TENDER
FOR
OPERATION AND MAINTENANCE
OF
AC EQUIPMENTS AND ACCESSORIES

TENDER NO.
IPR/ST/TN-OMC/001/16-17
19th May, 2016

प्लाज़्मा अनुसंधान संस्थान

INSTITUTE FOR PLASMA RESEARCH

भाट, निकट इन्दिरा पुल, गांधीनगर - ३८२ ४२८ (भारत)

Bhat, Near Indira Bridge, Gandhinagar 382 428, Gujarat (India)

TELEPHONE : (079) 2396-2260; 2262, 2263 FAX : (079) 2396-2277

STORES E-mail : stores@ipr.res.in

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DETAILED TENDER NOTICE No.IPR/ST/TN-OMC/01/16-17 dated 19.05.2016

Sealed Tenders are invited in TWO PARTS from reputed manufacturers or their authorised service providers for providing Comprehensive Operation and Maintenance of AC Equipments and Accessories such as AC plants upto 375 TR, Chiller Package Units upto 15 TR, Air cooled Package units upto 40 TR, Dx -type Air Conditioning Unit upto 34 TR, Ductable Split units upto 8.5 TR, Air Washer Unit upto 40000 CFM, Ventilation Systems of different capacities, Kitchen exhaust upto 15000 CFM, RF Cooling systems of different capacities, D.M. Water Plants upto 6 CMPH and Soft Water Plant for cooling towers upto 30 CMPH at IPR, FCIPT and IPR-Extension Lab for a period of three years.

Eligibility criteria for the issue of the Tender document are as under: -

a) Manufacturers of the Semi hermetic screw compressors or their authorised service providers for providing Annual Operation and Maintenance for central AC plants / manufacturers of Open type reciprocating compressors or their authorised service providers for providing Operation and Maintenance for central AC plants.
b) Should have well established servicing facility in Ahmedabad / Gandhinagar.
c) Experience of successfully carried out similar kind of Central Air Conditioning Annual Operation and Maintenance works within the last three years ending 31-03-2016, shall be of Minimum value as under :
at least One Annual Operation and Maintenance Work of minimum value of ₹48 lakhs/per year **OR**
at least Two Annual Operation and Maintenance Work of minimum value of ₹36 lakhs each /per year **OR**
at least Three Annual Operation and Maintenance Work of minimum value of ₹24 lakhs each/per year.
d) Should have valid bank solvency of minimum Rs. 22 Lakhs.
e) Should have minimum of five years of experience in Central Air Conditioning AMC business as on 31-03-2016.
f) Annual Turnover (gross) in AMC Works computed, as average of the last three years i.e. 2012-13, 2013-14, 2014-15 duly audited by Chartered Accountant should be over Rs. 1 Crore, each year. Vendor will have to submit Audited Balance Sheet in support.
g) The firm should have been a profit-making organisation for any two years ending 31-03-2013 (FY 2012 -13), 31-03-2014 (FY 2013-14) and 31-03-2015 (FY 2014-15).

Tender No. and date	Tender Fee in Rs.	EMD in Rs.	Date for		Date / Time of Opening of Technical Bid
			Receiving Request and Issue of Tender Document upto	Tender Due Date / Time	
IPR/ST/TN-OMC/01/16-17 dated 19.05.2016	1000.00	1,85,850.00	25.05.2016	22.06.2016 13.00 Hrs.	22.06.2016 14.30 Hrs.

For the purpose "Cost of AMC Work" shall mean gross value of the complete operation & maintenance works including the cost of consumable materials supplied by the contractor, but excluding those supplied free of cost. For the purpose of clause "Similar Works" means operation & maintenance Works of central Air Conditioning Plants comprising of operation of the AC plants by the qualified operators and preventive & breakdown maintenance of water cooled Screw Chillers, AHUs, Pumps, Piping Works, ducting work etc. Documentary evidence for each similar work should contain performance certificate from client clearly indicating full details of nature of work, work order no. and date, client address, value of work as per work order and as per actual carried out, period of AMC work as per work order and as per actual.

Vendor who meet the Eligibility criteria as specified above at (a) to (g), may arrange to collect the tender documents from the Stores Officer-I by 25.05.2016 with a written request and documentary evidence/supporting proof and tender fee of Rs. 1000/- (Non refundable) by Demand Draft/Pay Order/Banker's Cheque in favour of "Institute for Plasma Research" payable at Ahmedabad. Issue of Tender Documents does not mean that vendor is prequalified.

Sealed Envelope, superscribing Tender No. Date, Due date and Brief Description of tendered item, containing both Part – A and Part – B (both in separate envelopes) and putting them in single envelope subscribing on the envelope "TECHNICAL BID AND COMMERCIAL BID FOR OPERATION AND MAINTENANCE OF AC EQUIPMENTS AND ACCESSORIES" along with Tender Fee and EMD, should be submitted to the Stores Officer – I at the above address by **13 hrs. on 22.06.2016**. Part – A shall be opened on the same day at **14.30 hrs** in the presence of attending tenderers or their authorized representatives (carrying authority letter).

