Bharat Heavy Electricals Limited
भारत हैवी इलेक्ट्रिकल्स लिमिटेड

Operation Contract of HVAC system for 1 year for BHEL Sadan, Plot no. 25, Sec-16A, Noida for 1 year.

BHEL Sadan, Plot 25, sector 16A, Noida – 201301

18/4/24

अभिषेक कुमार झा / ABHISHEK KUMAR JHA
उप प्रबंधक / Manager
Plot No. 25, Sector-16A, Noida-201301

Signature
With name, Designation & seal of the Firm

भारत हेवी इलेक्ट्रिकल्स लिमिटेड
Bharat Heavy Electricals Ltd.
BHEL Sadan, Plot 25, Sector 16A, Noida - 201301

NOTICE INVITING TENDER

Tender is invited in Single part bid system. Complete offer is required to be placed inside a single envelope/cover & submitted on or before the specified date and time (mentioned below) at the address specified in the tender document. NIT No. and its due date to be clearly mentioned on the envelope containing offer.

SN	Name of work	Last date and time of submission of tender	Date and time of opening of Tender	Tender submission venue
1.	Operation Contract of HVAC system for 1 year BHEL Sadan, Plot no. 25, Sec-16A, Noida.	22/04/2024 Up to 14:30 Hrs.	22/04/2024 at 15:00 Hrs.	10th floor, BHEL Sadan, Plot 25, sector 16A, Noida - 201301

- For detail, refer tender documents
- Tender documents can be downloaded from BHEL web site (www.bhel.com) or from CPP portal (http://eprocure.gov.in). All subsequent corrigendum/amendment shall be published only on website and not in press.
- Late Tender is liable for rejection.
- BHEL reserves the right to accept or reject the bid or cancel or withdraw the invitation of tender without assigning any reason whatsoever and in such case bidder shall not have any claim arising out of such action by BHEL.
- For penalty for delay refer tender documents.
- In case of any clarification the bidder can contact undersigned on Mobile No. – 09899332457 or at e-mail: abhishekjha@bhel.in.

18/4/24

(Abhishek Jha)
Dy. Mgr. (NBP)

18/4/24

Signature
With name, Designation & seal of the Firm

M/s Universal MEP Projects Engineering Services Limited
Plot No. – 12/7, Sarai Khawaja, Mathura Road,
Faridabad – 121003, Haryana.

Kind Attn: Shri Shashank Tiwari (Mob: 9711436300)

SUBJECT: Tender for Operation Contract of HVAC system for BHEL Sadan, Plot no. 25, Sec-16A, Noida.

Your most competitive offer is invited, in sealed cover for Operation Contract of HVAC system for 1 year for BHEL Sadan, Plot no. 25, Sec-16A, Noida for a period of 1 year at BHEL Sadan, plot 25, sector 16A, Noida – 201301. The Scope, terms & conditions of the tender are mentioned below.

A. SCOPE OF WORK

1. The scope of works for the tender is broadly defined as follows:
   a. Operation of HVAC system
2. **Period of contract:** One year from the date of award of work.
3. **Duties and Responsibilities of the Contractor:** The duties and responsibilities under the contract shall be for services (i.e. regular operation, routine checkups, testing etc. as required), in respect of HVAC system including BMS. Liability shall also include deployment of necessary resources including manpower, tools and tackles etc. as may be required in order to ensure safe, efficient and smooth operation of the said system and duties/responsibilities shall include all activities as may be required but not limited to the following.

a) Safe, efficient and reliable operation of the HVAC system including BMS.

b) Starting and Stopping of plant & accessories in proper sequence or as per requirements

c) Maintaining daily log to record observations of various parameters under the services of the contract in prescribed format. Each of the equipment's like compressors, Heat Exchangers, Pumps, Cooling towers, Motors, Electrical Panels & other associated items etc. shall be serially numbered and proper record shall be maintained by the contractor in respect of the same.

d) Continuous monitoring, recording of parameters on daily basis.

e) Taking all necessary precautions to ensure safety of the personnel and equipment.

f) All the necessary tools, tackles and measuring instruments etc. required during operation will be arranged by the contractor at no extra cost.

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g) Detail scope of work is covered in subsequent clauses of the specification.

B. Description of System

1. Details of the major equipment's covered under HVAC system is mentioned in Annexure G.

2. CHILLERS

a) Operation of Chillers throughout the contract period.
b) To Check for proper operation of expansion valves every year or as and when required.
c) To Carry out the proper functioning of VFD and take the control test on regular basis.
d) To check / calibrate the proper functioning of flow switch.
e) To check the antifreeze and setting of the same every quarterly or as and when required.
f) To check LP / HP cut out switches.
g) To operate the chillers and compressors without any failure.
h) To check the filter drier core.
i) To clean the electrical panel of the m/c every quarterly with air blower.
j) To check the leakages of refrigerant from the chilling units and rectify/ repair the same.
k) To check the compressor oil and oil filters as per requirement.
l) To descale the condenser of machine as per requirement or at least once in a year.
m) Checking of sensors, control valves, control's equipment & cleaning of strainers.
n) To calibrate control instruments - Transducers, sensors & motor current, if possible.
o) The refrigerant system shall be checked for any leakage of gas and lubrication oil and the same will be charged/topped up as and when required. The lubrication oil shall be replaced with new oil at least once in a year.

3. PUMPS

a) To operate the pumps connecting to the system as per requirement
b) To lubricate bearings for pumps and motors from time to time.
c) To clean the Strainer as and when required.
d) To make proper alignment of the pump, if necessary.

4. AIR HANDLING UNITS (AHUs)

a) To clean the filters of Air Handling Unit every 15 days or as and when required.
b) To clean the cooling coils quarterly.
c) To check the belt tension on regular basis.
d) To check blower pulley and motor pulley alignment as required at site.
e) To lubricate motor and blower shaft's bearings from time to time.

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f) To check the bearings of blower or motor.
g) To operate control equipment such as thermometers, modulating motors, pressure gauges, valves, starter, etc.
h) To clean the drain lines every quarterly.

5. **VAV's and Dampers**

a) To operate VAVs and Dampers properly so that temperature on floors are 24°C ± 10% during summers and 22° ± 10% during winters.

6. **COOLING TOWER**

a) To clean the spray nozzles, if found choked.
b) Checking of water level in cooling towers and expansion tank.
c) To clean the fills as and when required.
d) To clean the spray chamber / tank every quarterly (during PMS).
e) To check and rectify the motor and blower alignment.
f) To lubricate the motor and blower shaft bearing as and when required.
g) To operate motor and blower bearings, if found defective.

7. **Hot Water Generating System**

a) To check hot water generator control, electric circuit and immersion heaters.
b) To check temperature meters and rectify/replace the same if needed.

8. **HVAC ELECTRICAL PANEL & Other panels related to HVAC system in basements & Terrace**

a) To clean the electrical panel quarterly.
b) To tighten the electrical terminations related to the air conditioning system once in a month.
c) To operate the electric components of main AC Panel and other distribution boards timely. This includes main incomer - ACB and various switches specifically for central AC Plant Systems.
d) To check the electrical circuits of air conditioning plants.

9. **VRF Units (both Indoor & Outdoor Units)**

i) Routine inspection, operation and general checking of units.
ii) Refrigerant Gas charging or topping up, if required.
iii) Dry Cleaning of Indoor & Outdoor Units Filter every 15 days. Wet cleaning, at least once in a quarter or as and when required.
iv) VRF units are installed in Hub Rooms on floors, Switch rooms, etc. where the rooms should be cooled 24 x 7. The operator should ensure the same.

10. **BMS**

i) BMS should be monitored and operated on regular basis. All AHU's and other functioning shall be controlled by BMS.

C) This clause is deleted.

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D) **This clause is deleted.**

E) **Penalty Clauses:**

a. Penalty shall be imposed on the contractor as mentioned below:

Rs. 2000/- Per day for non-operation of HVAC system.

Rs 100/- Per day for non-cleaning of each filter of either AHU/ VRF as per time schedule.

Rs 100/- Per day for non-cleaning of each drain

Rs 100/- Per day for non-maintenance of Daily Log book.

b. At a time only one penalty which has more value shall be applicable.

c. Total Penalty under the contract shall not exceed 10% of the contract value.

d. If any equipment/parts found broken/damaged due to negligence of contractors work/worker and or damages the property of BHEL deliberately, the same shall be replaced/repaired by the contractor. If the contractor fails to repair/replace, same shall be repaired/replaced by BHEL and its cost shall be recovered from the contractor's bill.

F) BHEL working hours and Operator deployment

i) Our office hours are 09:00AM to 5:30PM. Office is open on all days except 2nd & last Saturday of every month, Sunday and National Holidays.

ii) The operator availability shall be in two shifts – 6:00 am to 2:00 pm & from 2:00 pm to 10:00 pm on all working days. Operator may be required on holidays/beyond office timings on some days on account of any function or exigency at no extra cost.

iii) Trained operator/AC mechanic shall be deployed by the contractor for the operation of HVAC system including BMS system.

iv) The operational parameters such as temperature, humidity etc. shall be monitored continuously and the same shall be entered in the log book on daily basis during operation.

v) The contractor will provide the operator with handbook for day to day operation of the AC System and the operator will have to follow the procedures.

vi) The contractor will provide all the safety equipment's/kits/emergency light/ First Aid box etc. to its operators.

vii) In case of absenteeism, the contractor will have to make alternative arrangement and advance information to be given to engineer in-charge.

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viii) The contractor/vendor shall abide all by all labour laws, regulations, rules, Acts, ESI, PF etc.

G) Special Conditions:

i) All risk of loss or damage to physical property and of personal injury and death, which arises during/in consequence of the performance of the contract, other than expected risks, are the responsibility of the contractor.

ii) The onus of compliance of all statutory requirements including labour laws, PF, ESI etc shall be on the contractor only.

iii) The bidder shall visit the site to acquaint himself regarding all site features and existing system condition etc. Any claim by the bidder of any ignorance, whatsoever in this regard will not be entertained by BHEL at later stage.

H. GENERAL TERMS & CONDITIONS

i) Vendor may visit the site and check the installed system before bidding for the subject work in the tender.

ii) The successful bidder should comply with all statutory requirements applicable for this contract.

iii) All tools & tackles required for carrying out the work shall have to be provided by the successful bidder at no extra cost.

iv) Any components / parts damaged due to mishandling by the person deputed by the successful bidder shall have to be restored back to its original condition by the successful bidder at their own cost.

v) The successful bidder shall indemnify BHEL against any compensation that may arise out of any injury or death to any person deputed by the successful bidder.

vi) Bid with overwriting is liable to be rejected.

vii) During the execution of the contract, the performance of the contractor shall be reviewed at the end of every quarter of the contract. If the performance of the contractor is adjudged to be non-satisfactory, then, BHEL at its discretion; may terminate / foreclose the contract by giving a written notice of 15 days. No compensation, whatsoever, shall be admitted by BHEL on account of such termination / foreclosure.

viii) The bidder must accept all terms & conditions of the tender unconditionally. Offer with deviations from terms and conditions of this tender is liable to be rejected.

