections shall be air tight & water proof and withstand high temperature application, non flammable type and does not support combustion. There shall be extruded Angle aluminum frame at both ends for connection.

5.0 MOTORIZED COMBINATION SMOKE & FIRE DAMPER

All supply/return air duct or path at Package unit room wall or slab crossing shall be provided motorized combined smoke and fire damper. The fire rating shall be of 120 minutes at 250oC. Fire damper blades and outer frame shall be formed of 1.6mm galvanized sheet steel. The damper blade shall be pivoted spindles in self lubricated bronze bushes, stop seals shall be provided on top and bottom of the damper housing made of 16G galvanized sheet steel. Side seal shall be provided to prevent fine leakages. Smoke damper shall be kept open during normal mode with the help of 230 V operated electric actuators to provide maximum air passage without creating any noise or through UL stamped electro-thermal link with limit switch for fan cut-off. The actuator shall be energized with the help of a signal from space smoke detector installed in air conditioned space/ RA duct. The fire damper has to be provided with a sleeve of at least 450 mm length such that the spindle mounted in the sleeve will house the actuator and the actuator should be accessible from inside the AHU room. The fire damper shall also close due to temperature rise in SA ducts through the electric temp sensor factory set at 165 deg F, limit switches with Bakelite base will be provided to stop fan motor & give open & close signal at remote panel in case of motorized damper. Fire dampers in sensitive installations shall operate through duct mounted Heat sensors operating at 94 deg C. In case of power failure, the damper shall close with spring and automatically open when power is switched 'ON'. Each damper shall be provided with its individual control panel along with interlocking through AHU control panel. Fan shall remain off when damper is in closed position. Damper shall remain shut off after smoke/fire unless switched on manually.

6.0 SUPPLY AND RETURN AIR GRILLES

Supply and return air grilles shall be anodized extruded aluminum construction with individually adjustable/fixed bars as shown on drawings and indicated in schedule of quantities. Supply air grilles shall generally be double deflection type, with removable key operated volume control dampers. Return air

grilles shall generally be double deflection type similar to supply air grilles but without dampers. All supply and return air grilles behind wooden grilles shall be single deflection type with one way bars only, the supply air grilles being provided with removable key operated volume control dampers. Aluminum supply and return grilles shall be powder coated with color of client's choice or shall be extruded aluminum as per schedule of quantities.

7.0 SUPPLY AND RETURN AIR DIFFUSERS

Supply and return air diffusers shall be as shown on the drawings and indicated in schedule of quantities. The supply air diffuser shall be provided with removable key operative volume control dampers if specified. Aluminum supply and return air diffusers shall be powder coated with color of client's choice, or shall be anodized aluminum.

i. Round or Rectangular Diffusers

Supply/return air linear diffuser shall be extruded aluminum construction, square, rectangular, or round diffusers with flush fixed pattern or adjustable flow pattern. Anodized aluminum diffusers shall be square or rectangular in shape. Diffusers for different spaces shall be selected in consultation with the Architect/Consultants. Supply air diffusers may be equipped with fixed air-distribution grids, removable key-operated volume control dampers, and anti-smudge rings as indicated in schedule of quantities.

ii. Linear Supply air/ Return Air Grilles

These shall be extruded aluminum construction with fixed horizontal bars at 15 deg inclination and flanges on both sides. The thickness of fixed bar louvers shall be at least 5.5mm & angle shall be 20mm/30mm inside. The grilles shall be suitable for concealed fixing. Volume control damper of aluminum construction with black anodized finish shall be provided in SA duct collars.

8.0 LINEAR DIFFUSER

Liner diffuser shall be extruded aluminum construction multi slot type with air pattern control provided in each slot. Supply air diffuser shall be provided with hit & miss damper in each slot of the supply air diffuser. Plenum shall be provided for each supply air diffuser.

The Material of Grilles shall be as follows:

- i. All grilles shall be selected in consultation with the Client/Architect/Consultant. Different spaces shall require horizontal or vertical face bars, and different width of margin frames.
- ii. All grilles shall have a soft, continuous neoprene gasket between the periphery of the registers and the surface on which it has to be mounted. The effective area of the registers shall not be less than 85 percent.
- iii. Grilles shall be of adjustable pattern as each grille bar shall be pivotable to provide pattern with 0 to 90 deg horizontal arc and up to 30 deg deflection up or down. Bars shall hold deflection settings under all conditions of velocity and pressure. Extruded aluminum grilles shall have fixed bars.
- iv. Bars longer than 45cm shall be reinforced by set-back vertical members of approved thickness.

The material thickness of grills, diffuser, and damper shall be as follows:

Diffuser Aluminum

- | | | |
|----|---------|-----------|
| a) | Frame | 18 gauges |
| b) | Louvers | 18 gauge |

Grills

- | | | |
|----|---------|-----------|
| a) | Frame | 18 gauges |
| b) | Louvers | 24 gauge |

V.C. Damper

- | | | |
|----|--------|-----------|
| a) | Frame | 18 gauges |
| b) | Louver | 24 gauge |

- v. Fresh air intake and extract louvers

All the louvers shall be rain protection type and shall be fabricated from extruded aluminum/G.I section. The bottom louver shall be provided with extended lip to prevent rain water seepage inside duct/room. The louvers shall additionally be provided with heavy duty expanded metal (aluminum -alloy) bird screen from within.

9.0 TESTING & BALANCING

After the installation of the entire air distribution system is completed in all respects, all ducts shall be tested for air leaks before painting the interiors of conditioned spaces air distribution system shall be allowed to run continuously for 2 hours for driving away any dust & foreign material logged within ducts during installation.

10.0 MISCELLANEOUS

Sponge rubber gaskets also to be provided behind the flange of all grills. Each shoot from the duct, leading to a grille, shall be provided with an air deflector to divert the air into the grille through the shoot.

Inspection doors measuring at least 450 mm x 450 mm are to be provided in each system at an appropriate location, as directed by Engineer-in-Charge.

Diverting vanes must be provided at the bends exceeding 600 mm and at branches connected into the main duct without a neck. Proper hangers and supports should be provided to hold the duct rigidly, to keep them straight and to avoid vibrations. Additional supports are to be provided where required for rigidity or as directed by Engineer-in-Charge. All duct work joints are to be true right angle and with all sharp edges removed.

All the air distribution terminals like diffusers, grilles etc has to be suspended from the true ceiling using adjustable suspension system and the same should not rest on the false ceiling.

AIR FILTER

1.0 GENERAL

This specification covers the manufacture, construction feature, erection, testing and commissioning of Air filter at site.

2.0 SCOPE

The scope of work will include supplying, installing, testing and commissioning of following type of filters.

3.0 SYNTHETIC FIBRE FILTERS (FOR AHU'S AND FRESH AIR INTAKE)

The filter media shall be constructed of suitable fibrous material (ie. coir extruded of (HDPE). Packaged into frame of Aluminium sheet 18 gauge thickness. Filter element shall be supported by galvanized steel wire mesh of 10 mm square on either side. Filter frame shall be provided with suitable handle.

This filter shall be capable of being cleaned off the accumulated dust by ordinary tap water flushing.

Initial pressure drop through the filter shall not exceed 3.5 mm WC. Final pressure drop shall not exceed 7.5 mm WC at rated flow.

4.0 METALLIC FILTERS

Filter shall consist of V-fold galvanized wire mesh interspaced with a flat layer of galvanized wire mesh. The density of the filter medium shall increase in the direction of air flow. Wire mesh edges shall be suitably hemmed to eliminate the danger of abrasion during handling. Filter media shall be supported on either side by galvanized expanded metal casing. Filter frame shall be fabricated from aluminum alloy of minimum 16 gauge thickness. The filter shall be either dry or oil wetted type.

Filter must be capable of being completely cleaned off their accumulated dust by flushing with tap water.

The efficiency of the filter shall be as per ASHRAE 52-76/ BS-6540 initial pressure drop shall not exceed 5.0 mm WC & Final pressure drop shall not exceed up to 7.5 mm WC at rated flow filter frame shall be provided with suitable handle.

5.0 FINE FILTER

These filters shall be installed in the AHU for high level of filtration. These shall be capable to filter the air in the range of 1 to 5 microns with low initial pressure drops. These shall have high dust holding capacity and washable / cleanable type. The frame shall be of Galvanized steel / CRCA powder coated / Aluminium anodized / SS 304. The separators shall be with aluminium. The filter media shall be HDPE media / Non-woven synthetic media. The gasket shall be Neoprene rubber gasket. The fine filter shall confirm to Eurovent class and BS EN 779 CLASS. The filter efficiency shall be 90 – 95 % arrestance.

6.0 HEPA MINI PLEAT FILTERS

These filters shall remove a broad range of airborne contaminants, including fine dust, smoke, soot and pollen. These filters shall increase its energy efficiency due to lower pressure drop in comparison to

conventional deep pleat HEPA. The filter housing shall be with a very minimal size. The performance of the filters has to be factory scanned prior to the supply. Individual testing under rigid quality control and modern assembly methods has to be used to ensure conformance to specifications.

Class of filters should be confirmed to

ASHRAE 52.2	MERV 16 - 20
EN 1822	E10 – H14
Eurovent 4 / 5	EU 10 - EU 14 IEST RP CC
001.3	A, B, C, D

These filters has to be with special grade micro glass fiber paper spaced with uniformly positioned hot melt adhesive beads to ensure optimum air – flow. The filter shall be with micro glass pleated media (Imported). The frame shall be with extruded aluminium or SS 304 material. It shall be of hi flow box type with flange. The gasket shall be Polyethylene food grade. The maximum operating temperature shall be from 100 deg C to 300 deg C and the maximum humidity shall be 100% RH at 0% condensation. The initial pressure drop shall be 20 mm wg at rated air flow capacity and the final pressure drop shall be within 50 mm wg. Efficiency on 0.3 micron as per EN 1822 shall be 85 - 99.99995% and Efficiency on 0.3 micron as per IEST RP 001.3 shall be 99.97% - 99.999%.

The separators shall be thread glue separators and the adhesive shall be polyurethane based.

INSULATION

1.0 GENERAL

Scope of this specification comprises of supplying, installing, testing and commissioning of insulation on duct, pumps, chilled/hot water piping, chillers, expansion tank, AHU room and duct acoustic lining.

2.0 THERMAL DUCT INSULATION

2.1 Duct Insulation (Closed Cell)

The material should be high quality closed cell nitrile rubber insulation. The thermal conductivity of insulation shall not exceed 0.033 W/MoK (0.20 Btu. In/hr. ft.2 Fo) at 0oC (32o F) mean temperature and density shall not be less than 60 Kg/m3. Temperature range shall be – 50oC to + 116o C and should be class 'O' self-extinguishing type. All the adhesives employed should be VOC / SVOC free. Material should be FM approved.

Recommended Adhesive

- The adhesive shall be specially formulated for the Duct insulation application and supplied by insulation manufacturer.
- The adhesive shall be Solvent based rubber insulation adhesive, free from benzene.
- It should have Excellent Bonding to Porous and Non Porous Surfaces.