Tender received without Tender Fee, EMD & Proof against eligibility criteria will be rejected.

Those who have submitted the tender and want to attend the tender opening event must carry authorization letter for permitting him/her to attend the tender opening event. Without such letter he/she or representative will not be allowed to attend the Tender Opening Event. Only one representative will be allowed to attend Tender Opening event.

The Director, IPR reserves the right to accept or reject the tenders in full or part thereof without assigning any reasons. Tender Notice and Tender Document can be viewed and downloaded from our website http://ipr.res.in/documents/tenders.html

PART-A(I)

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TENDER NOTICE No. IPR/ST/TN-OMC/01/16-17 DATED 19.05.2016
(TWO PART)

GENERAL CONDITIONS

NOTE: THIS IS A TWO PART TENDER. KINDLY SUBMIT TECHNICAL BID & TERMS AND CONDITIONS (PART-A{I} & PART-A{II}) AND PRICE BID (PART-B) SEPARATELY IN TWO ENVELOPES AND PUTTING THEM IN ONE SINGLE ENVELOPE SUPERSCRIBING THE ENVELOPE "TECHNICAL BID AND COMMERCIAL BID FOR OPERATION AND MAINTENANCE OF AC PLANTS AND ACCESSORIES".

NOTE:

1. Full details and specifications of the items and general instructions to be followed regarding submission of tenders are indicated in the tender documents.

2. **Proof for fulfillment of eligibility criteria mentioned hereunder should be submitted along with the tender. Kindly submit all the documentary proof with serial number of our eligibility criteria. If the tender is submitted without valid documents, we shall not consider your offer. Quotations received without proof of eligibility criteria, Tender Fee and EMD will be rejected.**

   Eligibility criteria for the issue of the Tender document are as under: -

   a) Manufacturers of the Semi hermetic screw compressors or their authorised service providers for providing Annual Operation and Maintenance for central AC plants / manufacturers of Open type reciprocating compressors or their authorised service providers for providing Operation and Maintenance for central AC plants.
   b) Should have well established servicing facility in Ahmedabad / Gandhinagar.
   c) Experience of successfully carried out similar kind of Central Air Conditioning Annual Operation and Maintenance works within the last three years ending 31-03-2016, shall be of Minimum value as under :
      at least One Annual Operation and Maintenance Work of minimum value of ₹48 lakhs/per year **OR**
      at least Two Annual Operation and Maintenance Work of minimum value of ₹36 lakhs each /per year **OR**
      at least Three Annual Operation and Maintenance Work of minimum value of ₹24 lakhs each/per year.
   d) Should have valid minimum bank solvency of minimum Rs. 22 Lakhs.

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e) Should have minimum of five years of experience in Central Air Conditioning AMC business as on 31-03-2016.
f) Annual Turnover (gross) in AMC Works computed, as average of the last three years i.e. 2012-13, 2013-14, 2014-15 duly audited by Chartered Accountant should be over Rs. 1 Crore, each year. Vendor will have to submit Audited Balance Sheet in support.
g) The firm should have been a profit-making organisation for any two years ending 31-03-2013 (FY 2012 -13), 31-03-2014 (FY 2013-14) and 31-03-2015 (FY 2014-15).

3. Tender documents can also be obtained by submitting a written request alongwith Tender Fees to the Stores Officer-1. Last date for issue of Tender documents is 25.05.2016.

4. While requesting for Tender Documents, such request shall indicate the **"REQUEST FOR TENDER DOCUMENTS AGAINST TENDER NOTICE No. IPR/ST/TN-OMC/01/16-17 DATED 19.05.2016.**

5. Request for the extension of due date will not be considered.

6. Late/Delayed offers will not be accepted.

7. **Quotation in a sealed envelope containing (Part-A(i) and Part-A(ii) & Tender Fees alongwith EMD in one envelope and Part-B in another envelope superscribing with the above tender no., date, due date and brief description of tendered item should be submitted to the *Stores Officer-1* at the above address by 1.00 p.m. on 22.06.2016. Part-A(i) and Part-A(ii) - Technical Bid - along with terms and conditions and Tender Fees and EMD for Rs.1,85,850.00/- received upto 1.00 p.m. on 22.06.2016, which will be opened on the same day at 2.30 p.m. in the presence of attending tenderers.**

8. In the event of any date indicated above is a declared Holiday, the next working day shall become operative for the respective purpose mentioned herein.

9. IPR will not be responsible for any delay/loss of documents in transit.

10. Tenders received without the details asked for will not be considered.

11. Tenderers should furnish/enclose full technical details/literature, and confirm the terms and conditions attached with the tender.

12. **Tenders received without Tender Fee & EMD will be rejected.**

13. **Those who do not meet with the eligibility criteria need not to submit the tender.**

14. **Those who want to attend the tender opening event (only those who has submitted tender) must carry authorization letter for attending the event.**

15. The Director, IPR reserves the right to accept or reject any offer in full or part thereof without assigning any reason thereof.