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ix) Tender shall be received and opened on the due date and time as mentioned above and opening will be in the presence of bidder or their authorized representative; who may like to be present. Tender received after due date & time is liable to be rejected.

x) The General terms & conditions form part of the Tender specifications. All pages of the tender documents shall be duly signed, stamped and submitted along with the offer in token of complete acceptance thereof. The information furnished shall be complete by itself. The tenderer is required to furnish all the details and other documents as required in the following pages.

xi) Tenderer is advised to study all the tender documents carefully. Any submission of tender by the tenderer shall be deemed to have been done after careful study and examination of the tender documents and with the full understanding of the implications thereof. Should the tenderer have any doubt about the meaning of any portion of the Tender Specification or find discrepancies or omissions in the tender documents issued are incomplete or shall require clarification on any of the technical aspect, the scope of work etc., he shall at once, contact the authority inviting the tender well in time (so as not to affect last date of submission). Tenderer's request for clarifications shall be with reference to Sections and Clause numbers given in the tender documents. The specifications and terms and conditions shall be deemed to have been accepted by the tenderer in his offer. Non-compliance with any of the requirements and instructions of the tender enquiry may result in the rejection of the tender.

I. SPECIAL TERMS & CONDITIONS

a. Price to be filled-in strictly as per the Price Bid Format (refer Annexure A). Price quoted shall be firm, final and not subject to any price escalation.

b. **This clause is deleted.**

c. The rates quoted in the Tender shall remain valid for a period of **THREE (3) MONTHS** from latest due date of tender opening (including extension, if any).

d. **Validity of contract:** The operation contract shall be valid for a period of One (1) years w.e.f. date of award of order. The accepted rates shall remain firm during the entire duration of the contract.

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e. Bid shall be submitted on 10th floor, BHEL Sadan, plot 25, sector 16A, Noida on or before the due date and time.

f. Tender shall be accompanied with a covering letter giving index interlinking all the documents enclosed and all pages should be signed & stamped and should be as per the instructions given for quoting the bid.

g. The offer is to be submitted in single part bid in sealed covers prominently super scribed the tender number and due date and time as mentioned in the tender enquiry.

J. COMMENCEMENT OF WORK

a) The contractor shall commence the work as per the time indicated in the Letter of Intent/Award from BHEL and shall proceed with the same with due expedition without delay.

b) If the contractor fails to start the work within stipulated time as per LOI/ LOA or as intimated by BHEL, then BHEL at its sole discretion will have the right to cancel the contract.

c) All the work shall be carried out under the direction and to the complete satisfaction of BHEL.

d) The responsibility of contractor under this Contract commences from the date of issue of the Letter of Intent.

K. TAXES AND DUTIES

a) Price shall be all inclusive, except GST. The amount towards GST shall be indicated separately as specified in the price format.

b) To enable BHEL to avail GST input tax credit, vendor shall submit GST compliant invoice containing all the particulars as stipulated under Invoice Rules of CGST Rules, 2017 as amended from time to time. Such invoice shall be submitted within prescribed time limit in the name of BHEL, Corporate Office, BHEL House, Siri Fort, New Delhi.

c) Digital tax invoice shall be preferred or e-invoice, if applicable.

d) To protect BHEL's interest for GST input tax credit, GST portion amount shall be withheld and the same shall be released only after confirmation from GST website/portal that such invoice has been declared in GSTR-1 return filed by vendor within the stipulated time for the relevant period and tax amount thereon has been paid by vendor to Govt. within the stipulated time for the relevant period as per GST Law.

e) BHEL reserves the right to protect its interest against any loss on account of availability of GST credit. In case of any loss to BHEL on account of non-compliance

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by vendor, the same shall be to vendor's account. BHEL has a right to take necessary steps to protect its interest at the time of release of payment.

f) GSTIN of BHEL will be provided to the vendor along with the work order.

g) Any statutory changes as and when made applicable by the Government shall become applicable against documentary evidence.

h) While making the payment, statutory deductions as applicable, shall be made by BHEL. Payment to the vendor will be subjected to TDS as per rules in force from time to time. The Tax Deduction at Source (TDS) shall be done as per the provisions of Income Tax Act & GST, as amended from time to time and a certificate to this effect shall be provided to the vendor by BHEL.

i) Invoice submitted should be in the format as specified under GST Laws viz. all details as mentioned in Invoice Rules like GSTIN registration number, invoice number, quantity, rate, value, taxes with nomenclature – CGST, SGST, IGST mentioned separately, HSN (Harmonized System of Nomenclature) Code/ SAC (Services Accounting Code) etc.

j) All applicable taxes and duties other than mentioned in the contract document, shall be payable by the Service provider and the BHEL shall not entertain any claims whatsoever with respect to the same.

k) Any Statutory variation in the rate of GST, taking place between the Bid Submission by service provider and Bid End Date, shall be to the Service provider's account. Hence, Service provider must ensure that any Statutory variation in the rate of GST till Bid End Date is duly incorporated in the bid submitted by the service provider. In case service provider fails to incorporate the same in bid, the service provider will not be eligible for claiming any change in price due to such Statutory variation.

l) Statutory variation in the rate of GST, taking place between the Bid end date and the original / refixed delivery period, shall be to the BHEL's account. For claiming any change in price due to such Statutory variation, the service provider shall have to lodge claim before the BHEL providing documentary evidence of change in rate of GST taking place after Bid end date and the date of supply within the original / refixed delivery period along with an undertaking that the provisions of anti-profiteering clause under GST Act have been complied with.

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m) No increase in price on account of statutory increase in the rate of GST taking place during the period of delivery period extension with liquidated Damages shall be admissible. Nevertheless, the BHEL shall be entitled to the benefit of any decrease in price on account of reduction in GST taking place during extended delivery period.

n) The Bill Form / On-line invoice shall be generated by the Service provider which may interalia include the following confirmations from the Service provider:

i) Certified that the Goods and Services Tax (GST) charged on this Bill is not more than what is payable under the provision of the relevant Act or the Rules made there under.

ii) Certified that the goods on which GST has been charged have not been exempted under the GST Act or the rules made there under and the charges on account of GST on these goods are correct under the provisions of that Act or the Rules made there under.

iii) Certified that the Service provider is registered with above indicated GSTIN as dealer in the State where in their Billing address is located for the purpose of GST.

iv) The service provider shall provide an undertaking that the provisions of antiprofiteering clause under GST Act have been complied with.

o) Service provider shall comply with all the necessary statutory compliances, including but not limited to, GST registration in line with the extant provisions of GST Act, providing GST invoices or other documentation as per GST Law relating to the supply of Goods or Services, uploading the details of the invoices, payment of taxes, timely filing of valid statutory returns for the tax period in the GST portal, etc.

p) In case the Input Tax Credit of GST is denied or demand is recovered from BHEL on account of any act/ omission of the Service provider in this regard, the Service provider shall be liable in respect of all claims of tax, penalty and / or interest, loss, damages, costs, expenses and liability that may arise due to such non-compliance. BHEL shall have the right to recover such amount from any payments due to the Service provider or from Performance Security, or any other legal recourse from the said Service provider. If any tax is required to be paid by the Service provider in pursuance of any demand from tax authorities, on account of Service provider's suppression of facts, fraud or wilful misstatement of facts while offering the products/service or submitting the bids, then the same shall not be passed on to BHEL through debit notes or Invoices or Supplementary Invoices and the service provider shall be solely liable for payment of the same.

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L. PAYMENT TERMS

i. The Operation charges shall be made on monthly basis.

ii. Bill shall be raised after end of every month in which operation services have been rendered successfully and payment will be made against each bill within 30 days from the date of submission of the bill complete in all respects after due verification; subject to other terms & conditions mentioned in Taxes & Duties above. The GST amount shall be made only after compliance of clause no. (i) & (viii) of Taxes & duties above.

Note: No interest shall be payable for delay in making the payment.

M. Security Deposit

a. Upon acceptance of Tender, the successful Tenderer should deposit the required amount of Security Deposit towards fulfilment of any obligations in terms of the provisions of the contract. The total amount of Security Deposit will be 5% of the contract value.

b. The security Deposit should be furnished before start of the work by the contractor.

c. The amount to make up the required Security Deposit of 5% of the contract value may be accepted in the following forms.

i) Cash (as permissible under the extant Income Tax Act).

ii) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.

iii) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL).

iv) Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format for Security Deposit shall be in the prescribed formats.

v) Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL).

vi) Insurance Surety Bonds.

vii) Security deposit can also be recovered at the rate of 10% of the gross amount progressively from each of the running bills of the contractor till the total amount of the required security

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deposit is collected. However, in such cases at least 50% of the required Security Deposit, including the EMD, should be deposited in any form as prescribed before start of the work and the balance 50% may be recovered from the running bills as described above.

Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.

viii) The Security Deposit shall not carry any interest.

ix) In case the value of work exceeds / reduces from the awarded / accepted value, the Security Deposit shall be correspondingly enhanced / reduced as given below:

a. The enhanced part of the Security Deposit shall be immediately deposited by the Contractor or adjusted against payments due to the Contractor.

b. There will be no reduction in Security Deposit value in case of variation in contract value up to the lower limit specified in Quantity variation clause. In case of reduction of contract value beyond the lower limit specified in Quantity Variation clause, then the Security Deposit shall be re adjusted in proportion.

c. The recoveries made from running bills (cash deduction towards balance SD amount) can be released against submission of equivalent Bank Guarantee in acceptable form, but only once, before completion of work, with the approval of BHEL.

x) The validity of Bank Guarantees towards Security Deposit shall be initially up to the completion period as stipulated in the Letter of Intent/ Award + 3 months, and the same shall be kept valid by proper renewal till completion of maintenance period which necessarily required certification of BHEL.

xi) BHEL reserves the right of forfeiture of Security Deposit in addition to other claims and penalties in the event of the Contractor's failure to fulfill any of the contractual obligations or in the event of termination of contract as per terms and conditions of contract. BHEL reserves the right to set off the Security Deposit against any claims of other contracts with BHEL.

RETURN OF SECURITY DEPOSIT

Security Deposit shall be refunded / Bank Guarantee(s) released to the Contractor upon fulfilment of contractual obligations as per terms of the contract.

N. FRAUD PREVENTION CLAUSE

The bidder along with their associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed

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on BHEL Website https://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

O. DOCUMENTS REQUIRED:

i. Complete tender document in all respects duly signed & stamped on each and every page as a token of acceptance of all the terms and conditions of tender.

ii. Self-attested copies of the PAN No. & GSTIN Registration No.

iii. Bidder must submit the price bid (enclosed at Annexure-A) duly filled & signed.

iv. No deviation certificate as per Annexure –B (enclosed) must be signed and stamped.

v. The Bidder must submit a declaration (enclosed at Annexure –C), duly filled & signed.

vi. Bidder must submit the letter of indemnity in the enclosed format (Annexure-D).

vii. Bidders must submit the bidder's details (enclosed at Annexure – E).