Properties

Viscosity @ 30°C :	700 - 1200 cps	Specific Gravity	
:	0.80 - 0.85 g/cc	Density	:
	0.083 kg/m3+	0.01 Flash Point :	
	> 10 °C		
Coverage :	6-8 square meters of bonded material/liter Drying		
Time :	4 - 5 Minutes		
Tack Retention Time :	25 Minutes		

2.2 Thickness of Insulation

The thickness of the nitrile rubber shall be as shown on drawing or identified in the schedule of quantity. Following installation procedure should be adopted:

2.3 Application – Unexposed duct

- Duct surfaces shall be cleaned to remove all grease, oil, dirt, etc. prior to carrying out insulation work.
- Measurement of surface dimensions shall be taken properly to cut closed cell elastomeric rubbers sheets to size with sufficient allowance in dimension.
- Material shall be fitted under compression and no stretching of material should be allowed.
- A thin film of adhesive shall be applied on the back of the insulating material sheet and then on to the metal surface.
- When adhesive is tack dry, insulating material sheet shall be placed in position and pressed firmly to achieve a good bond.
- All longitudinal and transverse joints shall be sealed as per manufacturer recommendations.
- The adhesive shall be strictly as recommended by the manufacturer.

2.4 Application – exposed duct

- Duct surfaces shall be cleaned to remove all grease, oil, dirt, etc. prior to carrying out insulation work.
- Measurement of surface dimensions shall be taken properly to cut closed cell elastomeric rubbers sheets to size with sufficient allowance in dimension.
- Material shall be fitted under compression and no stretching of material should be allowed.
- A thin film of adhesive shall be applied on the back of the insulating material sheet and then on to the metal surface.
- When adhesive is tack dry, insulating material sheet shall be placed in position and pressed firmly to achieve a good bond.
- All longitudinal and transverse joints shall be sealed as per manufacturer recommendations.
- The adhesive shall be strictly as recommended by the manufacturer.
- Apply 1st coat of UV resistant paint on the nitrile rubber insulation.
- Then wrap 7 mm thick fiber glass cloth.
- Apply 2nd coat of UV resistant paint over the fiber glass cloth.

Exposed Duct: and Pipe

For insulation of exposed duct shall be carried out from 50 mm thick expanded polystyrene sheet of 'TF Quality' having K value of 0.023 Kcal/hr sq.mt/deg C at mean temperature of 100C and a density shall not be less than 20 kg/cubic m.

Application:

Cleaning the surface of ducts with wire brush to remove dirt, rust etc. Applying a coat of adhesive.

Fixing the expanded polystyrene insulation.

Cover the insulation with 2 nos. polythene sheet 500g and seal the joint with CPRX compound.

Fixing 24 x 3/4" Hexagonal wire netting tied with G.I. wire.

Finally applying sand cement plaster in ratio 1:3 in two layers each 6mm thick with suitable water proofing compound.

- a. A layer of distemper over which emulsion Paint to required colour with brush.

3.0 ACCOUSTIC DUCT INSULATION

3.1 Duct Insulation (Open Cell)

The material should be high quality open cell nitrile rubber insulation. The thermal conductivity of insulation shall not exceed 0.047 W/MoK (0.26 Btu. In/hr. ft.2 Fo) at 20oC (68o F) mean temperature and density shall be 140-180 Kg/m³. Temperature range shall be – 20oC to + 105o C and should be class '1' acoustic type. All the adhesives employed should be VOC / SVOC free. Its material shall be fiber free. It shall have Microban®*; antimicrobial product protection, Antimicrobial Behavior: No fungal growth tested as per DIN EN ISO 846 Method A Standard for (Fungi), Bacterial Resistance: No bacterial growth and 99.9% reduction tested as per DIN EN ISO 846 Method C for (Bacteria). The material shall conform to Class 1 rating for surface spread of Flame in accordance to BS 476 Part 7 & UL 94 (HBF, HF 1 & HF 2) in accordance to UL 94, 1996. The insulation shall pass Air Erosion Resistance Test in accordance to ASTM Standard C 1071-05 (section 12.7), from an independent accredited testing agency. Thickness of the material shall be as specified for the individual application.

3.2 Application

The inside surface for the ducts shall be covered with adhesive recommended by the manufacturer. Cut Foamed sheets into required sizes apply adhesive on the foam and stick it to the duct surface

3.3 ACOUSTIC LINING OF AHU ROOM

For acoustic lining of AHU room the material shall be resin bonded glass wool of density 48 kg/m³. The extent of insulation will be as shown in the drawing.

3.4 Thickness of Insulation

The thickness of the insulation shall be 50 mm. Following installation procedure should be adopted:

3.5 Application

- Masonry surface to be lined shall be dry and clean.
- Fix 600 x 600 x 50 mm/100 mm thick 22 G GI Channel frameworks to masonry with rowl plugs.
- Insulating material of specified thickness shall be fixed in GI frame of 600mm x 600mm dimension, covered with R.P. Tissue.
- Cover the material with 22 gauge perforated GI sheet with perforation center to center with self-tapping screws.
- Perforated GI Sheet shall be sealed with 20 mm GI beading (25 mm x 3 mm) over all vertical channel frame work. GI screws with washer shall be fixed to horizontal channels. Perforated sheet shall be stretched tight over frame work.

4.0 CHILLED WATER PIPES INSULATIONS

4.1 INSULATION USING RPUF

The RPUF used shall conform to the following requirements:

- Density : Not less than 32 Kg/cum
- Compressive Strength : Not less than 1.73 kg/sqcm
- 'K' value: Not greater than 0.019 W/m deg C at 10 deg.C
- Water Vapour : Not more than 13 Mg/Nh.

The insulation material used for insulating equipment shall be in the form of panels while for piping, the RPUF shall be in the form of pre-formed cylindrical sections.

4.2 THICKNESS

The Chilled water piping shall be insulated to the following thickness.

Chilled water piping

- | | | | |
|---|------------------|---|-------|
| • | Up to 100 mm | : | 30 mm |
| • | 125 mm – 350 mm | : | 50 mm |
| • | 400 mm and above | : | 75 mm |

4.3 Application – For interior, exposed & trench piping

All chilled water pipes shall be insulated after pressure tested as follows:

- Brush and clean all piping and fittings to remove all dust, rust, dirt, mortar and oil. Then provide 2 coats of zinc chromate primer of ASIAN Paints or approved equal.
- Apply 2 coats of cold setting CPRX adhesive.
- Apply pre-moulded pipe sections over the pipe before the adhesive dries up and seal all longitudinal and transverse joints with hot bitumen. Wrap 500g polythene sheet over the surface with 50 mm overlap in longitudinal and transverse joints. All joints shall be sealed with 50 mm wide PVC/aluminum faced adhesive tape, to provide proper vapour barrier.
- Final finish shall be made by cladding the Chilled Water pipe with 24 gauge aluminum sheet. The insulation shall be continuous over the entire run of piping fittings and valves.
- Insulation pipes shall be marked with arrow to indicate the direction of flow.

4.4 Application – For buried piping

All chilled water pipes shall be insulated after pressure tested as follows:

- Brush and clean all piping and fittings to remove all dust, rust, dirt, mortar and oil. Then provide 2 coats of zinc chromate primer of ASIAN Paints or approved equal.
- Apply 2 coats of cold setting CPRX adhesive.
- Apply pre-moulded pipe sections over the pipe before the adhesive dries up and seal all longitudinal and transverse joints with hot bitumen. Wrap 500g polythene sheet over the surface with 50 mm overlap in longitudinal and transverse joints. All joints shall be sealed with 50 mm wide PVC/aluminium faced adhesive tape, to provide proper vapour barrier.
- Apply galvanized hexagonal chicken wire mesh of 24g x ¾ "on the surface.
- Do sand cement plaster in ratio 1:3 in two layers each 10 mm thick.
- Insulation shall be covered with two layers of Tar felt sheets manufactured by Shalimar Tar Products or equivalent. The felt sheet shall be stuck with Bitumen Grade 85/25 applied at the rate of 1.6 Kg/Sqm.

4.5 INSULATION USING NITRILE RUBBER SHEETS / ROLL

The material should be high quality closed cell nitrile rubber insulation. The thermal conductivity of insulation shall not exceed 0.036 W/MoK (0.20 Btu. In/hr. ft.2 Fo) at 0oC (32o F) mean temperature and density shall not be less than 60 Kg/m3. Temperature range shall be – 50oC to + 116oC and should be class

'O' self-extinguishing type. All the adhesives employed should be VOC / SVOC free. An air gap of 100 mm shall be present between adjacent insulated surfaces carrying chilled water and also between the insulated surface and the wall to allow natural ventilation without affecting its external surface coefficient of heat transfer.

4.6 Thickness of Insulation

The thickness of the nitrile rubber shall be as shown on drawing or identified in the schedule of quantity. Following installation procedure should be adopted:

MODE OF MEASUREMENTS

Mode of Measurement for payment of items of ducting and piping & their insulation shall be as Follows:

1.0 DUCTING

Payment for ducting shall be on the basis of the external surface area of the ducting including all material and labor for installed duct.

The rate per Sq.meter of the external surface shall include all wastage, flanges, gaskets for joints, bolts and nuts, duct supports and hanger vibration isolation pads or suspenders, flexible connections, inspection doors, dampers, turning vanes, straight vanes and any item which will be required to complete the external insulation and acoustic lining.

The external area shall be calculated by measuring the overall width and depth (including the corner joints) in the center of the duct section from flange face to flange face in case of ducts length with uniform cross section. Total area will be arrived at by adding up the area of all duct sections.

In case of taper pieces average width and depth will be worked out as follows:

W 1	=	Width	of	small	cross
		section			
W 2	=	Width	of	large	cross
		section			
D 1	=	Depth	of	small	cross
		section			
D 2	=	Depth	of	large	cross
		section			

Average Width = $(W1 + W2) / 2$

Average Depth = $(D1 + D2) / 2$

Width and depth in the case of taper pieces shall be measured at the edge of the collar of the flange for duct sections flatted with angle iron flanges, otherwise at the bottom of the flange where the flanges are of duct sheet.

For circular pieces the diameter of the section midway between large and small diameters shall be measured and adopted as the mean diameter for calculating the surface area of the taper piece. Duct measurements for calculation of area shall be taken before applications of insulation.

For the special pieces like bends, branches and tees etc, same principles of areas measurements as for liner and outer periphery along the curvature angle of the piece shall apply.

2.0 PIPING

Shall be measured in units of length along the center line of installed pipes including all pipe fittings, flanges (with gaskets and nuts and bolts for jointing), unions, bends, elbows, tees, concentric and eccentric reducers, inspection pieces, expansion loops, ceiling/floor mounted supports etc. The above accessories shall be measured as part of piping length along the center line of installed pipes and no special rates for these accessories shall be permitted.

The quoted unit rates for center line linear measurements of piping shall include all wastage allowances, pipe supports includes hangers, MS channel, wooden haunches, nuts and check nuts, vibration isolator suspension where specified or required, and cost of excavation, bedding, back filling and finishing as required to complete the piping installation as per the specification. None of these items will be separately measured nor paid for. However, all valves (gate/globe/butterfly/check/balancing/purge/drain etc.), strainers, orifice plates, temperature gauge, pressure gauges shall be separately measured and paid as per their individual unit rates, which shall also include their insulation as per specifications, piping measurements shall be taken before application of the insulation.