***NOTE:** Issue of tender documents does not mean that a vendor is pre-qualified. IPR's decision to consider as to whether a vendor has met with the eligibility criteria is final.*

PART-A(II)

प्लाज़्मा अनुसंधान संस्थान
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INSTRUCTIONS TO BIDDERS AND TERMS AND CONDITIONS

1. The offer and any order resulting from this tender/enquiry shall be governed by our Conditions of Contract and vendor quoting against this tender notice shall be deemed to have read and understood the tender completely.

2. Where counter terms and conditions have been offered by the vendor, the same shall not be deemed to have been accepted by us, unless our specific written acceptance thereof is obtained.

3. **CLARIFICATIONS :**

   Any technical and commercial questions, information, clarifications, etc. that may be required pertaining to this Tender/enquiry may be obtained from Stores Officer - 1 before submitting the tender.

4. Bids shall be complete in all respects and shall include properly filled in prices, other specifications, schedules, relevant drawings and catalogues as necessary along with the bid covering letter.

5. **QUOTATION:**

   Quotation should be submitted in sealed envelope stating on the top the above tender no., date, due date and brief description of tendered item along with (i) Tender Fees for ₹1,000.00, Earnest Money Deposit (EMD) for **₹1,85,850/-** by way of Demand Draft/Pay Order/Banker's Cheque drawn in favour of ***Institute for Plasma Research,*** payable at Ahmedabad, (ii) **Technical Bid and Terms and conditions [Part-A(i) and Part-A(ii)]** and (iii) **Price Bid [Part-B]; Annexure-IIIa, IIIb, IIIc and IIId** to the Stores Officer - 1 at the above address latest by 1.00 p.m. on **22.06.2016.** **Envelope containing Part-A(i) and Part-A(ii) - Technical Bid along with terms and conditions and Tender Fees for ₹1,000.00 EMD for ₹1,85,850/-** will be opened on the same day at 2.30 p.m. in the presence of attending tenderers.

6. **SERVICE :**

   The Service includes Operation and Maintenance and must be provided strictly conforming to our scope defined in the tender documents.

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7. **REPAIRS AND REPLACEMENTS**

Repairs and Replacements are spelled out clearly in the detailed scope. Those which are not coming under the scope of the contractor are also given very clearly. Please refer **ANNEXURE – II**. The repairable items mentioned under the heading '**Repairs:**' can be repaired by the contractor and made functional. If they are found not repairable, then need to be replaced by the tenderer with new one. Similarly the items mentioned under the heading **'Replacement of Items:'** if found faulty need to be replaced by the tenderer with new one without trying any repairing work on these items.

8. **PRICES AND RATES:**

The quoted price should not be subject to price escalation for whatsoever reasons. The quoted price shall be firm, fixed and non-revisable during the validity/extended validity of Work Order/contract. Break-up of price, wherever required, should be furnished.

Prices are to be quoted according to the units indicated in the tender form. When quotations are given in terms of units other than those specified in the tender form, relationship between the two sets of units must be furnished.

Whenever options are specified in the tender documents, IPR reserves the right to accept any option/s irrespective of whether all the vendors have quoted for all the options or not. The decision of IPR in this regard will be final.

Tender should be free from Correction and Erasing. Corrections, if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amounts quoted in words and figures, **amount quoted in words shall prevail.**

IPR shall be under no obligation to accept the lowest or any tender.

Rates must be submitted in the Rate Schedule given in Part-B Annexure IIIa, IIIb, IIIc and IIId.

9. **COMPLIANCE WITH VARIOUS ACTS:**

9.1 The Contractor shall be fully responsible for complying with all the relevant statutory obligations as applicable from time to time including :

- **Contract Labour (Regulation and Abolition) Act**
- **Minimum Wages Act**
- **Payment of Wages Act**
- **Employees Provident Fund Act**
- **ESI/Workmen's Compensation Act**
- **Bonus Act**
- **Fatal Accident Act**
- **Gratuity Act**
- **Private Security Agencies (Regulation) Act 2005.**
- **Any other act, as applicable from time to time**
- **Police Verification**

Consequences arising out of the non-compliance with statutory requirements shall be the entire responsibility of the contractor and the liability to be borne by the contractor.

All the relevant records / documents / registers /correspondances / récits etc. for the above may be produced for verification whenever desired by the Institute, kept ready for the official inspection.

9.2 The contractor shall have to strictly pay minimum wages as notified by the Asst. Labour Commissioner (Central) for Zone C i.e. remaining area of Gujarat, from time to time to his personnel. The payment of wages to the persons deployed by the Contractor may be witnessed by an accredited representative of the Institute.

9.3 The contractor shall obtain valid license under the Contract Labour (R & A) Act 1970 and contract labour (Regulation and abolition central rules 1971) before the commencement of work and continue to have valid license during the currency of the contract if more than 20 workmen are engaged.