P. PRICE VARIATION COMPENSATION, BONUS & OVER RUN COMPENSATION

Price Variation compensation, Bonus & Over Run compensation are not applicable.

Q. Settlement of Disputes

I. **CONCILIATION:** If at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, execution, effect, interpretation or breach of the Contract, which the Parties are unable to settle mutually, arise inter-se the Parties, the same may be referred by either Party to Conciliation to be conducted through Independent Experts Committee (IEC) to be appointed by competent authority from the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration & Conciliation Act, 1996 or any statutory modification thereof and as provided in the BHEL Conciliation Scheme as applicable from time to time.

II. **ARBITRATION:**

a. Except as provided elsewhere in this contract, in case amicable settlement is not reached between the parties, in respect of any dispute or difference; arising out of the formation, breach termination, validity of execution of the Contract; or, the respective rights and liabilities of the parties; or, in relation to interpretation of any provision of the Contract; or in any manner touching upon the contract, then, either party may, by a notice in writing to the other party refer such dispute or

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difference to the sole arbitration of an arbitrator appointed by Head of the BHEL Unit/Region/Division issuing the Contract.

The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the Parties.

Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) or statutory modifications or re-enactments thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceedings under this clause. The seat of arbitration shall be at New Delhi.

The cost of arbitration shall be borne as per the award of the Arbitrator.

Subject to the arbitration in terms of Clause above, the Courts at New Delhi shall have exclusive jurisdiction over any matter arising out of or in connection with this contract.

Notwithstanding the existence or any dispute or differences and /or reference for the arbitration, the Contractor shall proceed with and continue without hindrance the performance of its obligations under this contract with due diligence and expedition in a professional manner except where the Contract has been terminated by either party in terms of this Contract.

b. In case of order/contract on Public Sector Enterprises (PSE) or a Govt. Deptt., the following clause shall be applicable: -

In the event of any dispute or difference relating to the interpretation and application of the provisions of the Contract, such dispute or difference shall be referred to by either party for arbitration to the sole arbitrator in the department of public enterprises to be nominated by the secretary to the Government of India in-charge of the Department of Public Enterprises. Arbitration and Conciliation Act 1996 shall not be applicable to arbitration under this clause. The award of the arbitrator shall be binding upon the parties to the dispute, provided, however, any party aggrieved by such award may make a further reference for setting aside or revision of the award to the Law secretary, Deptt. Of Legal Affairs, Ministry of Law & Justice, Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary or Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the parties hereto finally and conclusively. The parties in the dispute will bear equally the cost of arbitration as intimated by the arbitrator.

III. **APPLICABLE LAWS AND JURISDICTION OF COURTS**: Indian laws both substantive and procedural, for the time being in force, including modifications thereto, shall govern the Contract including Arbitration proceedings. Notwithstanding any other court or courts having jurisdiction to decide the question(s) forming the subject matter of the reference if the same had been the subject matter of a suit, any and all actions and proceedings arising out of or relative to the contract shall lie only in the court of competent civil jurisdiction in this behalf at **DELHI** and only the said Court(s) shall have jurisdiction to entertain and try any such action(s) and/or proceeding(s) to the exclusion of all other Courts.

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R. FORCE MAJEURE:

A Force Majeure (FM) means extraordinary events or circumstance beyond human control such as an event described as an Act of God (like a natural calamity) or events such as war, strike, riots, crimes (but not including negligence or wrong-doing, predictable/seasonal rain and any other events specifically excluded in the clause). An FM clause in the contract frees both parties from contractual liability or obligation when prevented by such events from fulfilling their obligations under the contract. An FM clause does not excuse a party's non-performance entirely, but only suspends it for the duration of the FM. The firm has to give notice of FM as soon as it occurs and it cannot be claimed ex-post facto. There may be a FM situation affecting the purchase organization only. In such a situation, the purchase organization is to communicate with the supplier along similar lines as above for further necessary action. If the performance in whole or in part or any obligation under this contract is prevented or delayed by any reason of FM for a period exceeding 90 (Ninety) days, either party may at its option terminate the contract without any financial repercussion on either side.

Notwithstanding the punitive provisions contained in the contract for delay or breach of contract, the supplier would not be liable for imposition of any such sanction so long as the delay and/or failure of the supplier in fulfilling its obligations under the contract is the result of an event covered in the FM clause.

S. BANK GUARANTEE

Where ever Bank Guarantees are to be furnished/submitted by the contractor, the following shall be complied with:

i) Bank Guarantees shall be from Scheduled Banks / Public Financial Institutions as defined in the Companies Act.

ii) The Bank Guarantees shall be as per prescribed formats.

iii) It is the responsibility of the bidder to get the Bank Guarantees revalidated/extended for the required period (subject to a minimum period of six months), as per the advice of BHEL Project Manager. BHEL shall not be liable for issue of any reminders regarding expiry of the Bank Guarantees.

iv) In case extension/further extensions of any Bank Guarantees are not required, the bidders shall ensure that the same is explicitly endorsed by the Project Manager and submitted to the Regional HQ issuing the LOI/LOA.

v) In case the Bank Guarantees are not extended before the expiry date, BHEL reserves the right to invoke the same by informing the concerned Bank in writing, without any advance notice/communication to the concerned bidder.

vi) Bidder to note that any corrections to Bank Guarantees shall be done by the issuing Bank, only through an amendment in an appropriate non judicial stamp paper.

vii) The Original Bank Guarantee shall be sent directly by the Bank to BHEL under Registered Post (Acknowledgement Due), addressed to the Subcontracting Department of the respective Region.

T. OTHER ISSUES

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i. Value of Non judicial Stamp Paper for Bank Guarantees and for Contract Agreement shall be not less than Rs 100/- unless otherwise required under relevant statutes.

ii. Letter of Intent (LOI) shall be placed to the successful contractor before Contract Agreement. The Security Deposit amount shall be specified in the LOI, which has to be deposited to BHEL before Contract Agreement.

iii. Unless otherwise specified in NIT, offers from consortium / JVs shall not be considered.

iv. E- invoicing shall be applicable as per direction/norms of government.

U. INSURANCE

BHEL shall recover the amount of compensation paid to victim(s) by BHEL towards loss of life / permanent disability due to an accident which is attributable to the negligence of contractor, agency or firm or any of its employees as detailed below.

a) Victim: Any person who suffers permanent disablement or dies in an accident as defined below.

b) Accident: Any death or permanent disability resulting solely and directly from any unintended and unforeseen injurious occurrence caused during the manufacturing/ operation and works incidental thereto at BHEL factories/ offices and precincts thereof, project execution, erection and commissioning, services, repairs and maintenance, trouble shooting, serving, overhaul, renovation and retrofitting, trial operation, performance guarantee testing undertaken by the company or during any works / during working at BHEL Units/ Offices/ townships and premises/ Project Sites.

c) **Compensation in respect of each of the victims**:

*(i) In the event of **death** or **permanent disability resulting from Loss of both limbs**: ₹10,00,000/- (Rupees Ten Lakhs).*

*(ii) In the event of **other permanent disability**: ₹7,00,000/- (Rupees Seven Lakhs).*

d) Permanent Disablement: A disablement that is classified as a permanent total disablement under the proviso to Section 2 (I) of the Employee's Compensation Act, 1923."

18/4/2024

(Abhishek Jha)
Deputy Manager
Bharat Heavy Electricals Ltd.
BHEL Sadan, Plot 25, Sector 16A, Noida
Mob-9899332457

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ANNEXURE-A

PRICE BID

SN (A)	Item Description (B)	Unit (C)	No. of Months (D)	Rate (Rs.) (E)	Amount (in Rs.) (F)
1	Operation Contract of HVAC system & BMS for BHEL Sadan, Plot no. 25, Sec-16A, Noida	Per Month	12		
2	**Sub- Total (excluding GST)**				
3	GST @ .....%				
4	**Total charges for 1 Year (including GST)**				

Note:

1. The rates quoted above shall be all inclusive basis except GST.
2. GST shall be payable extra as applicable. Rate of applicable GST to be quoted.
3. The prices should be quoted in the price bid format only. If the prices will be quoted at any other place, then that may be treated as 'NULL & VOID'.
4. The scope of work shall be as per clause no. 1.0.
5. The rates shall remain firm for the entire duration of the contract.
6. Payment terms & Penalty clause shall be as per clause no. L & E respectively.

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ANNEXURE-B

No Deviation Certificate

Notwithstanding anything mentioned in our bid, we hereby accept all technical and commercial terms and conditions of the above tender. We hereby certify that we do not have any deviations to the tender. Deviations if any, mentioned elsewhere in our bid (whether Techno-commercial bid or Price bid) may be treated as null and void by BHEL.

We confirm that the offer submitted by us is confirming to all the terms and conditions mentioned in the tender document. We hereby undertake and confirm that we have understood the scope of services properly and shall carry out the job as mentioned in this tender.

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ANNEXURE-C

DECLARATION

I/ We hereby declare that I / we have not been banned or de-listed by any PSU / Government Department / Financial Institute / Court and no case is pending with the police / court against our firm/ partner or the company.

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Annexure-D

LETTER OF INDEMNITY

I/ We Indemnify BHEL against any compensation that may arise out of any injury or death to any person deputed.

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ANNEXURE-E

Bidder's Details

Sl. No.	Vendor's Details	
1	Name of Vendor/ Party/ Firm	
2	Name of Representative	
3	Postal Address	
4	Phone/ Landline Nos.	
5	Mobile Nos.	
6	Fax No.	
7	E-Mail address	
8	Web Site Address (if any)	
9	PAN No. & GSTIN No.	
10	Bank details for payment through NEFT/ RTGS	Name of Bank Branch Account No. IFSC No. MICR No.

Note: (1) Submit a cancelled cheque for verification of above bank details. (2) Submit Self-attested copies of the PAN No. & GSTIN Registration No.

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ANNEXURE-F

This annexure is deleted.

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ANNEXURE-G

LIST OF Equipment Details INSTALLED AT BHEL Sadan, Noida

SCHEDULE OF QUANTITIES FOR HVAC, BMS & Precision AC			
S No (1)	Description of items (2)	Unit (3)	Quantity
A	Equipment:		
1	Water Cooled Screw Compressor Type Water Chilling Machines (ARI or Eurovent Certified)^^:		
	Helical rotary screw type water chilling machine of actual cooling capacity as mentioned below complete with semi - hermetic compressor, motor, starter, water cooled condenser, insulated (insulation to be carried out at factory only) evaporator, vibration isolators, sole plates, integral refrigerant piping with insulation, first charge of refrigerant and oil, wiring, all accessories as per specifications, automatic and safety controls, microprocessor control panel, all mounted on steel frame, all accessories as per specifications and any other item required to make the system complete.		
	Refrigerant: R-134a		
	Maximum Chilled Water Velocity / Pressure Drop in Evaporator: 8 FPS / 18 ft WG		
	Maximum Condenser Water Velocity / Pressure Drop in Condenser: 8 FPS / 18 ft WG		
	Fouling Factors: 0.0005 FPS units for evaporator & 0.001 FPS units for condenser		
	Machine with variable frequency drive: VFD to be Provided.		
	Chillers VFDs to be provided with RS485 Modbus / Bacnet / Open Protocol BMS Module.		