3.0 PIPING INSULATION

Shall be measured in units of length along the center line of the installed pipe, strictly on the same basis as the piping measurements described above. The linear measurements shall be taken before the application of the insulation, it may be noted that for piping measurements, all valves, orifice plates and strainers are separately measurable and their quoted unit rates shall include the insulation cost in the valve required and as specified.

4.0 DUCT INSULATION/ACOUSTIC LINING

This item is provided separately for various thickness and shall be paid for an area basis of un-insulated duct. The area of the duct to be insulated shall be measured before application of insulation

5.0 GRILLS & DIFFUSERS

Grills and dampers shall be measured on cross sectional area basis excluding flanges.

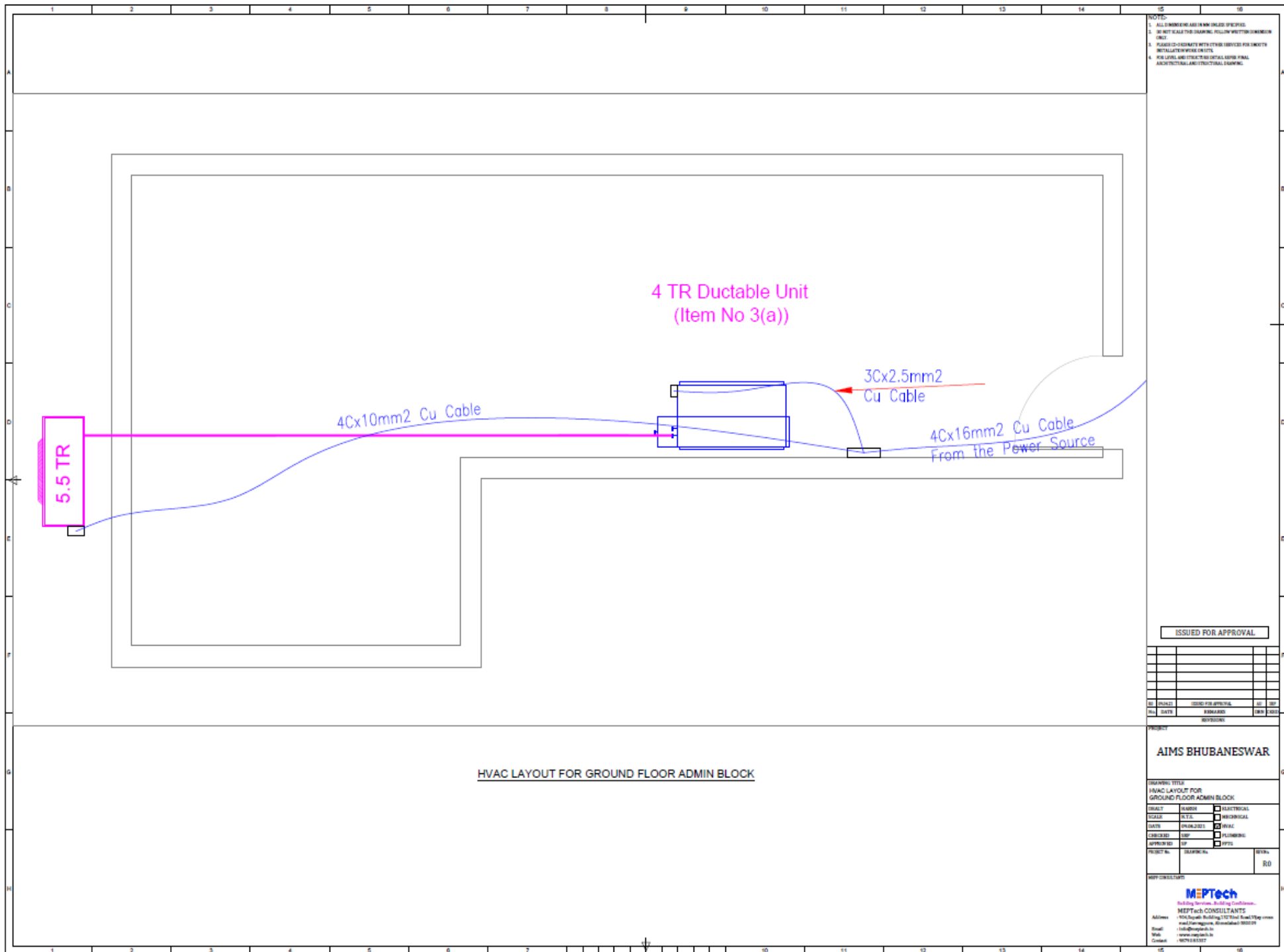
6.0 CABLES

Payment of LT armoured cables shall be on the basis of linear measurements measured from gland to gland. The rate shall include extra cables left in the panel. Measurement will be taken as straight runs along the route. No claims for balance cable remaining after the completion of work will be entertained. No joints in straight runs will be permitted. The contractor has to take the actual measurements based on approved route before procuring the cables.

The rates quoted for the cables laid in underground trenches shall include excavation, sand cushioning, standard burnt brick protection, refilling consolidating, etc. as per specifications.

7.0 CABLE TERMINATION

The rate quoted for the termination shall include copper/ Al. lugs as applicable, brass compressed glands, copper earth clamps for glands, taping, crimping etc.



- NOTES:
1. ALL DIMENSIONS ARE IN MM UNLESS SPECIFIED.
 2. DO NOT SCALE THE DRAWING. FOLLOW THE TOLERANCES GIVEN.
 3. PLEASE CO-ORDINATE WITH OTHER SERVICES FOR SMOOTH INSTALLATION OF THE SYSTEMS.
 4. FOR LEVEL AND ELEVATION DETAILS REFER FINAL ARCHITECTURAL AND STRUCTURAL DRAWING.

ISSUED FOR APPROVAL

NO.	REVISED	ISSUED FOR APPROVAL	BY	DATE	REMARKS	CHKD	DATE

REVISIONS

PROJECT

AIMS BHUBANESWAR

DRAWING TITLE

HVAC LAYOUT FOR

GROUND FLOOR ADMIN BLOCK

DESIGNER

DATE

APPROVED

PROJECT NO.

REVISION

MEPTech

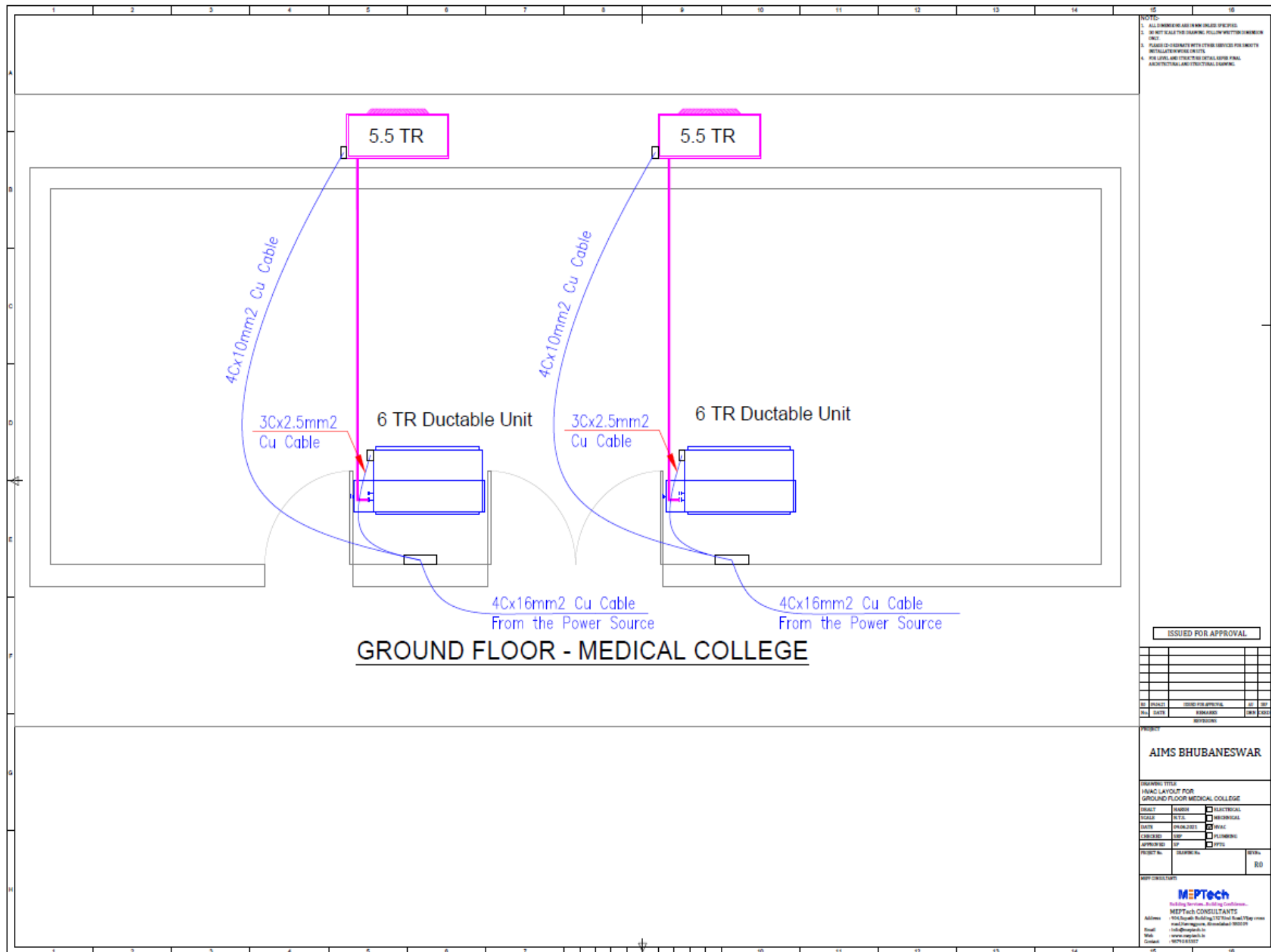
MEPTech CONSULTANTS

Address

Phone

Email

Website



- NOTES:
1. ALL DIMENSIONS ARE IN MM UNLESS SPECIFIED.
 2. ON ANY SCALE THIS DRAWING, FOLLOW WRITTEN DIMENSIONS ONLY.
 3. PLEASE CO-ORDINATE WITH OTHER SERVICES FOR EXACTLY INSTALLATION WORKS ONLY.
 4. FOR LAYOUT AND STRUCTURE DETAIL, REFER FINAL ARCHITECTURAL AND STRUCTURAL DRAWING.