9.4 The contractor shall comply with the provision of payment of wages Act 1936, minimum wages Act 1948, employees liability Act 1938, Workmen's compensation Act 1923, Industrial disputes Act 1947, maternity benefit Act 1961 and the contractor labour (Regulation & Abolition) Act 1970 or the modifications thereof or any other laws relating thereto and the rules made there under from time to time.

10. **SALES TAX/SERVICE TAX/VAT etc.:**

We do not have "C" or "D" Form. The percentage of sales-tax, surcharge, if applicable, and other levies legally leviable and intended to be claimed should be clearly indicated in the tender. Where this is not done, no claim on these accounts would be admissible later.

11. **EXCISE DUTY :**

As per Notification No.10/97-CE (Central Excise) dated 1-3-1997, the Purchaser is entitled for availing Excise Duty exemption at present. Excise Duty Exemption Certificate, wherever applicable, and as per rules will be issued at the appropriate time. Hence Excise Duty for such items should not be included in the BID. However, prevailing percentage of Excise Duty may be indicated.

12. **EARNEST MONEY DEPOSIT (EMD):**

The Bidder shall submit interest free Earnest Money Deposit (EMD) of Rs.1, 85,850/- (Rupees One lakh Eighty-five thousand Eight Hundred Fifty only) by way of Demand Draft issued in favour of "Institute for Plasma Research" and payable at Ahmedabad. **Quotation received without EMD will be rejected.**

13. **VALIDITY OF OFFER :**

The offer must be valid for 120 days from the date of opening of Tender.

14. **FOLLOW UP AND CANVASSING** :

Undue follow up and canvassing on the part of tenderer shall disqualify from consideration. The refund of EMD shall be the basis to know that the tender is not considered in their favour.

15. **VALIDITY / TENURE OF CONTRACT :**

a. This contract will be valid for a period of **03 years** from the date of commencement of the contract. The contract, if awarded, **may be in force initially for a period of three months**, which

may be extended for the entire term of the contract if the performance during the initial period is found to be satisfactory.

b. If IPR is not satisfied, in the event of award of contract, with the performance of the contractor during the period of contract including the trial period, IPR reserves the right to terminate the contract by giving 30 days notice to the successful tenderer. The contractor shall be required to hand over the Plant and Equipments in satisfactory working condition to IPR which will have to be certified by the Section Head/Division Head, AC & WC Section. IPR.

c. Validity of the contract shall normally come to an end on the last day of its validity period / extended period of validity. Therefore, IPR is not bound to issue separate letter to the successful contractor-indicating expiry of the Contract. The Contractor must be ready for handing over the Plant and Equipments in satisfactory working condition to the incoming contractor vide Clause 19 given here below.

d. Validity of the contract may be further extended for another one year or less than one year with mutual consent of IPR and successful bidder on the same rate and terms and conditions of the third year of the contract.

16. **TERMINATION OF CONTRACT :**

If the performance of the Contractor on award of the contract is not found satisfactory during the period of validity or extended period of validity of the Contract, IPR reserves the right to terminate the contract by issuing three months' notice to the contractor.

If reason for termination is serious and keeping the contractor is detrimental to the interest of the institute the contract may be terminated with immediate effect.

17. **PAYMENT**

The Contractor shall bill for $1/12^{th}$ of the accepted annual amount every month and the payment shall be made within 30 days from the date of submission of bill.

a) All the spares/consumables procured and used by the successful tenderer shall be OEM, genuine and new. IPR reserves the right to ask the successful contractor to use only original, genuine and new spares/consumables. **However, before going to use, the successful contractor shall furnish necessary delivery Challans to the IPR**. The decision of designated Engineer / (or) Section Head/Division Head/ (or) Project Leader-AC&WC section in the respect of spares/consumables will be binding on the successful contactor

b) If the work carried out by the successful contractor is not satisfactory, IPR shall hold such bill/s till satisfactory services are provided.

c) Any amount due from the successful contractor to IPR will be recovered from his monthly bill.

d) 1^{st} Payment will be made only on submission of Security Deposit by the successful Contractor.

18. **PENALTY :**

Please Refer to Clause C (Annexure Ia) of this Tender Document

19. **HANDING OVER AND TAKING OVER OF EQUIPMENTS :**

The tenderer if awarded the contract shall be responsible to take over the plant, machinery and equipment in satisfactory working condition from the outgoing contractor. Similarly he shall be responsible to hand over the plant, machinery and equipment so taken over to the incoming contractor at the time of expiry of the contract. Payment for the last bill as well as release of Security Deposit will be subject to fulfillment of satisfactory handing over and complying with all the terms and conditions of the contract to the entire satisfaction of IPR. IPR reserves the right to hold the last payment and Security Deposit till the tenderer if awarded the contract completes the pending job if any, to the entire satisfaction of IPR, at the expiry of the tenure of the contract, including satisfactory handing over of the plant to the incoming contractor.