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	Machine with variable frequency drive shall be provided with Active Harmonic Filter to limit the electrical power supply distortion for the variable speed drive to comply with IEEE-519. The filter shall be unit mounted & shall be UL listed. As part of active harmonic filter the following parameters shall be displayed on the chiller display: • **Total power factor** • **Input voltage** • **Input current** • **Total demand distortion (TDD)** **Calculations shall be submitted by the chiller manufacturer to prove that the harmonic distortions of the electrical system are with in the limits specified by IEEE-519.**		
	Hardware & Software for integration with BMS: Required - To be Provided		
	Chillers to be provided with RS485 Modbus / Bacnet / Open Protocol BMS Module in the Chiller Control Panel.		
	Power Supply: Single Point Power Supply, 415V, 3 Phase, 50 Hz, 4 Wire		
	Note: The Chillers shall meet the COP, IKW/TR & IPLV requirements as per the Green Building Certification Requirements		
	COP at ARI Conditions: 5.77 (Minimum)		
	IPLV at ARI Conditions: 0.52 (Maximum)		
	<u>Performance Parameters at 100% Load:</u>		
	Actual Cooling Capacity at conditions specified below, in TR: 345		
	Chilled Water Inlet/ Outlet Temp. Deg. F: 54.00/44.00		
	Chilled Water Flow Rate in USGPM: 828		
	Condenser Water Inlet/ Outlet Temp. Deg. F: 90.00/97.50		
	Condenser Water Flow Rate in USGPM: 1380		
	Input KW/TR at above actual parameters: To be furnished by Bidder.		
	<u>Performance Parameters at 75% Load - Chilled Water Outlet Temperature, Chilled Water Flow Rate, Condenser Water Flow Rate shall be same as for 100% Load:</u>		
	Actual Cooling Capacity at conditions specified below, in TR: 75% of Full Load		
	Condenser Water Inlet Temp. in Deg. F = (CDW Inlet Temperature at 100% Load + 65.00) / 2		
	Input KW/TR at above actual parameters: To be furnished by Bidder.		

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	Performance Parameters at 50% Load - Chilled Water Outlet Temperature, Chilled Water Flow Rate, Condenser Water Flow Rate shall be same as for 100% Load:		
	Actual Cooling Capacity at conditions specified below, in TR: 50% of Full Load		
	Condenser Water Inlet Temp. in Deg. F = 65.00		
	Input KW/TR at above actual parameters: To be furnished by Bidder.		
	Performance Parameters at 25% Load - Chilled Water Outlet Temperature, Chilled Water Flow Rate, Condenser Water Flow Rate shall be same as for 100% Load:		
	Actual Cooling Capacity at conditions specified below, in TR: 25% of Full Load		
	Condenser Water Inlet Temp. in Deg. F = 65.00		
	Input KW/TR at above actual parameters: To be furnished by Bidder.		
	Working + Standby: 3 + 1	**SET**	**4**
1.02	**50 mm Deflection Spring Type Vibration Isolators for above Chillers**	**SET**	**4.00**
1.03	**Flow Switches for Chilling Machines including control cabling/wiring between flow switch and chilling machine / electrical panel complete with all accessories as per specifications and any other item required to make the system complete.**	**SET**	**8.00**
2	**Centrifugal Pumps^^:**		**-**
	Centrifugal type pumps complete with motor (TEFC Squirrel Cage Induction, Insulation Class F, Efficiency Class IE2 for Motors Operating on VFD & Efficiency Class IE3 for Motors operating on Fixed Speed Starters. factory fitted mechanical seal, common base frame for pump and motor, coupling & coupling guard, foundation bolts, vibration isolators, insulation (if applicable), all accessories as per specifications and any other item required to make the system complete.		**-**
2.01	**Duty: Condenser Water Pumps for Chillers**	**SET**	**4.00**
	Flow Rate (without any negative tolerance): 1380 USGPM		**-**
	Head: 90 ft. WG		**-**
	Type: End Suction Back pull Out Long Coupled		**-**
	Motor Rating in KW (Maximum): 37.00 (Eff. Class IE3)		**-**
	Power Supply: 415V, 3 Phase, 50 Hz		**-**
	Working + Standby: 3 + 1		**-**
2.02	**Duty: Primary Chilled Water Pumps for Chillers**	**SET**	**4.00**
	Flow Rate (without any negative tolerance): 828 USGPM		**-**

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	Head: 55 ft. WG		-
	Type: End Suction Back pull Out Long Coupled		-
	Motor Rating in KW (Maximum): 15.00 (Eff. Class IE3)		-
	Power Supply: 415V, 3 Phase, 50 Hz		-
	Working + Standby: 3 + 1		-
2.03	Duty: Secondary Chilled Water Pumps for Chillers	SET	3.00
	Flow Rate (without any negative tolerance): 1242 USGPM		-
	Head: 60 ft. WG		-
	Type: End Suction Back pull Out Long Coupled		-
	Motor Rating in KW (Maximum): 22.00 (Eff. Class IE2)		-
	Power Supply: 415V, 3 Phase, 50 Hz		-
	Working + Standby: 2 + 1		-
3	Variable Speed Pumping Systems:		-
	Variable Speed Pumping System complete with One adjustable frequency drive for each secondary pump (including standby pump), one dedicated microprocessor based pump controller (with parallel pumping software for each zone downloaded), minimum 2 sensors/transmitters per zone, power/ control cabling/ wiring between the controller, VFDs, Sensors/ Transmitters etc., mounting arrangements/ frames/ supports etc., all accessories as per specifications and any other item required to make the system complete.		-
	VFDs shall not be provided with any bypass starter in the electrical panels - whether specified in general specifications or not.		-
	Master Controller to be provided with RS485 Modbus / Bacnet / Open Protocol BMS Module.		-
	Application: Variable Speed Pumping System - For 3 (2 Working & 1 Standby) x 22.00 KW Secondary Chilled Water Pumps:		-
	Panel for Variable Speed Pumping System, complete with Master Controller with all required hardware and software, Variable Frequency Drives (3 x 22.00 KW), Miscellaneous all other items including but not limited to control wiring between the sensors, controller and variable frequency drives.		-
3.01	Panel for Variable Speed Pumping System - PUB-ACP-01C	SET	1.00
3.02	Differential Pressure Sensors/ Transmitters	SET	2.00
			-
4	Cooling Towers^^:		-
	FRP Induced draft cooling towers complete with FRP basin, casing, distribution system, fills, louvers, ladder, fan, motor (TEFC Squirrel Cage Induction, Insulation Class F, Efficiency Class IE2), supports for fan & motor, brass strainers, all accessories as per specifications and any other item required to make the system complete.		-

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	Note: The Motor shall be suitable for operation with Variable Frequency Drive. However, Variable Frequency Drive is not a part of this item.		-
4.01	**Duty: Condenser Water for Chillers**	**SET**	**4.00**
	Water Inlet/ Outlet Temp.: 97.50/90 Deg. F		-
	Design ambient wet bulb temperature: 83 Deg. F		-
	Water Flow Rate (Minimum) in USGPM: 1380		-
	No. of Fans x KW each: 2 x 3.70 (Eff. Class IE2)		-
	Type of Draft: Induced		-
	Power Supply: 415V, 3 Phase, 50 Hz		-
	Working + Standby: 3 + 1		-
	^^In addition to the above description refer Corrigendum No. 3 for modification/clarification		-
5	**Electrical Hot Water Generators:**		-
5.01	**SITC of Electrical Hot Water Generators of Capacities as specified below complete with mounting arrangement, all accessories as per specifications and any other item required to make the system complete. Units shall be suitable for 3 Phase Power Supply.**	**SET**	**3.00**
	Units shall be suitable for Indoor Installation (with IP-52 Degree of Protection)		-
	Units shall be with BMS Interfacing Module - Yes		-
	Units to be provided with BMS Module over LON works / Bacnet / Modbus / Open Protocol BMS System. The Units / Controllers with Proprietary Protocol shall not be acceptable.		-
	Capacity in KW: 360		-
	Hot water leaving temperature: 50 Deg. C		-
	Hot water entering temperature: 41.67 Deg. C		-
	Minimum No. of Steps = 6		-
	Power Supply: 415V + 10%, 50 Hz, 3 phase, AC		-
	Working + Standby: 3 + 0		-
			-
6	**Air Handling Units^^:**		-
	Air handling units complete with casing, sections & components as described below & in the specifications, vibration isolators, all accessories as per specifications and any other item required to make the system complete.		-
	Orientation / Mounting: Horizontal Floor Mounted		-
	Casing: Double Skin (Nominal Thickness of Panels 25 mm)		-
	Configuration: Draw Through		-
	Location: Indoor		-
	Units to be with Thermal Break Profile: No		-
	Filters: Pre - Filters (50 mm Thick), MERV-13 Fine Filters		-