ISSUED FOR APPROVAL

NO.	REVISION	DATE	ISSUED FOR APPROVAL	BY	DATE
01					
02					
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PROJECT

AIMS BHUBANESWAR

DRAWING TITLE

HVAC LAYOUT FOR GROUND FLOOR MEDICAL COLLEGE

DRAWN BY: ☒ ELECTRICAL

CHECKED BY: ☒ MECHANICAL

DATE: 09.06.2021

DESIGNED BY: ☒ HVAC

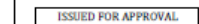
APPROVED BY: ☒ PLUMBING

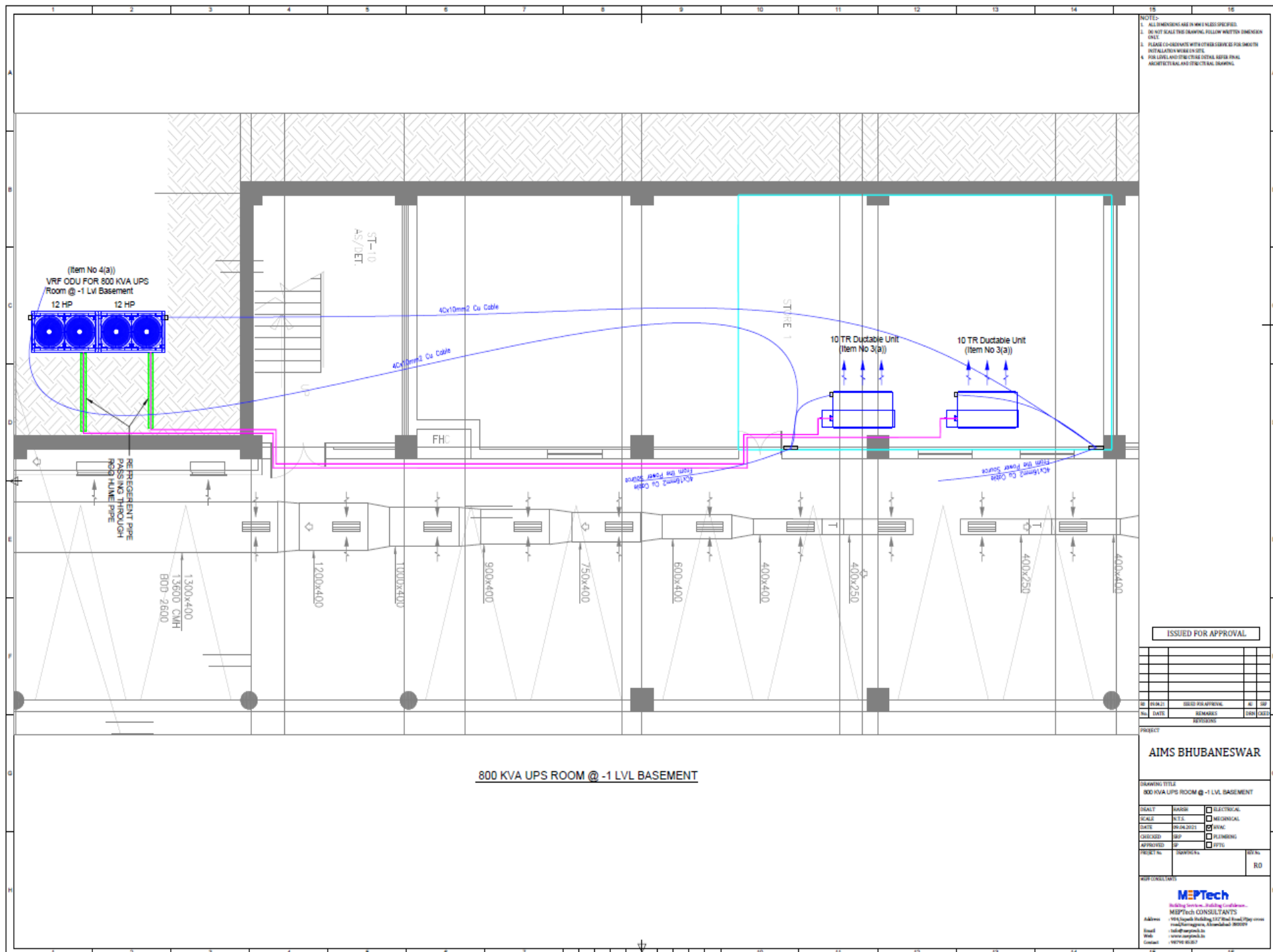
APPROVED BY: ☒ RFO

MEPTech

MEPTech CONSULTANTS

Address: 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 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2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090,





- NOTES:
1. ALL DIMENSIONS ARE IN MM UNLESS SPECIFIED.
 2. DO NOT SCALE THIS DRAWING FOLLOW WRITTEN DIMENSION ONLY.
 3. PLEASE CO-ORDINATE WITH OTHER SERVICES FOR EXISTING INSTALLATION WORK ON SITE.
 4. FOR LEVEL AND FLOOR FINISH REFER FINAL ARCHITECTURAL AND STRUCTURAL DRAWING.

ISSUED FOR APPROVAL

REV	DATE	REMARKS	BY	CHKD

PROJECT

AIMS BHUBANESWAR

DRAWING TITLE
800 KVA UPS ROOM @ -1 LVL BASEMENT

DESIGN	ANISH	☐ ELECTRICAL
SCALE	N.T.S.	☐ MECHANICAL
DATE	09/04/2021	☒ HVAC
CHECKED	SDP	☐ PLUMBING
APPROVED	SP	☐ PETS

PROJECT NO.	DRAWING NO.	REV NO.
		RD

FOR CONSULTANTS

MEPTech
Building Services Consulting Engineers
MEPTech CONSULTANTS
Address: 104, Gupta Building, 157, Old Road, Old Post Office
Email: info@meptech.in
Phone: 98765 43210
Contact: 98765 43210

ACCEPTED MAKES OF EQUIPMENT AND MATERIALS

Sl.No	Description of Item	Approved Makes
1	Screw Chiller	Dunham Bush (Model No - AVX B 170 S) York (Model No - YVAA0153BAF50BAVSXX) Carrier (Model N0 – 30KAV0550A) or equivalent.
2	FRP Induced Draft Cooling Tower	Advance / Bell / Marley / Paharapur or equivalent.
	Split Casing / Monoblock Pump	
3	Primary Pump (below 850 GPM), Condenser Pump (all capacities)	Grundfoss / Armstrong (UK) / Wilo / Lubi or equivalent.
4	Primary Pump (above 850 GPM)	Mather & Platt (Wilo) / Grundfoss / Armstrong / Lubi or equivalent.
5	Secondary CHW Pump with variable speed Pumping System Including Following	Mather & Platt (Wilo) / Grundfoss / Armstrong / Lubi or equivalent.
6	Secondary pumps and pump controller	Mather & Platt (Wilo) / Grundfoss / Armstrong / Lubi or equivalent.
7	Adjustable frequency Drive	Danfoss / ABB / Siemens or equivalent.
8	Differential Pressure Sensor / Transmitter	ABB /Danfoss / Siemens or equivalent.
	Air Handling Units/Fans/Air washer/Kitchen Scrubber	
9	Air Handling Units (Double Skin)/ TFA sectional type / ceiling hung type	Creative Air Tech / Edgetech / Stulz / Flaktwood or equivalent.
10	AHU fan section (Single Skin) for fresh air, Exhaust, Staircase & Lift pressurization	Edgetech / Stulz / Creative Air Tech or equivalent.
11	Cooling coil for AHU's	Creative Air Tech / Edgetech / Stulz / Flaktwood or equivalent.
12	Fan Coil Unit (with imported fan deck)	Creative Air Tech / Edgetech / Stulz / Flaktwood or equivalent.
13	Fan Coil Motor	Make or As per OEM.
	Fans	
14	Centrifugal Fan AMCA approved (Forward curved fan)	Kruger / Nicotra / Systemair or equivalent.
15	Centrifugal Fan AMCA approved (backward curved fan) Exhaust Fan	Nikotra/Comfrei/Kruger or equivalent.
16	Axial Flow Fan	Flaktwoods / Greenheck / Kruger / Nicotra / Systemair or equivalent.
17	Propeller Fan	Alstom/Havells/ Kruger or equivalent.
18	In-line Fan	Systemaire- Kanalfakt/ Caryaire/Kruger/Nuaire/ Nicotra or equivalent.
19	Air Curtain	Creative Air Tech / System Air / Carryaire or equivalent.
	Electrical Equipment	
22	Electrical Panel Board / Motor Control Centre (Power Coated)	Power controls/ ABB/ Schneider Elec./ Star Electro fabrication or equivalent.
23	Electric Motor (TEFC)	Siemens /Crompton /ABB/ Bharat Bijli or equivalent.
24	Starters / Switch gear	Siemens/L&T/ GE or equivalent.
25	Miniature Circuit Breaker (MCB)	Siemens/MDS Legrand/ Hager (L&T)/ ABB or equivalent.

26	Moulded case circuit breaker (MCCB)	Siemens/L&T/ GE power/Scheider Elec./ABB or equivalent.
27	Air circuit breaker (ACB)	Siemens/L&T/ GE power/Scheider Elec./ABB or equivalent.
28	Earth leakage circuit breaker (ELCB/ RCCB)	MDS Legrand / Hager (Larsen & Turbo) or equivalent.
29	Motor protection circuit breaker (MPCB)	Siemens/L&T/Scheider Elec./ABB or equivalent.
30	Push Button Starter	Siemens/L&T/Scheider Elec. /ABB or equivalent.
31	Auxiliary Relays / Contactors	Siemens/L&T/Scheider Elec./GE or equivalent.
32	Line Type Fuse	Siemens/L&T/GE or equivalent.
33	Timer	Siemens/L&T/GE or equivalent.
34	Terminal Block	Elmax or equivalent.
35	Voltmeter / Ammeter (Digital)	Automatic Electric / L& T / Siemens / Enercon or equivalent.
36	Indicating Lamps (LED Type) / Push Button	Siemens/ L&T/Vaishno or equivalent.
37	Single Phase Preventor (Current Base)	L&T/Minilec / Sneider or equivalent.
38	Electronic Digital Meters (A/V/PF/HZ/KW/KWA) with LED Display	Enercon System Pvt Ltd / L&T or equivalent.
39	Overload Relays with built in single phase preventer	L&T/Minilec/Siemens/Group Schneider (MG) France or equivalent.
40	Selector Switches / Toggle Switch	Siemens / L&T/Kaycee or equivalent.
41	Change over switch	Siemens/L&T/HH Elcon/HPL-Socomech or equivalent.
42	Protection Relay	Alstom/L&T/Siemens or equivalent.
43	Control Transformer/Potential Transformers	Precise/Gilbert & Maxwell/AE/Advance or equivalent.
44	Current Transformer (Epoxy Cast Resin)	Precise/Gilbert & Maxwell/AE/Advance or equivalent.
45	Rubber Mats 1199 V, 6 mm thick (ISI aprvd)	Jyoti or equivalent.
46	Weather Proof Boxes (IP55)	Advance/Adlec/Milestone / Havells or equivalent.
47	MS Painted Cable trays	Ricco/Slotco/M.M Enterprises or equivalent.
48	Socket outlet (Industrial type)	Lexic/ Hager/ ABB or equivalent.
	Cable & Accesories	
49	Control Cables	Avocab/Polycab/Universal/KEI / CCI / Finolex or equivalent.
50	XLPE/ PVC Insulated Aluminium Conductor Armoured Power Cables	Avocab/Polycab/Universal/KEI / CCI or equivalent.
51	Communication Cable	Fusion/ Comscope/Contemps or equivalent.
52	Cable Gland Double Compression with Earthing Links	Power/Commet/Gripwell/Baliga/Lighting Ltd./ Dowell's Electromech or equivalent.
53	PVC Insulated Copper Conductor Stranded Flexible Wires	Finolex/National cables-NC/Polycab/Skytone or equivalent.
54	PVC Conduit & Accessories (ISI Approved)	Sharma Sales Corporation / Super Sales Corporation or equivalent.
55	Bimettalic Cable Lugs	Hax (Brass copper Alloy India Pvt Ltd)/ Dowell's (Billar India Pvt Ltd) or equivalent.
56	Lugs(Tinned Copper)	Dowell or equivalent.
57	MS conduit	BEC/ AGK/ MK or equivalent.