20. **ADDITION AND DELETION OF THE UNITS FOR OPERATION & MAINTENANCE :**

IPR may include additional units or delete the units as and when desirable. The rate for additional units will be same as matching equipments in the contract. If matching accordingly the total operation & maintenance charges will vary. **If the tonnage of matching equipments is not same for the additional units then the rate will be derived from per tonnage charges of the matching equipments.**

21. **SECURITY DEPOSIT :**

The successful contractor will have to furnish to the Institute an interest free security deposit of 10% (Ten percent) of the accepted average Annual contract value in the form of Bank Guarantee from a nationalised/scheduled Bank within 15 days from the date of LOI/Work Order valid through the tenure of entire contract. The Security deposit shall be forfeited in case the tenderer who is awarded the contractor does not commence the work within the time limit specified or fails to perform within the stipulated guidelines of the institute or fail to comply with any of the terms and conditions in the Work Order/contract, including satisfactory handing over of the plant to the new contractor.

22. **SUB CONTRACT :**

The tenderer if awarded the contract shall not sub contract any portion in any phase of the work covered in the tender document without prior written approval of IPR. The decision of the IPR to accept or reject the request of the contractor to subcontract the scope of work in full or part thereof shall be final and based on the submission of credentials of proposed sub contractor. Subcontract shall be permitted only if the sub contractor is an authorized service provider, have servicing facility in Ahmedabad / Gandhinagar.

23. **JURISDICTION :**

The Contract/Work order shall be governed by the Laws of the country for the time being in force. The Courts of Ahmedabad only shall have jurisdiction to deal with and decide any legal or dispute arising out of this contract.

24. **DISPUTES :**

Any disputes or difference arising out of or in connection with the Contract/Work Order shall be to the extent possible settled amicably between the parties. If amicable settlement cannot be reached then all disputed issues shall be settled by arbitration.

25. **ARBITRATION:**

In the event of any dispute or difference arising under this Contract, the matter shall be referred to the Arbitrators one each nominated by the Purchaser and Contractor from their respective organisations. In case the said Arbitrators are not able to settle the dispute by themselves, the matter shall be referred to the Arbitrator mutually nominated by the Institute and the Contractor and whose decision will be final and binding on both the parties. The venue of arbitration will be IPR. Subject to as aforesaid the Arbitration Act, 1940 and the rules thereunder and any statutory modification thereof for the time being in force shall be deemed to apply to the Arbitration proceedings under this Contract.

26. Late / Delayed tenders will not be accepted. Incomplete tenders may be rejected at the discretion of IPR.

27. **IPR is not bound to accept the lowest tender. IPR reserves the right to select any vendor at its sole discretion.**

Great Emphasis will be put in Selection of Contractors for the proposed AMC work on the quality of their service infrastructure, ability and competency of contractors to do good quality AMC work according to the time schedule. IPR shall evaluate the contractor's service infrastructure facility for the proposed AMC work, by visiting their facility.

28. IPR reserves the right to place order on a single party or to split the order at its sole discretion.

29. The Director, IPR reserves the right to accept or reject any quotation/tenders fully or partly without assigning any reason.

We agree to the above terms and conditions.

Place:
Date : **Signature of Bidder with seal**

Note: A copy of our terms and conditions duly signed should accompany your quotation.

ANNEXURE – I.a

प्लाज़्मा अनुसंधान संस्थान
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SCOPE OF ANNUAL OPERATION AND MAINTENANCE OF PLANTS

(Refer Annexure-II: PLANTS MAINTENANCE SCHEDULE for annual maintenance works involved in the AC system & AHUs to keep the equipments in proper and safe operating condition)

IPR having two other campuses as FCIPT and IPR-Extension Lab at Electronic Estate, GIDC, Gandhinagar. Air conditioning systems are installed at these campuses also mentioned in I.b.

The location details are as follows:

FCIPT
A-10/B, G.I.D.C.
Electronics Estate, Sector 25
Gandhinagar
Gujarat-382044

IPR-Extension lab
B 185-189, G.I.D.C.
Electronics Estate, Sector 25
Gandhinagar
Gujarat-382044

A. PLANTS OPERATION:

1. SPECIFIC DUTIES OF OPERATORS:

a) Routine operation of the system as per requirement

b) Seasonal starting and stopping of the system as per requirement.

c) Taking all required readings regularly, maintaining the logbook record up to date with observations, if any.

d) Operations like pump down, removing and charging refrigerant, purging, leak testing, evacuation and dehydration etc.

e) Cooling water and chilled water system leakage detection in the plant.

f) All other routine inspections to ensure smooth running of the plants as well as those which are otherwise related to satisfactory plant operations, viz., safety related checks.

g) Performing all the operations according to standard methods, without damaging other working parts of the system.

h) Maintaining and submitting monthly presence record to Section Head / Division Head / Project Leader, AC&WC section along with the routine bill.

i) Maintaining operation logbook for the inspection of Section Head / Division Head, AC&WC section

j) Taking adequate insurance cover against all risks for the persons deployed by the contractor.