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	Cooling Coil: Type - Chilled Water		-
	Supply Air Fan - Type: Centrifugal / Plug Type, Blades: Backward Curved, Belt Driven, Fan Motor: Single Speed, Fan Motor Power Supply: 3 - Phase		-
	Notes:		-
	All Motors shall be of high efficiency with Efficiency Class IE2		-
	The Motor shall be suitable for operation with Variable Frequency Drive. However, Variable Frequency Drive is not a part of this item.		-
	One Set of Commissioning Filters shall be supplied as spare and the units shall be dry run for 2 weeks for flushing before putting the AHUs to beneficial use.		-
	All Dampers shall be of Extruded Aluminium Construction with Aerofoil Double Skin Blades.		-
	The Units shall be provided with Ports for installation of Air Flow Switch for Fan Section & Dirty Filter Switch across the filters.		-
	SA Fan CFM x SA Fan Static Pressure mm WG x SA Fan Motor KW (Maximum) x Cooling Coil Rows Deep x TR		-
6.01	AHU - GU: 21150 x 65 x 11.00 x 6 x 40.00	SET	1.00
6.02	AHU - GL: 23100 x 65 x 11.00 x 6 x 42.00	SET	1.00
6.03	AHU - 1U: 12650 x 65 x 7.50 x 6 x 35.00	SET	1.00
6.04	AHU - 1L: 15950 x 65 x 7.50 x 6 x 31.00	SET	1.00
6.05	AHU - 2U: 15850 x 65 x 7.50 x 6 x 33.00	SET	1.00
6.06	AHU - 2L: 16600 x 65 x 7.50 x 6 x 33.00	SET	1.00
6.07	AHU - 3U: 15600 x 65 x 7.50 x 6 x 33.00	SET	1.00
6.08	AHU - 3L: 16400 x 65 x 7.50 x 6 x 33.00	SET	1.00
6.09	AHU - 4U: 16550 x 65 x 7.50 x 6 x 34.00	SET	1.00
6.10	AHU - 4L: 19300 x 65 x 11.00 x 6 x 38.00	SET	1.00
6.11	AHU - 5U: 16850 x 65 x 11.00 x 6 x 35.00	SET	1.00
6.12	AHU - 5L: 19700 x 65 x 11.00 x 6 x 39.00	SET	1.00
6.13	AHU - 6U: 16100 x 65 x 7.50 x 6 x 34.00	SET	1.00
6.14	AHU - 6L: 19500 x 65 x 11.00 x 6 x 39.00	SET	1.00
6.15	AHU - 7U: 15950 x 65 x 7.50 x 6 x 34.00	SET	1.00
6.16	AHU - 7L: 20250 x 65 x 11.00 x 6 x 40.00	SET	1.00
6.17	AHU - 8U: 17100 x 65 x 11.00 x 6 x 35.00	SET	1.00
6.18	AHU - 8L: 19050 x 65 x 11.00 x 6 x 38.00	SET	1.00
6.19	AHU - 9U: 17200 x 65 x 11.00 x 6 x 36.00	SET	1.00
6.20	AHU - 9L: 19950 x 65 x 11.00 x 6 x 39.00	SET	1.00
6.21	AHU - 10U: 15950 x 65 x 7.50 x 6 x 34.00	SET	1.00
6.22	AHU - 10L: 19450 x 65 x 11.00 x 6 x 39.00	SET	1.00
6.23	AHU - 11U: 16250 x 65 x 7.50 x 6 x 34.00	SET	1.00
6.24	AHU - 11L: 19550 x 65 x 11.00 x 6 x 39.00	SET	1.00

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6.25	AHU - 12U: 15600 x 65 x 7.50 x 6 x 33.00	SET	1.00
6.26	AHU - 12L: 17200 x 65 x 11.00 x 6 x 35.00	SET	1.00
6.27	AHU - 13U: 17250 x 65 x 11.00 x 6 x 36.00	SET	1.00
6.28	AHU - 13L: 19100 x 65 x 11.00 x 6 x 37.00	SET	1.00
6.29	AHU - 14U: 16200 x 65 x 7.50 x 6 x 33.00	SET	1.00
6.30	AHU - 14L: 17500 x 65 x 11.00 x 6 x 34.00	SET	1.00
6.31	AHU - 15U: 16600 x 65 x 7.50 x 6 x 35.00	SET	1.00
6.32	AHU - 15L: 18900 x 65 x 11.00 x 6 x 38.00	SET	1.00
6.33	AHU - 17U: 14250 x 65 x 7.50 x 6 x 29.00	SET	1.00
6.34	AHU - 17L: 14550 x 65 x 7.50 x 6 x 28.00	SET	1.00
6.35	AHU - 18U: 11850 x 65 x 7.50 x 6 x 26.00	SET	1.00
6.36	AHU - 18L: 8800 x 65 x 5.50 x 6 x 21.00	SET	1.00
7	Air Handling Units:^^		-
	Air handling units complete with casing, sections & components as described below & in the specifications, vibration isolators, all accessories as per specifications and any other item required to make the system complete.		-
	Orientation / Mounting: Horizontal Floor Mounted		-
	Casing: Double Skin (Nominal Thickness of Panels 25 mm)		-
	Configuration: Draw Through		-
	Location: Indoor		-
	Units to be with Thermal Break Profile: No		-
	Filters: Pre - Filters (50 mm Thick), MERV-13 Fine Filters		-
	Cooling Coil: Type - Direct Expansion Type - Four Circuits - Intertwined Type, suitable for connecting to VRV / VRF Type Condensing Units.		-
	Supply Air Fan - Type: Centrifugal / Plug Type, Blades: Backward Curved, Belt Driven, Fan Motor: Single Speed, Fan Motor Power Supply: 3 - Phase		-
	Notes:		-
	All Motors shall be of high efficiency with Efficiency Class IE2		-
	The Motor shall be suitable for operation with Variable Frequency Drive. However, Variable Frequency Drive is not a part of this item.		-
	One Set of Commissioning Filters shall be supplied as spare and the units shall be dry run for 2 weeks for flushing before putting the AHUs to beneficial use.		-
	All Dampers shall be of Extruded Aluminium Construction with Aerofoil Double Skin Blades.		-
	The Units shall be provided with Ports for installation of Air Flow Switch for Fan Section & Dirty Filter Switch across the filters.		-

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	SA Fan CFM x SA Fan Static Pressure mm WG x SA Fan Motor KW (Maximum) x Cooling Coil Rows Deep x TR		-
7.01	AHU - 16U: 12500 x 65 x 7.50 x 6 x 29.70	SET	1.00
7.02	AHU - 16L: 15150 x 65 x 7.50 x 6 x 33.00	SET	1.00
			-
8	AHU & VRV / VRF Outdoor Unit Integration Kit:^^		-
	The kit shall comprise of all items in required quantities to complete the system, as listed below, but not limited to the following:		-
	AHU Control Kit(s), AHU EEV (Electronic Expansion Valve) Kit(s), Thermistors for Pipes & Room (complete with field wiring), Dry Contact PCB(s), Capacity Setting PCB(s),Control Wiring between AHU Control Kit(s) and AHU EEV Kit(s), Power & Control Wiring between AHU Starter Panel(s); AHU Control Kit(s) & AHU EEV Kit(s), Interlocking (complete with wiring) of AHU starter(s) with Condensing Unit(s).		-
8.01	For Floor Mounted AHU 16U: 12500 CFM x 29.70 TR	SET	1.00
8.02	For Floor Mounted AHU 16L: 15150 CFM x 33.00 TR	SET	1.00
	^^In addition to the above description refer Corrigendum No. 3 for modification/clarification		-
			-
9	Floor Mounted Heat Recovery Air Handling Units for Fresh Air:		-
	Air handling units complete with casing, sections & components as described below & in the specifications, vibration isolators, all accessories as per specifications and any other item required to make the system complete.		-
	Orientation / Mounting: Double Tier Floor Mounted		-
	Casing: Double Skin (Thickness of Panels 50 mm)		-
	Configuration: Draw Through		-
	Location: Outdoor (Outdoor Units shall be complete with Canopy to make the units suitable for Outdoor Installation)		-
	Units to be with Thermal Break Profile: Yes		-
	Lower Tier - Fresh Air Section:		-
	Fresh Air Intake Box complete with Fresh Air Damper		-
	Filters: Pre - Filters (50 mm Thick), MERV-13 Fine Filters		-
	Common between Lower & Upper Tier: Heat Recovery Wheel with 3 Phase Motor: Minimum Efficiency 75% (Both Sensible and Latent), Type - Desiccant Based Heat Recovery Wheel		-
	Fresh Air Fan - Type: Centrifugal, Blades: Backward Curved, Belt Driven, Fan Motor: Single Speed, Fan Motor Power Supply: 3 - Phase		-
	Fan Outlet Dampers		-
	Upper Tier - Return / Exhaust Air Section:		-

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	Return Air Intake Box complete with Return Air Damper		-
	Filters: Pre - Filters (50 mm Thick)		-
	Return / Exhaust Air Fan - Type: Centrifugal, Blades: Backward Curved, Belt Driven, Fan Motor: Single Speed, Fan Motor Power Supply: 3 - Phase		-
	Fan Outlet Dampers		-
	Notes:		-
	All Motors shall be of high efficiency with Efficiency Class IE2		-
	The Motor shall be suitable for operation with Variable Frequency Drive. However, Variable Frequency Drive is not a part of this item.		-
	One Set of Commissioning Filters shall be supplied as spare and the units shall be dry run for 2 weeks for flushing before putting the AHUs to beneficial use.		-
	All Dampers shall be of Extruded Aluminium Construction with Aerofoil Double Skin Blades.		-
	The Units shall be provided with Ports for installation of Air Flow Switch for Fan Section & Dirty Filter Switch across the filters.		-
	RA Fan CFM x RA Fan Static Pressure mm WG x RA Fan Motor KW (Maximum) x SA Fan CFM x SA Fan Static Pressure mm WG x SA Fan Motor KW (Maximum) x Heat Recovery Wheel Motor KW (Maximum)		-
9.01	**Unit on Terrace for Upper Part: 7975 x 40 x 3.70 x 27375 x 65 x 15.00 x 1.50**	**SET**	**1.00**
9.02	**Unit on Terrace for Lower Part: 10500 x 40 x 3.70 x 25735 x 65 x 15.00 x 1.50**	**SET**	**1.00**
			-
10	**Variable Frequency Drives for Motors of Fans of Air Handling Units & Cooling Towers^^:**		-
	Variable Frequency Drives for the Fan Motors complete with all required hardware & software, as required for Fan speed Control. <u>The Drives shall be installed in the Electrical Panels detailed under Electrical Section.</u> VFDs shall be designed for HVAC application. The VFD shall be with in built PID Controller, control panel (Keypad & Display) and with IP 20 enclosure. The VFD shall not cause any derating of the connected motor and must ensure that class B temperature level of the connected motor is never exceeded.		-

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	The display of the VFD shall be in alpha - numeric characters and programming facility shall be in user friendly HVAC terminology. The VFDs shall have in built harmonic filters. The VFD shall be complete with suitable mounting arrangement for installation of its Control Panel (Keypad and Display) on the door of the switchboard and interconnecting wires shall also be included. Each VFD control panel shall display electrical parameters such as voltage, current, power consumption, speed etc.		-
10.01	For AHU Fan Motors: 11.00 KW	SET	18.00
			-
10.02	For AHU Fan Motors: 7.50 KW	SET	19.00
			-
10.03	For AHU Fan Motors: 5.50 KW	SET	1.00
			-
10.04	For Fresh Air AHU Supply Fan Motors: 15.00 KW	SET	2.00
			-
10.05	For Cooling Tower Fan Motors: 3.70 KW	SET	8.00
11	Variable Air Volume (VAV) Terminal Units:		-
	Single Duct, Pressure Independent Type Variable Air Volume (VAV) Terminal Units complete with Casing, Central Averaging Airflow Sensor, Control Damper, Modulating Actuator, Heating - Cooling Thermostat, Power & Control Box mounted on the casing of the unit, power & control wiring with conduiting between all the components including thermostat, all other accessories as per the specifications and as required to make the system complete.		-
	VAV Controller shall be able to accept Analogue Signal from CO2 Sensor. The Sensor shall not form part of this item but shall be supplied separately by the BMS Vendor.		-
	Unit shall be suitable for Single Point 230 V, Single Phase, 50 Hz Power Supply.		-
	The power supply to the units shall be through UPS.		-
	The Units shall be compatible with BMS.		-
	Required Air Flow in CFM:		-
11.01	50 to 500	EACH	59.00
11.02	525 to 1000	EACH	155.00
11.03	1025 to 1500	EACH	129.00
11.04	1520 to 2000	EACH	65.00
11.05	2001 to 2500	EACH	30.00
11.06	2501 to 3000	EACH	5.00
11.07	3001 to 3500	EACH	6.00
11.08	3501 to 4000	EACH	1.00
11.09	4001 to 4500	EACH	1.00
11.10	4501 to 5000	EACH	1.00