	Ducting & Grills	
58	GI Sheets	SAIL / Jindal / Tata or equivalent.
59	Factory Ducts	Rolastar / Zeco / Ductofab or equivalent.
60	Grills/ Diffusers/ Dampers	Creative Air Tech / Dynacraft / Systemair or equivalent.
61	Flexible Ducts	ATCO / Sevenstar / Supaflex or equivalent.
62	Fire Damper	Creative Air Tech / Airmaster / Greenheck / Ruskin Titus or equivalent.
63	Actuators	Belimo / Honeywell / Johnson Control / Sauters / Siemens or equivalent.
64	Double skin plenum	Edgetech / ETA / Systemair / Zeco or equivalent.
65	Mixing box	Creative Air Tech / Airmaster / Caryaire / System air or equivalent.
66	Filters	AAF / Aerosol / Dynafilters / Spectrum / Thermadyne / Creative Air Tech or equivalent.
67	Fibre Glass Insulation	Kimko / Owens Corning / UP Twiga or equivalent.
68	Duct flange	Zeco/Techno fabriduct or equivalent.
69	Self Adhesive Sealing Gasket for Ducts	Prima Seal/ Air flow/ Trocellen or equivalent.
	Pipes & Fittings	
70	GI pipe Medium Class	Jindal Hissar / TATA or equivalent.
71	MS Pipe (up to 200 mm Dia)	Jindal Hissar / TATA or equivalent.
72	MS Pipe (above 200 mm upto 450mm)	Jindal Maharastra/Mukut steel/SAIL/lalit steel or equivalent.
73	MS Pipe (above 200 mm Dia factory Rolled)	Jindal Hissar / TATA/SAIL/Mukut Steel/ Lalit Steel or equivalent.
74	Flexible Pipe connection	Resistoflex / Kanwal or equivalent.
75	PUF Insulation	Polynate Foams / Rinac or equivalent.
76	Butterfly Valves	Audco / Advance / Belimo / Valtree / Honeywell or equivalent.
77	Check Valves	Advance / C & R / Valtree / Honeywell or equivalent.
78	Balancing valves	Advance / Bell & Gossett / Valtree / Belimo / Honeywell or equivalent.
79	Gate Valve	Audco / Advance / ITAP / TFL / RB or equivalent.
80	Ball Valve	Audco / Advance / ITAP / TFL / RB or equivalent.
81	Pot Strainer	C & R / DS Engg / Emerald / Sant / Honeywell or equivalent.
82	Y Strainers	C & R / Emerald / Sant / Valtree / TFL or equivalent.
83	2 - Way Motorised Valve	Belimo / Honeywell / Seimens / Sauter or equivalent.
84	2 - Way Modulating Valve	Belimo / Honeywell / Seimens / Sauter or equivalent.
85	Auto Air Vent	Anergy / Emerald or equivalent.
86	Suction Guide	Anergy / Emerald / Sant or equivalent.
87	Closed Expansion Tank	Anergy / Bell & Gossett / Emerald or equivalent.
88	Pressurisation Unit	Anergy / Bell & Gossett / Emerald or equivalent.
89	Open Expansion Tank	Kaveri / Sintex / Supreme or equivalent.
90	Air Seperator	Anergy / Bell & Gossett / Emerald or equivalent.
91	HDPE Pipes	Astral / Supreme or equivalent.

92	Temperature Gauge	Hguru / Waree or equivalent.
93	Pressure Gauge	Hguru / Waree or equivalent.
94	Flexible Pipe Connections	Cori or equivalent.
95	Pipe & Duct supports	Hitech / Grapple or equivalent.
96	Room Thermostat / AHU & FCU Thermostat	Honeywell / Siemens / Anergy or equivalent.
97	Humidistat	Honeywell / Siemens / Anergy or equivalent.
98	Safety Thermostat for Heater	Anergy Controls or equivalent.
99	Dial Thermometer Capillary Type	Penn / Tadington or equivalent.
100	Cooling and heating mode changer	Honeywell / Siemens or equivalent.
101	Ultrasonic Energy Meter (BTU meter)	Honeywell / Siemens / Kamstrup or equivalent.
102	Digital thermostat with cordless remote	Trane / Magneto or equivalent.
	Insulation	
103	Expanded Polystyrene (TF Quality) (Premoulded pipe section/slab)	Thermolloyd / Beard Sell / Styrene Pakagings or equivalent.
104	Cross Linked Polyethylene	Paramount/Trucool/Thermobreak or equivalent.
105	Glass Wool	U.P Twiga / Owens Corning or equivalent.
106	Closed Cell Elastomeric Insulation	A-flex / K-flex/ Supreme / armaxflex / Superlon or equivalent.
107	Premoulded PUF section for pipe & pipe supports	Malnpur / Lloyd or equivalent.
108	Aluminium Tape	Johnson / Birla 3M or equivalent.
109	Protective Coating over closed cell elastomeric	Polybond or equivalent.
110	Non Woven Fibre Material for acoustic	Mikasha International or equivalent.
	Miscellaneous	
111	Anchor fasteners	Cannon / Hilti/ Fisher or equivalent.
112	Welding Rods	Advani / Victor or equivalent.
113	V Belt	Dunlop / fennen/ Hilton or equivalent.
114	Gun metal sensor insert for pressure gauges and AHU's (duct) test points	Anergy / Primakool or equivalent.
	Paints	
117	Enamel	ICI/Asian/Nerolac/Berger or equivalent.
118	Bituminus	Shalimar or equivalent.
119	Tarfelt (for underground chilled water pipe insultaion)	Shalimar or equivalent.
121	DDC Controllers	Anergy / Honeywell / Siemens or equivalent.
122	Sensors (Pressure / Temperature)	Anergy / Honeywell / Siemens or equivalent.
123	VAV	Anergy / Honeywell / Siemens or equivalent.
124	Airflow Switch (Air & Water)	Anergy / Honeywell / Siemens or equivalent.

Technical Bid (Eligibility Criteria)

The scanned copies of the following mandatory documents to be uploaded on e-Tendering Portal in the following format.

Sl.no.	Details/ Particulars	Uploaded (Yes/No)	Page No.
(A)	Performa For Earnest Money Deposit Declaration.		
(B)	Appendix `A to C' duly filled in (Pages 13,14 & 15 ref.) and signed with stamp		
(C)	Certificates of Work Experience & Completion Certificate of Similar Work from Client not below the Rank of Executive Engineer or equivalent, as mentioned in Ser. No. - 4, Page No. - 8 refer under Eligibility Criteria		
(D)	Certificate of Registration for GST and acknowledgement, up to date filed return if required		
(E)	Attested Copies of PAN No.		
(F)	Copies of Balance Sheets.		
(G)	Copy of Affidavit. (As per page no 52)		
(H)	Copies of ESI Registration (enclose latest challan copy)		
(I)	Copies of EPF Registration. (enclose latest challan copy)		
(J)	The Bidder(s) should have their Registered Office/Branch in Bhubaneswar. If not, an Office should be opened in Bhubaneswar within 30 (Thirty) Days of the award of Work. Details of Address Proof of Office located at Bhubaneswar should be given to EE(AC&R).		
(K)	Declarations to be given by the Tenderer(s) (as per Page 07).		
(L)	Each page of the e-tender documents should be duly signed with seal otherwise the bid shall become invalid		

AFFIDAVIT

(To be submitted on Letter Head of the Company/Firm)

I/We hereby certify that, the above firm has not been ever blacklisted by any Central/State Government/Public Undertaking/Institute on any account.

I/We also certify that, Firm will supply the item(s) as per the specification given by Institution and also abide all the Terms & Conditions stipulated in Tender.

I/We also certify that, the information given in Bid is true and correct in all aspects and in any case at a later date, it is found that any details provided are false and incorrect, any contract given to the concerned firm or participation may be summarily terminated at any state, the firm will be blacklisted and Institute may impose any action as per e-Tender Rules.

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

Business Address: -

Name:

(Signature of Bidder with Firm's Seal)

Place: _____

Dated: _____

Annexure – I
FORM OF PERFORMANCE SECURITY (BANK GUARANTEE)

1. In consideration of the Director, AIIMS, Bhubaneswar (hereinafter called “the Government”) having offered to accept the terms and conditions of the proposed agreement between and (hereinafter called “the said Contractor(s)”) for the work (hereinafter called “the said agreement”) having agreed to production of an irrevocable Bank Guarantee for Rs. _____(Rupees only) as a security/ guarantee from the contractor(s) for compliance of his obligation in accordance with the terms and conditions in the said agreement.

I/We (hereinafter referred to as Bank) hereby (Indicate the name of the Bank) undertake to pay to the Government an amount not exceeding Rs. _____(Rupees _____only) on demand by Government .

2. I/We do hereby undertake to pay the (Indicate the name of the Bank) amount due and payable under this Guarantee without any demur, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the said contractor(s). Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs.(Rupees_____only).

3. I/We the said bank undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor (s) in any suit or proceeding pending before any court or Tribunal relating thereto, our liability under this present being absolute and unequivocal.

4. The payment so made by us under this bond shall be valid discharge of our liability for payment there under and the contractor (s) shall have no claim against us for making such payment.

5. I/ We further agree that the guarantee herein contained (Indicate the name of Bank) shall remain in full force and effect during the period that would be taken for the performance of the said agreement and it shall continue to be enforceable till all the dues of the Government under or by virtue of the said agreement have been fully paid, and its claims satisfied or discharged, or till Engineer-in- charge on behalf of the Government, certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor (s) accordingly discharges this guarantee.

6. I/We further agree with the Government that the (Indicate the name of Bank) Government shall have the fullest liberty without our consent, and without affecting in any manner our obligations hereunder, to vary any of the terms and conditions of the said agreement or to extend time of performance by the said contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor (s) and to forebear or enforce any of the terms and conditions relating to the said agreement & we shall not be relieved from our liability by reasons of any such variation or extension being granted to the said contractor (s) or for any forbearance, act of omission on that part of the Government or any indulgence by the Government to the said contractor (s) or by any such matter or thing whatsoever which under the law relating to sureties would , but for this provision, have effect of so relieving us.

7. The guarantee will not be discharged due to the change in the constitution of the Bank or the contractor (s).

We lastly undertake not to revoke this (Indicate the name of Bank) guarantee except with the previous consent of the Government in writing.

8. This Guarantee shall valid up to _____ unless extended on demand by Government, notwithstanding anything mentioned above, our liability against this Guarantee is restricted to Rs. _____(Rupees _____only) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this Guarantee all our liabilities under the Guarantee shall stand discharged.