2. OPERATION TIME:

The period of operation in terms of days and time during the tenure of contract shall be as follows:

a) Normal Time of operation: 9.00 a.m. to 5.30 p.m.
b) Normal Operation in a week: Monday to Saturday.

c) Normal No-Operation Days: Sundays, Three National Holidays, i.e. 26th January, 15th August and 2nd October and closed holidays declared /observed by the Institute.

d) Extra hours: Before and after the normal time of operation, i.e. before 9.00 a.m. and after 5.30 p.m. including Sundays and other holidays, if warranted.

(Prior intimation will be given to the contractor for carrying out operation outside the office hours mentioned above. The extra hours of operation work shall be got certified by Section Head/Division Head of WC&AC section)

3. MANPOWER ARRANGEMENT:

The tenderer if awarded the contract shall deploy the following manpower for operation and maintenance of plants:

a) **Supervision:**
The tenderer if awarded the contract, shall depute **a Supervisor** (Diploma holder in Mechanical/Refrigeration & AC having work experience of **at least 5 years** in the Air conditioning/Refrigeration field) who will be responsible for day to day planning of operation/maintenance/material and spares arrangement during regular shift / office hours and he shall co-ordinate with the Section Head/Division Head, AC&WC section to seek clarifications and instructions related to the work contracted to the tenderer.

b) **For operation of plants:**

(i) 5 Nos. of ITI / NCVT / Equivalent in Refrigeration & Air conditioning qualified **skilled operators** with at least 3 yrs. relevant experience in the similar work.

(ii) 2 Nos. **semi-skilled operators** during regular shift / office hours.

(iii) 1 No. **electrician** having Diploma / ITI / NCVT in Electrical field with **at least 3 yrs.** relevant experience in the similar capacity plants during regular shift / office hours.

c) **For operation of plants during extra hours:**

(i) 01 No. of ITI / NCVT / Equivalent in Refrigeration & Air conditioning qualified **skilled operator** with at least 3 yrs. relevant experience in the similar work and 1 No. **semi-skilled operators** for operation during extra hours operation for each plant (SST1 Air Conditioning Plant/ KBAC/ TBAC).

d) **For maintenance of plants:** The operators for operation of the plants can be utilized for maintenance related activities if plants are not in the operations. But if winter shutdown maintenance / maintenance schedule / situation demands additional manpower, then successful tenderer shall deploy following additional manpower for maintenance of plants:

(i) 1 No. of **Service mechanic** qualified ITI /NCVT / Equivalent (Refrigeration &Air conditioning) with at least 5 yrs. relevant experience in the similar work

(ii) 2 nos. **semi skilled mechanic**/ helpers with enough experience in similar work.

(iii) 1 No. **electricians** having Diploma/ ITI / NCVT I in Electrical field with **at least 3 yrs**. relevant experience in the similar capacity plants

e) **Supervision:**

(i) On Regular Basis throughout the period of Contract

The tenderer if awarded the contract, shall identify a **Senior Engineer / Senior Supervisor** (having work experience in the similar field) who would regularly visit IPR **once in a week** to inspect and supervise the work to be carried out under the contract. He shall liaise with the Section Head/Division Head, AC&WC section to seek clarifications and instructions related to the work contracted to the tenderer.

(ii) As and when required:

The tenderer, if awarded the contract, shall have to deploy, if warranted, a team of experienced mechanic/s and helper/s within a reasonable time to attend to the problems and arrange to solve the same by carrying out necessary repairs and replacement if any, to our satisfaction as per the contract.

Besides, the persons identified by the contractor for the work at IPR shall be made available during this period and as and when required by Section Head/Division Head, AC&WC section.

f) **Dress code for Operators:**

All contractors' personnel must have to wear a particular dress (**Sky blue shirt with Navy blue pant**) with safety shoes and ID-card. Without observing dress code and without safety shoes and ID-card, a contractor's person will not be allowed to enter in the IPR premises in any circumstances.

g) **Contractors' personnel police verification details:**

The contractor must have to submit police verification of character of all personnel deputed at IPR. The contractor also must submit an attested copy of any one of the Govt. issued ID card (Voter card/ Driving License/ Passport/ Pan card/equivalent)

h) **The Contractor shall be Responsible for:**

(i) Deployment of operators in the main plant rooms on continuous basis.

(ii) Withdrawing the operator/s / mechanic/s who is / are not found suitable according to the opinion of the Section Head/Division Head, AC & WC section and replacing him / them with suitable persons.

(iii) Deployment of suitable persons as per the contract for taking over and carrying out operation and maintenance of the plants and equipments in consultation of Section Head/Division Head, AC & WC section. Deployment of persons who are not qualified and experienced for carrying out the work shall not be permitted. (Proof of qualification of manpower to be submitted at the time of taking over the plants.)

(iv) Complying with the requirements of IPR security for regulating entry of the persons deployed for the contract. Further, in and out time of the persons deployed by the contractor for various activities under this contract shall be recorded in the prescribed register at the Main Gate. The Contractor shall be required to keep a similar register with the supervisor / Section Head / Division Head of AC &WC section.