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11.11	Thermostats (Heating - Cooling, with On-Off Switch) for VAV Units Operating on Temperature Control, complete with Conduiting / Wiring from Thermostat to the VAV Unit.	SET	452.00
12	Integrator for Variable Air Volume (VAV) Terminal Units:^^	EACH	19.00
	VAV Integrator for complete integration of all the VAV Units with Building Management System over LON works / Bacnet / Modbus / Open Protocol BMS System. The Units / Controllers with Proprietary Protocol shall not be acceptable.		-
	The price shall be inclusive of the required Rigid / Flexible Conduiting, Copper Communication / Control Cabling between the Integrator to the VAV Units and from Integrator to the BMS, including Network Switches / Adaptors. The price shall include for any other item not specifically mentioned, but required to make the system complete.		-
	Each Integrator shall be suitable for a minimum of 64 VAV Units.		-
			-
13	Centrifugal Inline Fans, Single Phase Type:		-
	Centrifugal In line Fans complete with mounting arrangement, all accessories as per specifications and any other item required to make the system complete. Fans shall be suitable for Indoor / Outdoor Installation, as required by the duty conditions, shall be complete with Speed Regulator or Multi - Speed Motor & shall be suitable for 230V, 1 Phase, 50 Hz AC supply. Total Static Pressure of Fan shall be 20 mm WG or as required.		-
	CFM Range From - To x Motor KW x Actual CFM		-
13.01	401 to 600 x 0.26 x 500	SET	40.00
14	Centrifugal Air Separator:		-
14.01	Centrifugal Air Separator complete with strainer, air vent valve, blow down connection with valve, insulation, mounting arrangement, all accessories as per specifications and any other item required to make the system complete. Pressure Rating of the Unit shall not be less than 16 Bar.	SET	1.00
	Line Size: 400 mm NB		-
	Design Flow Rate: 2484 USGPM		-
	Efficiency: 90 -95%		-
15	Closed Expansion Tank:		-

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	Closed Expansion Tank complete with system connection with isolating valve, drain connection with drain valve, make up connection with isolating & check valves, gas charging tire valve, lifting rings, mounting legs, safety relief valve, pressure reducing valve, pressure gauge, insulation, mounting arrangement, all accessories as per specifications and any other item required to make the system complete. Volume of the tank shall be compatible with the system volume.		-
15.01	Location: Main AC Plant Room	SET	1.00
	Appx. System Volume (Liters) = 130000		-
	Minimum Water Temp. (Deg. F) = 40.00		-
	Maximum Water Temp. (Deg. F) = 120.00		-
	Static Pressure at Floor Level of the Plant Room (Building Height from Bottom of Plant Room to Top of the Highest Point of the system) Including 15% Safety Factor (feet) = 325		-
	Pressure to be maintained at the top of system (psig) = 7.50		-
	Primary Pump Head (feet) = 55.00		-
	Secondary Pump Head (feet) = 60.00		-
	System Pressure Rating = PN16		-
			-
16	Pressurization Unit:		-
16.01	Dual Pump Pressurization unit complete with mounting base frame, pressure switch, pressure gauge, isolating valves, check valves, Y-strainer, mounting arrangement, all accessories as per specifications and any other item required to make the system complete.	SET	1.00
	Location: Main AC Plant Room		-
			-
17	Axial Flow Fans - Non Fire Rated^^:		-
	AMCA Certified Axial Flow fan complete with mounting accessories, vibration isolators, all accessories as per specifications and any other item required to make the system complete. Fans shall be suitable for 415V, 3 Phase, 50 Hz AC power supply.		-
	Type: Normal		-
	Noise: Low (Fans shall be carefully selected for lowest possible noise level)		-
	Notes:		-
	Price shall include for Welded Mesh Protective Screen / Grille for Inlet Only of Exhaust Air Fans & Outlet Only for Fresh Air Fans.		-
	The Motor shall be suitable for operation with Variable Frequency Drive. However, Variable Frequency Drive is not a part of this item.		-

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			-
	Fan Speed / No. of Motor Poles shall be as per the manufacturer's selections subject to that the Motor KW & Noise Pressure Levels mentioned below are not exceeded.		-
	CFM x Static Pressure (mm WG) x Motor KW (Maximum) x Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions)		-
17.01	**Basement Parking Normal Duty Fresh Air Fans: 20750 x 20 x 5.50 x 74 - With Motors of Efficiency Class IE2**	**SET**	**4.00**
17.02	**Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.**	**EACH**	**8.00**
17.03	**Basement Parking Normal Duty Fresh Air Fans: 21750 x 20 x 7.50 x 77 - With Motors of Efficiency Class IE2**	**SET**	**2.00**
17.04	**Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.**	**EACH**	**4.00**
17.05	**Basement Parking Normal Duty Fresh Air Fans: 22250 x 20 x 7.50 x 77 - With Motors of Efficiency Class IE2**	**SET**	**2.00**
17.06	**Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.**	**EACH**	**4.00**
17.07	**Basement Parking Fire Duty Fresh Air Fans: 20750 x 15 x 5.50 x 74 - With Motors of Efficiency Class IE3**	**SET**	**4.00**
17.08	**Basement Parking Fire Duty Fresh Air Fans: 21750 x 15 x 5.50 x 74 - With Motors of Efficiency Class IE3**	**SET**	**2.00**
17.09	**Basement Parking Fire Duty Fresh Air Fans: 22250 x 15 x 5.50 x 74 - With Motors of Efficiency Class IE3**	**SET**	**2.00**
17.10	**AC Plant Room Ventilation Fresh Air Fans: 19500 x 30 x 7.50 x 77 - With Motors of Efficiency Class IE3**	**SET**	**1.00**

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17.11	SITC of Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.	EACH	2.00
17.12	Pump Room Ventilation Fresh Air Fans: 9000 x 30 x 3.70 x 74 - With Motors of Efficiency Class IE3	SET	1.00
17.13	Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.	EACH	2.00
17.14	LT Panel Room Ventilation Fresh Air Fans: 11500 x 30 x 5.50 x 77 - With Motors of Efficiency Class IE3	SET	1.00
17.15	Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.	EACH	2.00
17.16	15F Exit Access Corridor Fire Duty Fresh Air Fans: 3200 x 25 x 1.50 x 72 - With Motors of Efficiency Class IE3	SET	2.00
17.17	16F & 17F Exit Access Corridor Fire Duty Fresh Air Fans: 2600 x 25 x 1.10 x 74 - With Motors of Efficiency Class IE3	SET	2.00
17.18	16F & 17F Exit Access Corridor Fire Duty Fresh Air Fans: 2500 x 25 x 1.10 x 74 - With Motors of Efficiency Class IE3	SET	2.00
17.19	18F Exit Access Corridor Fire Duty Fresh Air Fans: 3700 x 25 x 1.50 x 70 - With Motors of Efficiency Class IE3	SET	2.00
			-
	For Following Fans, Fan Speed / No. of Motor Poles shall be as per the manufacturer's selections subject to that the Motor KW & Maximum Motor Speed mentioned below are not exceeded.		-
	CFM x Static Pressure (mm WG) x Motor KW (Maximum) x Maximum Fan Speed RPM		-
17.20	Basement Staircase & Lift Lobby Pressurization Fans: 8500 x 35 x 3.70 x 3000 - With Motors of Efficiency Class IE3	SET	11.00
17.21	Basement Staircase & Lift Lobby Pressurization Fans: 9000 x 35 x 3.70 x 3000 - With Motors of Efficiency Class IE3	SET	5.00
17.22	Terrace Staircase Pressurization Fans: 33000 x 35 x 18.50 x 1500 - With Motors of Efficiency Class IE3	SET	1.00
17.23	Terrace Staircase Pressurization Fans: 34500 x 35 x 18.50 x 1500 - With Motors of Efficiency Class IE3	SET	1.00

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17.24	Terrace Staircase Pressurization Fans: 34000 x 35 x 18.50 x 1500 - With Motors of Efficiency Class IE3	SET	1.00
17.25	Terrace Lift Well Pressurization Fans: 25500 x 35 x 11.00 x 1500 - With Motors of Efficiency Class IE3	SET	2.00
18	Axial Flow Fans - Fire Rated^^:		-
	AMCA Certified Axial Flow fan complete with mounting accessories, vibration isolators, all accessories as per specifications and any other item required to make the system complete. Fans shall be suitable for 415V, 3 Phase, 50 Hz AC power supply.		-
	Type: Smoke Exhaust (Fire Rated for 250 Deg. C for 2 hours)		-
	Noise: Low (Fans shall be carefully selected for lowest possible noise level)		-
	Notes:		-
	All Motors shall be of high Temperature Class H for Fire Rated Fans		-
	Price shall include for Welded Mesh Protective Screen / Grille for Inlet Only of Exhaust Air Fans & Outlet Only for Fresh Air Fans.		-
	The Motor shall be suitable for operation with Variable Frequency Drive. However, Variable Frequency Drive is not a part of this item.		-
			-
	Fan Speed / No. of Motor Poles shall be as per the manufacturer's selections subject to that the Motor KW & Noise Pressure Levels mentioned below are not exceeded.		-
	CFM x Static Pressure (mm WG) x Motor KW (Maximum) x Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions)		-
18.01	Basement Parking Normal Duty Exhaust Air Fans: 18500 x 20 x 5.50 x 77 - With Motors of Efficiency Class IE2	SET	4.00
18.02	Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.	EACH	8.00
18.03	Basement Parking Normal Duty Exhaust Air Fans: 20750 x 20 x 5.50 x 74 - With Motors of Efficiency Class IE2	SET	4.00

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18.04	Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.	EACH	8.00
18.05	Basement Parking Normal Duty Exhaust Air Fans: 21750 x 20 x 7.50 x 77 - With Motors of Efficiency Class IE2	SET	2.00
18.06	Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.	EACH	4.00
18.07	Basement Parking Normal Duty Exhaust Air Fans: 22000 x 20 x 7.50 x 77 - With Motors of Efficiency Class IE2	SET	2.00
18.08	Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.	EACH	4.00
18.09	Basement Parking Normal Duty Exhaust Air Fans: 22250 x 20 x 7.50 x 77 - With Motors of Efficiency Class IE2	SET	4.00
18.10	Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.	EACH	4.00
18.11	Basement Parking Normal Duty Exhaust Air Fans: 23000 x 20 x 7.50 x 77 - With Motors of Efficiency Class IE2	SET	2.00
18.12	Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.	EACH	4.00
18.13	Basement Parking Fire Duty Exhaust Air Fans: 18500 x 15 x 5.50 x 76 - With Motors of Efficiency Class IE3	SET	4.00
18.14	Basement Parking Fire Duty Exhaust Air Fans: 20750 x 15 x 5.50 x 74 - With Motors of Efficiency Class IE3	SET	4.00
18.15	Basement Parking Fire Duty Exhaust Air Fans: 21750 x 15 x 5.50 x 74 - With Motors of Efficiency Class IE3	SET	2.00
18.16	Basement Parking Fire Duty Exhaust Air Fans: 22000 x 15 x 5.50 x 74 - With Motors of Efficiency Class IE3	SET	2.00