Dated the _____ day of _____ for _____

(Indicate the name of Bank)

Format for Agreement
(To be made on Rs 100/- Judicial Stamp Paper)

This Agreement is made at.....on this.....day of.....2021,

BETWEEN

Director, AIIMS, Bhubaneswar represented through Superintending Engineer, AIIMS, BHUBANESWAR,
....., (Hereinafter referred as the) (Address) "Principal/Owner", which
expression shall unless repugnant to the meaning or context hereof include its success or sand permitted as
signs).

AND

.....(Name and Address of the
Individual/firm/Company) through..... (Hereinafter referred to as the
(Details of duly authorized signatory)

"Bidder(s)/Contractor(s)" and which expression shall unless repugnant to the meaning or context hereof include
its success or sand permitted as signs)

Preamble

WHEREAS, the Principal/Owner has floated the Tender (NIT No **AIIMS/BBSR/AC&R/CENTRAL AC/UPS/07/2020**

(here in after refer red to as "**Tender/Bid**") and intends to award, under laid down organizational procedure,
contract for: **Name of work "SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF AIRCONDITIONING
SYSTEM FOR UPS ROOM AT AIIMS HOSPITAL, BBSR."** hereinafter referred to as the "**Contract**".

AND WHEREAS the Principal/Owner values full compliance with all relevant laws of the Land, Rules & Regulations,
Economic use of resources and of fairness/ transparency in its relation with its Bidder(s) and Contractor(s).

AND WHEREAS to meet the purpose afore said both the parties have agreed to enter to this Agreement
(hereinafter referred to as "**Pact**"), the terms and conditions of which shall also be read as integral part and parcel
of the Tender/Bid documents and Contract between the parties.

NOW, THEREFORE, inconsideration of mutual covenants contained in this Pact, the parties hereby agree as follows
and this Pact witnesses as under: -

Article - 1: Commitment of the Principal/Owner.

1. The Principal/Owner commit itself to take all measures necessary to prevent corruption and to observe the
following principles:

- (a) No employee of the Principal/Owner, personally or through any of his/her family members, will in
connection with the Tender, or the execution of the Contract, demand, take a promise for or accept, for self or
third person, any material or immaterial benefit which the person is not legally entitled to.
- (b) The Principal/Owner will, during the Tender process, treat all Bidder(s) with equity and reason. The
Principal/Owner will, in particular, before and during the Tender process, provide to all Bidder(s) the same
information and will not provide to any Bidder(s) confidential/additional information through which the Bidder(s)
could obtain an advantage in relation to the Tender processor the Contract execution.
- (c) The Principal/Owner shall endeavour to exclude from the Tender process any person, whose conduct in
the past has been of biased nature.

2. If the Principal/Owner obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal Code (IPC)/Prevention of Corruption Act, 1988 (P C Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal/Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

Article - 2: Commitment of the Bidder(s)/Contractor(s)

1. It is required that each Bidder/Contractor (including their respective officers, employees and agents) adhere to the highest ethical standard and makes, and report to the Government/Department all suspected acts of fraud or corruption or Coercion or Collusion of which it has knowledge or becomes aware, during the tendering process and throughout the negotiation or award of a contract.

2. The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution: -

(a) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/Owner's employees involved in the Tender process or execution of the Contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind what so ever during the Tender process or during the execution of the Contract.

(b) The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.

(c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act. Further the Bidder(s)/Contractor(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

(d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the names and addresses of agents/representatives in India, if any. Similarly, Bidder(s)/Contractor(s) of Indian Nationality shall disclose names and addresses of foreign agents/representatives, if any. Either the Indian agent on behalf of the foreign principal or the foreign principal directly could bid in a tender but not both. Further, in cases where an agent participates in a tender on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a subsequent/parallel tender for the same item.

(e) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to, or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.

3. The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

4. The Bidder(s)/Contractor(s) will not, directly or through any other person or firm indulge in fraudulent practice **means a wilful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing**

damage to justified interest of others and/or to influence the procurement process to the detriment of the Government interests.

5. The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use Coercive Practices (means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may be fall upon a person, his/her reputation or property to influence their participation in the tendering process).

Article - 3: Consequences of Breach.

Without prejudice to any rights that may be available to the Principal/Owner under law or the Contract or its established policies and laid down procedures, the Principal/Owner shall have the following rights in case of breach of this Integrity Pact by the Bidder(s)/Contractor(s) and the Bidder/Contractor accepts and undertakes to respect and uphold the Principal/Owner's absolute right: -

1. If the Bidder(s)/Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Article-2 above or in any other form, such as to put his reliability or credibility in question, the Principal/Owner after giving 14 days' notice to the contractor shall have powers to disqualify the Bidder(s)/Contractor(s) from the Tender process or terminate/determine the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal/Owner. **Such exclusion may before vigour for a limited period as decided by the Principal/Owner.**

2. **Forfeiture of EMD/Performance Guarantee/Security Deposit :** If the Principal/Owner has disqualified the Bidder(s) from the Tender process prior to the award of the Contract or terminated/determined the Contractor has accrued the right to terminate/determine the Contract according to Article-3(1), the Principal/Owner apart from exercising any legal rights that may have accrued to the Principal/Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and Security Deposit of the Bidder(s)/Contractor(s).

3. **Criminal Liability:** If the Principal/Owner obtains knowledge of conduct of a Bidder or Contractor, or of an employee or a representative or an associate of a Bidder or Contractor which constitutes corruption within the meaning of IPC Act, or if the Principal/Owner has substantive suspicion in this regard, the Principal/Owner will inform the same to law enforcing agencies for further investigation.

Article - 4: Previous Transgression.

1. The Bidder(s) declare(s) that no previous transgressions occurred in the last 05 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the Tender process.

2. If the Bidder(s) make(s) incorrect statement on this subject, he can be disqualified from the Tender processor action can be taken for banning of business dealings/holiday listing of the Bidder(s)/Contractor(s) as deemed fit by the Principal/Owner.

3. If the Bidder(s)/Contractor(s) can prove that he has resorted/recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/ Owner may, at its own discretion, revoke the exclusion prematurely.

Article - 5: Equal Treatment of all Bidders/Contractors/Sub-contractors.

1. The Bidder(s)/Contractor(s) undertake(s) to demand from all sub-contractors a commitment in Conformity with this Pact. The Bidder/Contractor shall be responsible for any violation(s) of the principles laid down in this agreement/Pact by any of its Sub-contractors/sub-vendors.

2. The Principal/Owner will enter in to Pacts on identical terms as this one with all Bidders and Contractors.

3. The Principal/Owner will disqualify Bidders, who do not submit, the duly signed Pact between the Principal/Owner and the bidder, along with the Tender or violate its provisions at any stage of the Tender process, from the Tender process.

Article - 6: Duration of the Pact.

1. This Pact begins when both the parties have legally sign edit. It expires for the Contractor/Vendor 12 months after the completion of work under the contractor till the continuation of defect liability period, whichever is more and for all other bidders, till the Contract has been awarded.
2. If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Competent Authority, AIIMS, Bhubaneswar.

Article - 7: Other Provisions.

1. This Pact is subject to Indian Law, place of performance and jurisdiction is the **Bhubaneswar** of the Principal/Owner, who has floated the Tender.
2. Changes and supplements need to be made in writing. Side agreements have not be unmade.
3. If the Contractor(s) is/are a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.
4. Should one or several provisions of this Pact turnout to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intensions.
5. It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Agreement/Pact, any action taken by the Owner/Principal in accordance with this **Agreement/Pact or interpretation thereof shall not be subject to arbitration.**

Article - 8: LEGAL AND PRIOR RIGHTS.

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and/or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Tender/Contact documents with regard any of the provisions covered under this Pact.

IN WITNESS WHEREOF the parties have signed and executed this Pact at the place and date first above mentioned in the presence of following witnesses:

.....
(For and on behalf of Principal/Owner)

.....
(For and on behalf of Bidder/Contractor)

WITNESSES:

1.
(Signature, Name and address)

2.
(Signature, Name and address)

Place:

Dated:

PROFORMA OF SCHEDULES

SCHEDULE 'A'

(Reference to General conditions of Contract.)

Name of Work: **Name of work: SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF AIRCONDITIONING SYSTEM FOR UPS ROOMS AT AIIMS HOSPITAL, BBSR.**

Estimated Cost of Work:			₹ 67,35,803/-
(a)	Earnest Money	=	NIL
(b)	Performance Guarantee	=	03% of Tendered Value
(c)	Security Deposit	=	05% of Final Value

SCHEDULE 'B'

GENERAL RULES & DIRECTIONS:

Officer Inviting Tender: - Executive Engineer (AC & R) , AIIMS, Bhubaneswar

Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined: -

in accordance with Clause -12.2 &12.3 = 50%

Definitions

See below

- | | | |
|---------|---|---|
| 2 (v) | Engineer-in-Charge | Superintending Engineering
AIIMS, Bhubaneswar |
| 2(viii) | Accepting Authority | Director
AIIMS, Bhubaneswar |
| 2(x) | Percentage on cost of materials and labour to cover all over heads and profit | : 15% |
| 2(xi) | Standard Schedule of Rates | - Central Public Works Department Schedule of Rates 2018 at Delhi with upto date correction slips |
| 9(ii) | Standard AIIMS Contract Form | - GCC for CPWD Works - 2014 as amended and up to and including correction slip |
| | (i) Time allowed for submission of Performance guarantee, Program Chart (Time & Progress) and applicable Labour Licenses, Registration with EPFO, ESIC & BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance | : 07 Days |
| | (ii) Maximum allowable Extension with late fee @ 0.1% of Performance guarantee amount beyond the period provided in (i) above. | : 01 to 15 days |

Clause – 2.

Authority for fixing compensation under Clause 2 : Director, AIIMS, Bhubaneswar

Clause – 2A.

Whether Clause 2A shall be applicable : **No**

Clause – 5.

Time allowed for execution of work : **90 Days (after issue of work order).**

Time of start of work: Within Seven days after issue of work order.

Number of days from the date of issue of letter of acceptance for reckoning: **07 Days**
date of start

Authority to decide fair & reasonable extension of time for completion:
of work **Superintending Engineer, AIIMS, Bhubaneswar**

Clause – 6A.

Whether Clause 6A shall be applicable : **No.**

Clause – 7A.

Whether clause 7A shall be applicable : **YES.**

Clause – 10B(ii).

Whether Clause 10B(ii) shall be applicable : **No.**

Clause – 10C. : **Not applicable.**

Clause – 10CA. : **Not applicable.**

Clause – 16.

Competent Authority for deciding reduced rates : **Superintending Engineer
AIIMS, Bhubaneswar**

Clause – 25.

Settlement of dispute & Arbitration : **Director, AIIMS, Bhubaneswar**

Clause – 36(i).