B. CONDITIONS FOR PLANTS MAINTENANCE:

The annual maintenance (mechanical and electrical) all in all service contract covers:

1. Preventive maintenance – Preventive Maintenance shall be carried out preferably in the weekends or as instructed by the Section Head / Division Head, AC & WC Section.

2. Break down service – The break down service consists of attending to the complaint within a reasonable time, identification of fault, Working out Repairs and replacement Procedure in consultation with the Section Head/Division Head AC & WC Section, completing the repairs and replacement to the satisfaction and commissioning of the equipments within the targeted time. Please go through the details given under Maintenance / Servicing Schedule given in Annexure II.

3. All the preventive maintenance and break down service must be carried out as per the instruction and time schedule provided by designated Engineer / Section Head / Division Head, AC&WC section. The time schedule shall be prepared and decided in coordination with the designated Engineer / Section Head / Division Head, AC&WC section and it shall be strictly adhered to.

4. The temperature and humidity conditions in the air-conditioned areas will have to be recorded daily.

5. The Contractor shall maintain daily reports as per the format as required by the designated Engineer / Section Head / Division Head, AC&WC section. The said daily reports maintained by you shall be got countersigned by designated Engineer whose instructions would be strictly followed. Monthly report covering the Preventive Maintenance and Break Down Service shall be prepared and submitted to Section Head / Division Head, AC&WC section. A brief monthly report form may be got approved by the Section Head / Division Head, AC & WC for compliance.

6. The Contractor shall be responsible to carry out all repairs of the equipments involving repair or replacement of components. The details of repair and replacements are given in Maintenance / Service Schedule – Annexure II.

7. The Contractor shall keep enough spares and consumables in stock to meet the requirements during the period of contract. The contactor shall also keep 1 No. 61 Kgs R-22 Gas Cylinder, 1 No. 61 Kgs R-134a Gas Cylinder, 50 Kgs compressor oil, gasket sets, `O' Ring set etc. at site. Contractor must keep a copy of receipted Challans with entry of Gate and Stores

8. The Contractor shall use only genuine original parts. If it is found otherwise it will be termed as a breach of contract. In case it the original manufacturer do not exist or particular item is phased out, then the other available makes or model of the parts shall be got approved from the concerned engineer or Section Head / Division Head and installed at no extra cost.

9. Notwithstanding as to what is specifically stated, it shall be the responsibility of the successful tenderer to attend to all the preventive maintenance/routine maintenance and repairs and breakdown services including replacements of all parts/components.

10. The repairs must be carried out without damaging other working parts of the system.

11. IPR will not supply any tool / tackle / equipment except power supply and water for any work. After satisfactory completion of each of the work, the Contractor shall get approval from designated Engineer/ (or) Section Head/Division Head / (or) Project Leader-AC&WC section. Incase any spares parts, equipment or accessories which supplied by IPR during the maintenance/ repairing/ service purpose on temporary basis, the contractor will be responsible for it and has to be returned back same to IPR in all good manners.

12. Logbook shall be maintained for each plant and the list of work carried out like servicing, maintenance, repairs etc. shall be recorded systematically on a regular basis. The recordings in the logbook shall be got endorsed by the designated Engineer from time to time and verified by the Section Head/Division Head, AC&WC section. The Logbook shall be the basic record for all purposes.

13. **Normally repairing and replacement works should be done at IPR Campus. However, if it is to be taken outside IPR campus to and fro transportation charges including any other charges like transit insurance etc. shall be borne by the contractor.**

C. PENALTY:

1. Failure to provide Manpower as per Clause A.3 above

a) Penalty for absence of **Supervisor** is Rs.1500/- per day shall be recovered from the routine bill of the contractor.

b) Penalty for absence of qualified skilled Operator/ Electrician/ Mechanic is Rs.700/- per day shall be recovered from the routine bill of the contractor.

c) Penalty for absence of semiskilled person is Rs.600/- per day shall be recovered from the routine bill of the contractor.

d) Penalty for absence of **Senior Supervisor / Senior Engineer**: Rs.2,000/- per visit shall be recovered from the routine bill of the contractor.

The above penalty shall be in addition to the consequential loss the Institute may incur for substituting the persons with same number or more for running the system in view of the failure of contractor to provide manpower.

2. Failure to complete the repair and replacement work by the contractor as per the contract.

A maximum period of 7 days is allowed to the contractor to carry out the minor repairs and replacement. If the Contractor fails to complete the minor repairs and replacement within 7 days, IPR will charge penalty @ Rs. 300/- per day from the 8th day till completing minor repairs/replacement.

If the repairs/replacement listed below fails to complete within 7 days due to unforeseen reasons/causes, extension of time limit may be granted by the Designated Engineer / Section Head / Division Head, AC & WC Section in writing after reviewing the nature of problem. The

decision of designated Engineer / Section Head/Division Head, -AC&WC section in this regard shall be final and binding.

Major repairs and replacement: Please refer Annexure-II

- Screw shaft and rotor repairs / replacement in Screw compressor.
- Crankshaft repairs/ replacement of reciprocating compressor.
- Rewinding of motor of compressors, AHUs and pumps.