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18.17	Basement Parking Fire Duty Exhaust Air Fans: 22250 x 15 x 5.50 x 74 - With Motors of Efficiency Class IE3	SET	4.00
18.18	Basement Parking Fire Duty Exhaust Air Fans: 23000 x 15 x 7.50 x 71 - With Motors of Efficiency Class IE3	SET	2.00
18.19	AC Plant Room Ventilation Exhaust Air Fans: 19500 x 30 x 7.50 x 77 - With Motors of Efficiency Class IE3	SET	1.00
18.20	Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.	EACH	2.00
18.21	Pump Room Ventilation Exhaust Air Fans: 9000 x 30 x 3.70 x 74 - With Motors of Efficiency Class IE3	SET	1.00
18.22	Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.	EACH	2.00
18.23	LT Panel Room Ventilation Exhaust Air Fans: 11500 x 30 x 5.50 x 77 - With Motors of Efficiency Class IE3	SET	1.00
18.24	SITC of Sound Attenuators at Inlet & Outlet of above Fans to reduce the Noise Level to 65 dBA (Maximum Noise Pressure Level @ 3 m distance (Hemispherical Propagation in Reverberant Room Conditions- Both Ends of Fans) complete with all accessories & finishes as per specifications and any other item required to make the system complete.	EACH	2.00
18.25	15F Exit Access Corridor Fire Duty Exhaust Air Fans: 3200 x 25 x 1.50 x 72 - With Motors of Efficiency Class IE3	SET	2.00
18.26	16F & 17F Exit Access Corridor Fire Duty Exhaust Air Fans: 2500 x 25 x 1.10 x 74 - With Motors of Efficiency Class IE3	SET	2.00
18.27	16F & 17F Exit Access Corridor Fire Duty Exhaust Air Fans: 2600 x 25 x 1.10 x 74 - With Motors of Efficiency Class IE3	SET	2.00
18.28	18F Exit Access Corridor Fire Duty Exhaust Air Fans: 3700 x 25 x 1.50 x 70 - With Motors of Efficiency Class IE3	SET	2.00
	^^In addition to the above description refer Corrigendum No. 3 for modification/clarification		-
19	Variable Frequency Drives for Motors of Normal Duty Supply & Exhaust Axial Fans for Basement Parking Ventilation:		-

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	Variable Frequency Drives for the Fan Motors complete with all required hardware & software, as required for Fan speed Control. The Drives shall be installed in the Electrical Panels detailed under Electrical Section. VFDs shall be designed for HVAC application. The VFD shall be with in built PID Controller, control panel (Keypad & Display) and with IP 20 enclosure. The VFD shall not cause any derating of the connected motor and must ensure that class B temperature level of the connected motor is never exceeded.		-
	The display of the VFD shall be in alpha - numeric characters and programming facility shall be in user friendly HVAC terminology. The VFDs shall have in built harmonic filters. The VFD shall be complete with suitable mounting arrangement for installation of its Control Panel (Keypad and Display) on the door of the switchboard and interconnecting wires shall also be included. Each VFD control panel shall display electrical parameters such as voltage, current, power consumption, speed etc.		-
19.01	For Axial Fan Motors: 7.50 KW	SET	14.00
19.02	For Axial Fan Motors: 5.50 KW	SET	10.00
20	Jet Fans (Fire Rated):		-
	Dual Speed, Dual Purpose, rated for 300 Deg. C for 2 hours Jet Fans complete with Impeller, Casing, Silencers, Inlet / Outlet Cones, Motor, Mounting Brackets, Terminal Box etc. complete with mounting accessories, vibration isolators, all accessories as per specifications and any other item required to make the system complete. Fans shall be suitable for 415V, 3 Phase, 50 Hz AC power supply. They shall carry a warranty of 36 months from the date of commissioning		-
	Direction: Unidirectional		-
	Note: The Actual Quantities shall be worked out based on the CFD Analysis to be carried out by the HVAC Contractor. The Estimated Quantities are based on Coverage Area Per Jet Fan = 20 Sqm Area x Low Speed Thrust		-
	Fan Shape x Impeller Dia mm x Thrust N High Speed x Thrust N Low Speed x CFM High Speed x CFM Low Speed x Motor KW High Speed x Motor KW Low Speed x Nominal RPM High Speed x Nominal RPM Low Speed		-
20.01	Circular x 400 x 85 x 21 (Minimum) x 6560 x 3280 x 2.40 x 0.48 x 3000 x 1500	SET	52.00
21	Carbon Mono-oxide Sensors		-
21.01	Ceiling mounted CO sensors compatible with PLC for Jet Fan Control	EACH	52.00
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22	VRV / VRF Equipment:		-
	VRV / VRF Equipment suitable for R-410 Refrigerant:		-
	Variable Refrigerant Volume / Flow System comprising of the following items:		-
22.01	VRV / VRF Outdoor Condensing Units:		-
	Fully factory assembled, wired and tested Heat Pump Type Outdoor Condensing Units as per specifications and complete with all accessories as required to make the system complete.		-
	Nominal Capacity in HP as stated below:		-
22.01.1	38	EACH	2.00
22.01.2	20	EACH	2.00
22.01.3	18	EACH	2.00
22.02	Indoor Fan Coil Units:		-
	Fully factory assembled, wired and tested Indoor Units as per specifications and as required to make the system complete.		-
	High Wall Mounted Type		-
	Nominal Capacity in HP x CFM		-
	2.50 HP x 671 CFM	EACH	38.00
			-
22.03	Remote Controls & Signal Receiving Units with wiring for Indoor Fan Coil Units		-
	Corded Remote Controls	EACH	38.00
22.04	Y Joints:		-
	Refrigerant Piping Y-Joints or Headers as required to connect the above outdoor units and indoor units	LOT	1.00
22.05	Central Control Console:		-
	Central Control Console for the control and monitoring of all of the above equipment complete with necessary hardware and software as required. The control unit shall be with display screen, scheduling facility, fault diagnostic facility, touch screen / push button human interface, built in Ethernet port for connecting to internet or intranet etc.		-
	Central Controller(s) shall be provided with RS485 Modbus / Bacnet / Open Protocol BMS Module for communication to BMS as per Data Point Schedule.		-
22.06	Central Controller for AHUs & VRV Outdoor Units for 16th Floor	SET	1.00
22.07	Central Controller for VRV Indoor Units & VRV Outdoor Units for Hub Rooms	SET	1.00
			-
23	Fire & Smoke Dampers:		-

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23.01	Motorized Fire & Smoke Dampers of 1.5 hour fire rating complete with casing, blades, linkages, retaining angle iron frame work on both ends, fittings, supports, 400 mm long sleeve, all accessories as per specifications and any other item required to make the system complete.	SQM	113.00
23.02	Control Panels for above Fire & Smoke Dampers complete with on-off-reset operation switch/push buttons, indication lamps, Power/Control Cabling/Wiring & Earthing, all accessories as per specifications and any other item required to make the system complete. Rates shall include wiring/earthing between the power supply source & actuator & control panel & fire damper. Panel shall be suitable for 230 V, 1 Phase, 50 Hz AC Power supply.	SET	160.00
23.03	Spring Return Actuators and Electronic Temperature Sensor (for sensing the temperature inside the duct) for above Fire & Smoke Dampers complete with linkages, mounting arrangement, supports, Power/Control Cabling/Wiring & Earthing, all accessories as per specifications and any other item required to make the system complete. The actuator shall be suitable for damper area of up to 2.4 Sqm.	SET	160.00
			-
24	Manual Volume Control Duct Dampers:		-
24.01	18 G GI Flanged Frame / 20 G GI blades type Volume Control Duct Dampers complete with linkages, levers, fittings, supports, all accessories as per specifications and any other item required to make the system complete.	SQM	135.41
			-
25	Non Return Dampers:		-
25.01	SITC of 16 G GI Frame / 22 G GI blades type Non Return Type Gravity Duct Dampers complete with linkages, levers, fittings, supports, all accessories as per specifications and any other item required to make the system complete.	SQM	71.00
			-
	Valves & Accessories:		-
	Valves/ Strainers/ Pipe Flexible Connectors/ Gauges / Thermometers etc. complete with fittings/flanges, nuts, bolts, gasket, supports, all accessories as per specifications and any other item required to make the system complete.		-
26	Wafer Type Butterfly Valves - Cast Iron Body, SG Iron Epoxy Coated Disc, Replaceable Seat, Stainless Steel Shaft, Gear Unit Operated, Minimum PN-16 rated - Nominal Diameters in mm as indicated below:		-
155.01	400	EACH	9.00
155.02	300	EACH	19.00
155.03	250	EACH	28.00

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155.04	200	EACH	14.00
			-
27	Wafer Type Butterfly Valves - Cast Iron Body, SG Iron Epoxy Coated Disc, Replaceable Seat, Stainless Steel Shaft, Manual Lever Operated, Minimum PN-16 rated - Nominal Diameters in mm as indicated below:		-
27.01	80	EACH	62.00
27.02	65	EACH	10.00
			-
28	Cast Iron Body Flanged Balancing Valves - Non Rising Stainless Steel Spindle, Cast Iron / Poly amide Digital Hand Wheel, with drain cock, stainless steel disc with EPDM seal, with pressure test cocks, Minimum PN-16 rated - Nominal Diameters in mm as indicated below:		-
28.01	400	EACH	1.00
28.02	300	EACH	4.00
28.03	250	EACH	7.00
28.04	200	EACH	8.00
			-
29	Wafer Type Dual Plate Check Valves - Cast Iron Body, Stainless Steel Plates & Springs, Minimum PN-16 rated - Nominal Diameters in mm as indicated below:		-
29.01	300	EACH	4.00
29.02	250	EACH	7.00
			-
30	Gun Metal Body Gate Valves - as per IS778 Class 2, Integral Seat, Solid Wedge, Copper Alloy Trim, 21 Kg/Sqcm (Body) & 16 Kg/Sqcm (seat) Hydraulic Pressures, Screwed in bonnet, Inside screw, Non-rising stem - Nominal Diameters in mm as indicated below:		-
30.01	50	EACH	12.00
30.02	32	EACH	4.00
30.03	25	EACH	118.00
			-
31	Mild Steel Body Flanged Y-Strainers - Permanent Magnet Type, Minimum PN-16 rated, Perforated stainless steel grade 304, minimum 1.2 mm thick Screen / Basket - Nominal Diameters in mm as indicated below:		-
31.01	300	EACH	4.00
31.02	250	EACH	7.00
31.03	80	EACH	31.00
31.04	65	EACH	5.00
			-