Requirement of Technical Staff and rate of recovery in case of non-compliance shall be as per the following table: -

Value of Work	Ser. No	Minimum qualification of Technical Representative	Discipline	Designation (Principal Technical/ Technical representative)	Minimum Experience in years	Number	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 36(i)	
							(Figures)	(Words)
For Agreement amount up to Rs150 Lakhs	(a)	Graduate Engineer OR Diploma Engineer	Elec.	Principal Technical representative	02 years for Graduate Engineer/ 05 years for Diploma Engineer	1	<i>Rs 15000/-</i>	<i>Rs Fifteen Thousand only</i>

Financial Bid (Schedule of Quantities)
NIT NO.: AIIMS/BBSR/AC&R/CENTRAL AC/UPS/07/2020

Name of the work: - **SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF AIRCONDITIONING SYSTEM FOR UPS ROOMS AT AIIMS HOSPITAL, BBSR.**

Sl. No.	Description	Unit	Qty	Rates	Amount (Including GST)
	Notes Rates to be inclusive of all prevailing taxes and duties. The rates considered also to be indicated for records. Vendor has to take approval on technical documents of each item from AIIMS, Bhubaneswar before procurement.				
1.0	Indoor Units - DX System				
	Supplying, installing, testing & commissioning the Air Handling Unit of following capacity, consisting of basic assembly of fan, cooling coil & condensate pan, thermostatic expansion valve with following features. GI double skin sandwich-insulated (25 mm thick PU), Ceiling Suspended Air Handling Units as per following Technical Specifications, Drawing and Bases of Design. AHUs shall be complete with: (I) Fan section with Statically & dynamically balanced Comefri / Kruger / Nicotra / Punker or equivalent make direct / sbelt-drive DIDW forward/backward curved centrifugal fan, TEFC squirrel cage induction drive motor. (II) Coil sections with 6-row DX type cooling coil. Face velocity not over 500 FPM. Seamless copper coils of plate finned compact tape with a minimum of air by pass. Copper tubes with smooth non-corrugated fins of aluminium. (III) Filter Sections with Fine Filters (90% down to 10 Micron), All filters should be washable type. Comprising heavy gauge construction with Echelon arrangement of filters, slides & end cap shall permit filter access at any end & compressing device hold filter snugly together. (IV) Sandwich insulated SS drain tray. (V) AHU mounted opposed blade aerofoil design low-leakage isolation (IL) or volume control dampers (VCD) of Aluminium with Nylon gears for supply & return air (VCD) for normal operation As applicable for each AHU. (VI) Corded Remote Control (VII) DOL/Star Delta Starter including cable connection from starter to fan motor. Indoor to Outdoor Control Cabling. (VIII) All necessary accessories etc.				
	Ceiling Suspended High Sensi Ductable Units				
a	5 TR @ 3300 CFM for 400 KVA UPS Room @ +4 Lvl (Hospital Block)	NOS.	2		

b	6 TR @ 3800 CFM for 500 KVA UPS Room @ Gr Lvl (Medical College Block)	NOS.	2		
c	4 TR @ 2000 CFM for 60 KVA UPS Room @ Gr Lvl (Admin Block)	NOS.	1		
2.0	Outdoor Units - DX System				
	Supply, Installation, Testing & Commissioning Of Condensing Unit - HDU of following capacity with all accessories like Expansion Valves, Filter Dryers & Hand Shutoff Valves etc etc.				
a	5.5 TR	NOS.	3		
b	8.5 TR	NOS.	2		
3.0	Refrigeration Piping				
	SITC of Seamless heavy gauge Copper piping (complying to ASTM B 280) of following size duly insulated with 19 mm thk (Insulation thickness shall be as per ref. pipe size and company specifications requirement) Nitrile Rubber Insulation. Refrigeration piping will have to be taken in the piping rack / Support individually connecting to all indoor units for the respective floors. Even necessary supports, fittings, valves & ref. joints where ever required will be included. All external ref. pipe insulation shall be coated with star bond CR 30-36 thermal insulation canvass coating including Gas charging of refrigerant pipes.				
a	12.7 mm dia Cu (Liquid Line) Refrigerant Piping and First charge of ref R410/32 or equivalent for the circuit of 5.5 TR Condensing Unit	RMT	50		
b	15.8 mm dia Cu (Hot Gas Line) Refrigerant Piping and First charge of ref R410 or equivalent for the circuit of 5.5 TR Condensing Unit	RMT	40		
c	15.8 mm dia Cu (Liquid Line) Refrigerant Piping and First charge of ref R410 or Eq for the circuit of 8.5 TR Condensing Unit	RMT	50		
d	19 mm dia Cu (Hot Gas Line) Refrigerant Piping and First charge of ref R410 or Eq for the circuit of 8.5 TR Condensing Unit	RMT	40		

4.0	Indoor Units - VRF System				
	Supplying, installing, testing & commissioning the Air Handling Unit of following capacity, consisting of basic assembly of fan, cooling coil & condensate pan, thermostatic expansion valve with following features. GI double skin sandwich-insulated (25 mm thick PU), Ceiling Suspended Air Handling Units as per following Technical Specifications, Drawing and Bases of Design. AHUs shall be complete with: (I) Fan section with Statically & dynamically balanced Comefri / Kruger / Nicotra / Punker or equivalent make direct / sbelt-drive DIDW forward/backward curved centrifugal fan, TEFC squirrel cage induction drive motor. (II) Coil sections with 6-row DX type cooling coil. Face velocity not over 500 FPM. Seamless copper coils of plate finned compact tape with a minimum of air by pass. Copper tubes with smooth non-corrugated fins of aluminium. (III) DX Cooling Coil with EEV Kit compatible to connect with 12 HP \$ 16 HP air cooled VRF condensing unit. (IV) Filter Sections with Fine Filters (90% down to 10 Micron), All filters should be washable type. Comprising heavy gauge construction with Echelon arrangement of filters, slides & end cap shall permit filter access at any end & compressing device hold filter snugly together. (V) Sandwich insulated SS drain tray. (VI) AHU mounted opposed blade aerofoil design low-leakage isolation (IL) or volume control dampers (VCD) of Aluminium with Nylon gears for supply & return air (VCD) for normal operation As applicable for each AHU. (VII) Corded Remote Control (VIII) DOL/Star Delta Starter including cable connection from starter to fan motor. Indoor to Outdoor Control Cabling. (IX) All necessaru accessories etc.				
	Ceiling Suspended High Sensi Ductable Units				
a	10 TR @ 6000 CFM for 800 KVA UPS Room @ -1 Lvl Basement	NOS.	2		
b	4 TR @ 2500 CFM for 500 KVA Battery Room @ Gr Lvl (ER 2 Battery Room -1 Level of Hospital Block)	NOS.	1		
c	8 TR @ 5100 CFM for 500 KVA UPS Room @ Gr Lvl (ER 2 UPS Room Hospital Block)	NOS.	1		

d	8 TR @ 5100 CFM for 500 KVA UPS Room @ Gr Lvl (ER 3 UPS Room Hospital Block)	NOS.	1		
5.0	Outdoor Units - VRF System				
	Engineering, Design and SITC of Compact Air Cooled type outdoor units of VRF system having hermetically sealed scroll type compressors & having all inverter compressor of outdoor unit , condenser coil fabricated from Seamless. Copper tube & Plate type Al. Fins of Multi Row, Axial Flow, upward throw condenser fan, Condenser fan-motor unit, insulated refrigeration piping, power / control wiring, and earthing, external wiring between Indoor & Outdoor units, all system controls-safety. Each Outdoor units with High Pressure switch, Fan driver overload protector, Over current relay, Inverter Overload Protector & Fusible Plug. The unit shall be suitable for 415 ± 10 % volts, 50 Hz, 3 phase AC supply, and IP 55 protection. Installation, Testing & Commissioning of Compact Air Cooled type outdoor units of VRF system includes connection of ref. piping connection supply/laying/dressing and termination of power / control wiring, earthing, external wiring between Indoor & Outdoor units including first gas charging in the system. Unit shall be installed on Vibration Isolators (The scope includes all cost related to Lifting, Shifting of Equipments to the desired location)				
a	12 HP for 800 KVA UPS Room @ -1 Lvl Basement	NOS.	2		
b	16 HP for 500 KVA UPS Room @ Gr Lvl ER 2 Hospital Building	NOS.	1		
c	10 HP for 500 KVA UPS Room @ Gr Lvl ER 3 Hospital Building	NOS.	1		
6.0	Branch Distribution Joints For Refrigerant Piping (Refnet)				
	SITC of Imported Branch Distribution Joints for VRF system. The Contractor has to propose the actual quantity required for their specific system design with total required quantity included under this head.				
a	Branch Distribution Joints For Refrigerant Piping For VRF System for -1 Floor	NOS.	1		
b	Branch Distribution Joints For Refrigerant Piping For VRF System for Ground Floor	NOS.	1		
c	Branch Distribution Joints For Refrigerant Piping For VRF System for Ground Floor	NOS.	1		
7.0	Refrigeration Piping				

	SITC of Seamless heavy gauge Copper piping (complying to ASTM B 280) of following size duly insulated with 19 mm thk (Insulation thickness shall be as per ref. pipe size and company specifications requirement) Nitrile Rubber Insulation. Refrigeration piping will have to be taken in the piping rack / Support individually connecting to all indoor units for the respective floors. Even necessary supports, fittings, valves & ref. joints where ever required will be included. All external ref. pipe insulation shall be coated with star bond CR 30-36 thermal insulation canvass coating including Gas charging of refrigerant pipes.				
a	12.7 mm dia (Liquid Line) Refrigerant Piping and First charge of ref R 410 or Eq for the circuit of 12 HP VRF System for -1 Floor	RMT	300		
b	28.58 mm dia (Hot Gas Line) Refrigerant Piping and First charge of ref R 410 or Eq for the circuit of 12 HP VRF System for -1 Floor	RMT	300		
c	12.7 mm dia (Liquid Line) Refrigerant Piping and First charge of ref R 410 or Eq for the circuit of 16 HP VRF System for Ground Floor	RMT	140		
d	28.58 mm dia (Hot Gas Line) Refrigerant Piping and First charge of ref R 410 or Eq for the circuit of 16 HP VRF System for Ground Floor	RMT	140		
e	12.7 mm dia (Liquid Line) Refrigerant Piping and First charge of ref R 410 or Eq for the circuit of 16 HP VRF System for Ground Floor	RMT	70		
f	28.58 mm dia (Hot Gas Line) Refrigerant Piping and First charge of ref R 410 or Eq for the circuit of 16 HP VRF System for Ground Floor	RMT	70		
g	9.52 mm dia (Liquid Line) Refrigerant Piping and First charge of ref R 410 or Eq for the circuit of 16 HP VRF System for Ground Floor	RMT	70		
h	19.05 mm dia (Hot Gas Line) Refrigerant Piping and First charge of ref R 410 or Eq for the circuit of 16 HP VRF System for Ground Floor	RMT	70		
i	12.7 mm dia (Liquid Line) Refrigerant Piping and First charge of ref R 410 or Eq for the circuit of 10 HP VRF System for Ground Floor	RMT	60		
j	28.58 mm dia (Hot Gas Line) Refrigerant Piping and First charge of ref R 410 or Eq for the circuit of 10 HP VRF System for Ground Floor	RMT	60		
8.0	PVC Drain				
	Supply, Installation, Dressing with Bends/Tees of C PVC DRAIN PIPING with proper leak proof adhesive at joints DULY INSULATED WITH 9 MM NITRILE RUBBER AND BOPP TAPE OF FOLLOWING SIZE DIA.				
a	32 mm	RMT	30		
b	25 mm	RMT	24		

9.0	MS Fabrication Work				
	Supply, Installation of MS Fabricated Platform with 2 coat of red oxide and final coat of corrosion proof enamel paint, shall be suitable to withstand dynamic weight of Out Door unit with safety railing.	Kg	450		
10.0	Supply, installation, balancing and commissioning of fabricated at site GSS sheet metal rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports etc. as per approved drawings and specifications of following sheet thickness complete as required.				
a	Thickness 0.63 mm sheet (24G , Duct)	Sq.m	50		
b	Thickness 0.80 mm sheet (22G , Duct)	Sq.m	10		
11.0	Supply Installation, Testing & Commissioning of Thermal insulation of Ducting with 19 mm thick class 'O' rated nitrile rubber faced with Aluminium foil 80 µ thickness, stuck to the cleaned external duct surface with synthetic rubber low VOC content adhesive of Pidlite industries or equivalent and to be used for ducts routed in unconditioned space.	Sq.m	50		
12.0	Supply Installation, Testing & Commissioning of Underdeck insulation with 50mm thick TF quality Expanded polystyrene fixed to the slab with Rawl plugs, covered with 22 SWG GI chicken wire mesh and held at all joints with GI washers and tied with GI wire.	Sq.m	70		
13.0	Supply Installation, Testing & Commissioning of wall mounted Digital Temperature meter. (Make - Honeywell, Siemens, Anergy or equivalent.)	NOS.	6		
14.0	Supply Installation, Testing & Commissioning of wall mounted digital Hygrometer (Humidity) meter. (Make - Honeywell, Siemens, Anergy or equivalent.)	NOS.	6		
	Dismantling Work				
15.0	Duct dismantling work at ER 2 & ER3 UPS Room / Battery Room. Dismantled material shall be handed over to the stores of AIIMS	Sq.m	50		
16.0	Dismantling of Cassette units along with all accessories like support, Chilled water pipe, cable connections, drain pipe etc etc. Dismantled material shall be handed over to the stores of AIIMS.	NOS.	2		
	Electrical Items				
17.0	Supply Installation, Testing & Commissioning of following sizes of XLPE insulated steel wire armoured power cable				
a	16 sqmm X 4 Core armoured copper cable	RMT	350		
b	10 sqmm X 4 Core armoured copper cable	RMT	670		
c	2.5 sqmm X 3 Core armoured copper cable	RMT	50		

18.0	Supply Installation, Testing & Commissioning of Electrical Panel of following rating with Indicating light ,ON/OFF push button, Auto/Manual & Bypass selector switch, Control fuse, timers, Contactors, Overload relay with SPP, Control fuse wiring & Suitable for 415 +/- 10% volts, 50 Hz, 3 Phase AC supply Incoming : 63 Amps 4P MCB Outgoing : 40 Amps 4P MCB - For Out Door 6 Amps 2P MCB - For Indoor	NOS.	6		
	Dismantling & Shifting Work				
19.0	DX Type Cassette units with Out Door and Indoor units to be dismantled at UPS room Basement of Main Hospital Block shall be shifted to Chiller Plant Area. Cost should include all necessary activities like removing of Cassette Units, Removing of ODU's, loading and shifting, necessary supports, Recharging of Refrigerant gas, reconnecting control and power cables	NOS.	2		
	Total				
In words:					

Name : _____

Business Address: _____

Date : _____

Place :

Signature of the Bidder: -

Seal of the Bidder _____

E-TENDERING INSTRUCTIONS TO BIDDERS

General

The Special Instructions (for e-Tendering) supplement 'Instruction to Bidders', as given in this Tender Document. Submission of Online Bids is mandatory for this Tender. E-Tendering is a new methodology for conducting Public Procurement in a transparent and secured manner. Suppliers / Vendors will be the biggest beneficiaries of this new system of procurement. For conducting electronic tendering, AIIMS BHUBANESWAR has decided to use the portal www.tenderwizard.com/AIIMSBBBSR through an ASP, M/s. ITI Ltd., Bhubaneswar.

Instructions.

- 1. Tender Bidding Methodology.** Two Stage Online Bidding.
- 2. Broad outline of activities from Bidders prospective:**
 - (a) Procure a Class III Digital Signature Certificate (DSC).
 - (b) Register on the e-Procurement portal www.tenderwizard.com/AIIMSBBBSR.
 - (c) Create Users on the above portal.
 - (d) View Notice Inviting Tender (NIT) on the above portal.
 - (e) Download Official Copy of Tender Documents from the above portal.
 - (f) Seek Clarification to Tender Documents on the above portal. View response to queries of bidders, posted as addendum, by AIIMS, Bhubaneswar.
 - (g) Bid-Submission on the above portal.
 - (h) Attend Public Online Tender Opening Event (TOE) on the above portal - Opening of Technical Part.
 - (j) Post-TOE Clarification on the above portal (Optional) – Respond to AIIMS, Bhubaneswar's Post-TOE queries.
 - (k) Attend Public Online Tender Opening Event (TOE) on the above portal - Opening of Financial Part (Only for Technical Responsive Bidders).

For participating in this tender online, the following instructions are to be read carefully. These instructions are supplemented with more detailed guidelines on the relevant screens of the above portal.

- 3. Digital Certificates.** For integrity of data and authenticity / non-repudiation of electronic records, and to be complaint with IT Act 2000, it is necessary for each user to have a Digital Certificate (DC), also referred to as Digital Signature Certificate (DSC), of Class III, issued by a Certifying Authority (CA) licensed by Controller of Certifying Authorities (CCA) [refer <http://www.cca.gov.in>].
- 4. Registration.** To use the Electronic Tender portal www.tenderwizard.com/AIIMSBBBSR, vendors need to register on the portal. Registration of each organization is to be done by one of its senior persons vis-à-vis Authorized Signatory who will be the main person coordinating for the

e-tendering activities. In the above portal terminology, this person will be referred to as the Super User (SU) of that organization. For further details, please visit the website/portal, and follow further instructions as given on the site. Pay Annual Registration Fee as applicable. (Rs 2000+ GST as applicable)

Note.: After successful submission of Registration details and Annual Registration Fee, please contact to the Help desk of the portal to get your registration accepted/ activated.

- (a) The Bidder must ensure that after following above, the status of bid submission must become – “Submitted”.
- (b) Please take due care while scanning the documents so that the size of documents to be uploaded remains minimum. If required, documents may be scanned at lower resolutions say at 150 dpi. However, it shall be sole responsibility of bidder that the uploaded documents remain legible.
- (c) It is advised that all the documents to be submitted are kept scanned or converted to PDF format in a separate folder on your computer before starting online submission.
- (d) The Financial part/BOQ may be downloaded and rates may be filled appropriately. This file may also be saved in a folder on your computer. Please don't change the file names & total size of documents (Preferably below 5 MB per document) may be checked.

5. Bid submission. The entire bid-submission would be online on the Tender wizard portal i.e. <https://www.tenderwizard.com/AIIMS, Bhubaneswar>.

6. Broad outline of submissions are as follows: -

- (a) Submission of Bid Parts (Technical & Financial).
- (b) Submission of information pertaining to Bid Security.
- (c) Submission of signed copy of Tender Documents/Addendums.

The TECHNICAL PART shall consist of Electronic Form of Technical Main Bid and Bid Annexure. Scanned/Electronic copies of the various documents to be submitted under the Eligibility Conditions, offline submissions, instructions to bidders and documents required to establish compliance to Technical Specifications and Other Terms & Conditions of the tender are to be uploaded.

The FINANCIAL PART shall consist of Electronic Form of Financial Main Bid and Financial Bid Annexure, if any. Scanned copy of duly filled price schedule (Section VII) for both packages are to be uploaded. If required, additional documents in support of taxes, quoted duties etc may also be uploaded.

7. Tender Processing Fee. You pay processing fee (0.1% of ECV + GST as applicable (Min. 750/- & Max 7500/- + GST as applicable)) through online (Credit card/ Debit card/ Net Banking), when participating in the e-tender.

8. Public Online Tender Opening Event (TOE). The e-Procurement portal offers a unique facility for 'Public Online Tender Opening Event (TOE). Tender Opening Officers as well as authorized representatives of bidder(s) can attend the Public Online Tender Opening Event (TOE) from the comfort of their office(s). For this purpose, representatives of bidders (i.e. Supplier organization) duly authorized. Every legal requirement for a transparent and secure 'Public Online Tender Opening Event (TOE)' has been implemented on the portal. As soon as a Bid is decrypted, the salient points of the Bids are simultaneously made available for downloading by all participating bidders. The medium of taking notes during a manual 'Tender Opening Event' is therefore replaced with this superior and convenient form of 'Public Online Tender Opening Event (TOE)'. The portal a unique facility of 'Online Comparison Statement' which is dynamically updated as each online bid is opened. The format of the Statement is based on inputs provided by the Buyer for each Tender. The information in the Comparison Statement is based on the data submitted by the Bidders. A detailed Technical and / or Financial Comparison Statement enhance Transparency. Detailed instructions are given on relevant

screens. The portal has a unique facility of a detailed report titled 'Online Tender Opening Event (TOE)' covering all important activities of 'Online Tender Opening Event (TOE)'. This is available to all participating bidders for 'Viewing/Downloading'. There are many more facilities and features on the portal. For a particular tender, the screens viewed by a Supplier will depend upon the options selected by the concerned Buyer.

Important Note. In case of internet related problem at a bidder's end, especially during 'critical events' such as – a short period before bid-submission deadline, during online public tender opening event it is the bidder's responsibility to have backup internet connections. In case there is a problem at the e-procurement / e-auction service- provider's end (in the server, leased line, etc) due to which all the bidders face a problem during critical events, and this is brought to the notice of AIIMS, BBSR by the bidders in time, then AIIMS, Bhubaneswar will promptly reschedule the affected event(s).

9. Other Instructions. For further instructions, the vendor should visit the home-page of the portal. The complete help manual is available in the portal for Users intending to Register / First-Time Users, Logged-in users of Supplier organizations. Various links are also provided in the home page.

Important Note.: It is strongly recommended that all authorized users of Supplier organizations should thoroughly peruse the information provided under the relevant links, and take appropriate action. This will prevent hiccups and minimize teething problems during the use of the said portal.

The following 'FOUR KEY INSTRUCTIONS for BIDDERS' must be assiduously adhered to: -

1. Obtain individual Digital Signature Certificate (DSC) well in advance of your first tender submission deadline on the portal.
2. Register your organization on the portal well in advance of your first tender submission deadline on the portal
3. Get your organization's concerned executives trained on the portal well in advance of your first tender submission deadline on the portal
4. Submit your bids well in advance of tender submission deadline on the portal (There could be last minute problems due to internet timeout, breakdown etc).

While the first three instructions mentioned above are especially relevant to first-time users on the portal, the fourth instruction is relevant at all times. Minimum Requirements at Bidders end Computer System with good configuration (Min P IV, 1 GB RAM, and Windows XP) Broadband connectivity. Microsoft Internet Explorer 8.0 or above. Digital Certificate(s) Vendors Training Program Necessary training to each and every registered bidder under this portal shall be impacted by the ASP, M/s. ITI, Bhubaneswar, if required, before participation in the online tendering.

For any further assistance, please contact **Mr Swadesh Bal (07008064095/ 07377708585)**, Helpdesk-011-49424365 ITI email ID for mailing communication: - twhelpdesk404@gmail.com/twhelpdesk680@gmail.com/twhelpdesk605@gmail.com.