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32	Neoprene Rubber Type Flexible Pipe Connections with Metal Retaining Rings and Control Rods, Minimum PN-16 rated - Nominal Diameters in mm as indicated below:		-
32.01	300	EACH	16.00
32.02	250	EACH	24.00
			-
33	Pressure Gauges:		-
	Industrial Type 100 mm Dial Pressure Gauges complete with syphons, gauge cocks, fittings, all accessories as per specifications and any other item required to make the system complete.	EACH	116.00
			-
34	Thermometers:		-
	Industrial Stem Type (150 mm Length) Thermometers complete with thermo wells, fittings, all accessories as per specifications and any other item required to make the system complete.	EACH	94.00
			-
35	Brass Body Auto Air Vent Valves:		-
	SITC of Auto Air Vent Valves complete with nipples, sockets, fittings, all accessories as per specifications and any other item required to make the system complete - Nominal Diameters in mm as indicated below:		-
	10	EACH	118.00
			-
36	HVAC Electrical Control Panels:		-
	HVAC Electrical Control Panels complete with all components, powiring, starters, all accessories as per specifications & schedule of electrical panels including any other item required to make the system complete.		-
	Description of Panels is given in Particular Technical Specifications - Schedule of HVAC Electrical Panels		-
36.01	Main AC Plant Room Panel - PUB-ACP-01	SET	1.00
36.02	Starter Panel for AHU Fan (11.00 KW)	SET	18.00
36.03	Starter Panel for AHU Fan (7.50 KW)	SET	19.00
36.04	Starter Panel for AHU Fan (5.50 KW)	SET	1.00
36.05	Panel for 2 Nos. Heat Recovery AHUs at Terrace	SET	1.00
36.06	Panel (22.00 KW) for Basement Parking Ventilation Axial Flow Fans (4 x 5.50 KW)	SET	5.00
36.07	Panel (26.00 KW) for Basement Parking Ventilation Axial Flow Fans (2 x 7.50 KW & 2 x 5.50 KW)	SET	6.00
36.08	Panel (30.00 KW) for Basement Parking Ventilation Axial Flow Fans (4 x 7.50 KW)	SET	1.00
36.09	Panel (16.80 KW) for Dual Speed Jet Fans (7 x 2.40 KW)	SET	5.00
36.10	Panel (14.40 KW) for Dual Speed Jet Fans (6 x 2.40 KW)	SET	2.00

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36.11	Panel (12.00 KW) for Dual Speed Jet Fans (5 x 2.40 KW)	SET	1.00
36.12	Unitary Panels for Axial Flow Fan (7.50 KW)	SET	2.00
36.13	Unitary Panels for Axial Flow Fan (5.50 KW)	SET	2.00
36.14	Unitary Panels for Axial Flow Fan (3.70 KW)	SET	18.00
36.15	Unitary Panels for Axial Flow Fan (1.50 KW)	SET	8.00
36.16	Unitary Panels for Axial Flow Fan (1.10 KW)	SET	8.00
36.17	Panel for 2 Nos. 18.50 KW Pressurization Axial Flow Fans at Terrace	SET	1.00
36.18	Unitary Panel for 1 Nos. 18.50 KW Pressurization Axial Flow Fans at Terrace	SET	2.00
36.19	Panel for 2 Nos. 11.00 KW Pressurization Axial Flow Fans at Terrace	SET	1.00
36.20	Panel for 2 Nos. 38.00 HP VRV Outdoor Units at Terrace	SET	1.00
36.21	Panel for 2 Nos. 20.00 HP & 2 Nos. 18.00 HP VRV Outdoor Units at Terrace	SET	1.00
			-
37	Pressure Independent Dynamic Balancing & Two way Modulating Valves (Complete With Actuator as per specifications) for Flow Limiting & Control for Variable Flow Application, having constructional details given in the General Technical Specifications, PN 16 Rating, with Diaphragm type Differential Pressure Regulator & Modulating Control Unit in single casing, complete with all accessories as required to make the system complete.		-
	Nominal Diameter in mm x Nominal Flow Rate USGPM x Setting Range as % of Nominal Flow Rate x Differential Pressure (Kpa) at Nominal Flow Rate		-
37.01	80 mm x 125 USGPM x 40-100% x 30 Kpa	SET	31.00
37.02	65 mm x 90 USGPM x 40-100% x 30 Kpa	SET	5.00
			-
38	Proportional / Modulating Thermostats - suitable for above Pressure Independent Dynamic Balancing & Two way Modulating Valves:		-
	Room Wall Mounted Proportional Electronic Thermostat suitable for 24 V or 230 V AC power supply with Temperature Set Point Adjuster, suitable for giving output of 0 to 10 V DC or 4 to 20 mA as required by actuator being controlled (3 point output is not acceptable), with in built temperature sensor, with provision to accept signal from remote mounted temperature sensor, heat - cool switch mounted on the fascia of thermostat for summer winter changeover complete in all respects as per specifications and any other item required to make the system complete.		-

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	Proportional / Modulating Thermostats shall be complete with Digital Display (LCD) of Actual Temperature / Set Point Temperature & Other Parameters.		-
	Proportional / Modulating Thermostats shall be complete with Fan 3 Speed Control Option.		-
	Proportional / Modulating Thermostats shall be complete with RS485 Communication Port.		-
38.01	Cooling OR Heating application - 2 Pipe System (with heat - cool switch) and with remote temperature sensor.	EACH	38.00
39	Two way Motorized On - Off Type Butterfly Valves:		-
	Two way Motorized On-Off Type Butterfly Valves complete with linkage and motorized on-off actuator complete in all respects as per specifications and any other item required to make the system complete. Valves shall be of PN16 rating. (Nominal Dia in mm as indicated below):		-
	Outlets of Condensers & Evaporators of Chillers and Inlets of Cooling Towers		-
39.01	300	EACH	8.00
39.02	250	EACH	4.00
			-
40	Central Equipment:		-
40.01	Desk Top Personal Computer with Intel i7 Processor, 3.4 GHz or better, Original Intel Motherboard, 4 GB RAM, 52 X DVD Writer with ROM, Minimum 1 TB Hard Disk, Minimum 2 serial; 1 parallel & 3 USB Ports on front of CPU, Original Windows Operating System (7 Pro or Higher) & MS Office Package, 21 Inch LED Colour Monitor, Wireless Mouse, & Wireless Key Board	SET	1.00
40.01	Desk Top B&W Laser Printer A-4 Size	EACH	1.00
40.02	1 KVA Online UPS for above Computer & Printer with minimum 20 minutes power back up	EACH	1.00
40.03	DDC Control Panels (As per Detailed Input / Output Data Point Summary) complete with Data Gathering Equipment, Powder Coated Sheet Enclosures (as per specifications of Panels given under Electrical Works Section), UL/CE Listed Standalone DDC Controllers as per Data Point Schedule, Input/output Relays as required, Power Supply Modules with necessary Step Down Transformers, Controllers to be with inbuilt real time clock & peer to peer communication capability & with 32 bit processors etc. complete in all respects as required to make the system complete. The panels shall be suitable for 230 V, Single Phase, 50 Hz Power Supply. The internal wiring shall be suitably segregated as per their voltages to avoid any signal interference.	LOT	1.00

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40.04	Hand Held Portable Terminal for above DDC Controllers	EACH	1.00
40.05	Network Control Units with connectivity to the DDC Controllers	LOT	1.00
40.06	Software & 3rd Party integration Hardware:		-
40.06.1	Colour Graphic BMS Software for Control & Monitoring of the BMS System, operating on Windows platform	LOT	1.00
40.06.2	Hardware & Software for the interface of the above systems and Third Party System Integration (As per Data Point Schedule) including providing of necessary adaptors / integrator / modules.	LOT	1.00
			-
41	Peripherals:		-
41.01	Water Duty Immersion type temperature sensors with thermowells for measuring Chilled water & condenser water supply and return temperature (Range 32-160 deg. F)	EACH	8.00
41.02	Low Water Level Switch with IP-65 Housing for indicating Water level in Cooling towers, sumps and tanks.	EACH	4.00
41.03	Differential Pressure Type Air Flow Switch across the fans of Air Handling Units for Fan's Air Flow Status	EACH	42.00
41.04	Air Duty Duct Mounted Air Pressure Sensor Cum Transmitter (As required by the duty) (Range 0 - 60 mm WG)	EACH	40.00
41.05	Differential Pressure Type Dirty Filter Switch across the Air Handling Unit filters, for indicating the filter status.	EACH	42.00
41.06	Air Duty Temperature Sensor - Duct / Wall Mounted (As required by the duty) (Range 40 - 150 deg. F)	EACH	38.00
41.07	Air Duty RH Sensor - Duct / Wall Mounted (As required by the duty) for measuring Supply / Return air RH	EACH	38.00
41.08	Air Duty CO2 Sensor - Duct / Wall Mounted (As required by the duty) for measuring Return Air CO2 Level	EACH	38.00
41.09	Water Duty Pressure Sensors (Transmitters if required), for measuring pressure (0 to 10 Kg / Sqcm)	EACH	1.00
41.10	Ambient Temperature cum Humidity sensors with IP-65 Housing for measuring outside air temperature and humidity (Range 35-130 deg. F)	EACH	1.00
41.11	Tank Water Level Sensor (cum Transmitters if required).	EACH	11.00
41.12	Water Duty Insertion Type Electro Magnetic Flow Meter Sensor (cum Transmitters if required).	EACH	2.00
			-
Precision AC			-
42	Precision AC Units for Data Centre, as per drawing and as per the satisfaction of Engineer in charge:^^		-

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	Precision Close Control AC Units complete with indoor unit, outdoor unit, refrigerant piping between indoor & outdoor units, controls, control wiring between indoor and outdoor units, control wiring between the indoor units, all accessories as per specifications and any other item required to make the system complete.		-
	The units shall be microprocessor based precision air-conditioning units, with reheat & humidifier for RH control and shall be complete with Fine Filters and Carbon Filters in the Indoor Units.		-
	Outdoor unit shall be suitable for operation up to 45 degree C ambient.		-
	Indoor conditions to be maintained are 22 +/- 2 degree C Dry Bulb Temperature & 50% +/- 5% RH.		-
	The unit shall be suitable for single point power supply at the isolator of the indoor unit. The power for the outdoor unit shall be drawn from the indoor unit.		-
	The unit shall be suitable for 415 V, 3 Phase, 50 Hz AC Power supply.		-
	MS Angle Iron Stands for mounting the outdoor units & indoor units		-
42.01	**Actual Refrigeration Cooling Capacity (at operating conditions of 22 Deg. C Indoor DBT, 50% Indoor RH & 43.33 Deg. C Ambient Dry Bulb Temperature) direct expansion type units with air cooled condensers, with minimum 4 row deep cooling coil**	**TR**	**40.00**
			-

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