3. **CONTRACTOR'S MATERIAL:**

a. IPR shall not be responsible for the safety of material brought by the contractor to IPR in connection with the contract. The successful tenderer shall be fully responsible for the safe custody of his material.

b. The contractor shall obtain Gate Pass from IPR for taking out his material from IPR campus. Contractor shall not be allowed to take out any material including his material without a valid Gate Pass to be issued by Section Head / Division Head, AC & WC or Stores Incharge. Normally the Contractor shall not be allowed to take out any material on holidays and before 10.00 Hrs. and after 5.00 p.m. on working days.

c. All the materials brought to IPR in connection with the work contracted to the Contractor are to be routed through IPR Stores with supporting delivery Challans in triplicate indicating full description, quantity, value etc. This procedure should be followed strictly during the contract period.

ANNEXURE – I.b

प्लाज़्मा अनुसंधान संस्थान
Institute for **Plasma Research**
भाट, निकट इन्दिरा पुल, गांधीनगर - ३८२ ४२८ (भारत)
Bhat, Near Indira Bridge, Gandhinagar 382 428, Gujarat (India)
दूरभाष / TELEPHONE : (079) 2396-2260; 2262, 2263
फैक्स / FAX : (079) 2396-2277
stores@ipr.res.in

SPECIFICATIONS OF PLANT EQUIPMENTS

S.NO	DESCRIPTION OF PLANTS / SYSTEMS	CAPACITY	NORMAL HOURS OF OPERATION
	Plants for Operation and Maintenance both (Sr. no. 1 to 9):		
1.	KBAC plant	375 TR	8-12 hrs
2.	TBAC plant	200 TR	8-12 hrs
3.	SST1 Air conditioning Plant	375 TR	8-12 hrs
4.	Air Cooled Package units (for Administration & Purchase section) - 7.5 TR x 2 nos.	15 TR	8-12 hrs
5.	Air washer Unit (for He-Compressor Hall)	40000 CFM	8-12 hrs
6.	D.M. Water Plants (for various Water Cooling plants)	6, 15 & 40 CMPH	8-12 hrs
7.	Chiller Package units (for SST-1 Vacuum system experiments) –9 TR x 01 no.	9 TR	8-24 hrs
8.	Soft Water Plant at Pump house	30 CMPH	8-12 hrs
9.	R.F. Water Cooling systems (for various RF & other experimental systems)	Diff. capacities	8-12 hrs
	Plants for Maintenance only (Sr. 9 to 36):		
10.	Chiller Package Unit (for Beta Lab Experimental Device)	7.5 TR	8-12 hrs
11.	Chiller Package units (for First wall experiment & LVPD experiment Device) –9 TR x 02 nos.	18 TR	8-12 hrs
12.	Chiller Package unit (for Vacuum furnace experiments)	10 TR	8-12 hrs
13.	Chiller Package Unit (for Laser Experimental Systems)	15 TR	8-12 hrs
14.	Chiller Package Unit (new one for Laser Experimental Systems)	15 TR	8-12 hrs
15.	Chiller Package Unit (for DFD at IPR and IPR-Extension Lab, GIDC,	20 TR	8-12 hrs

	Gandhinagar) – 10 TR x 02 nos.		
16.	Air Cooled Package unit (for Computer Hall, Mezzanine Floor) - 10 TR x01 nos.	10 TR	24 hrs
17.	Air Cooled Package units (for R.F. Lab.- Ground. & First Floor)- 15 TR x01 nos., 10 TR x01 nos. and 7.5 TR x 2 nos.	40 TR	8-12 hrs
18.	Air Cooled Package units (for Admin Annexure) - 10 TR x 2 nos.	20 TR	8-12 hrs
19.	Air Cooled Package units (Negative NBI Lab, FF, Utility building) – 17 TR x 02 nos.	34 TR	8-12 hrs
20.	Air cooled Package units (for Control room of Aditya Hall)- 11 TR x02 nos. (1W+1S)	22 TR	8-12 hrs
21.	Air Cooled Package units (Seminar Hall, FCIPT, Gandhinagar)-11 TR x 2 nos.	22 TR	8-12 hrs
22.	Air cooled Package unit (for IPR-Extension lab-Ground floor & first floor, GIDC, Gandhinagar) – 11 TR x04 nos.	44 TR	8-12 hrs
23.	Ductable Split Air Conditioner (for Guest house and Student facility building) – 7.5 TR x01 nos., 5.5 TR x01 nos. and 5 TR x 3 nos.	28 TR	8-12 hrs
24.	Ductable Split Air Conditioner (for IPR-Extension lab, GIDC, Gandhinagar)- 8.5TRx02 nos. and 5.5 TRx10 nos.	72 TR	8-12 hrs
25.	Ductable Split Air Conditioner (for Canteen, IPR)- 5.5TRx02 nos.	11 TR	8-12 hrs
26.	VRV Air Conditioning system for LHCD Lab	24 HP	8-12 hrs
27.	Dx Type Centralize Air Conditioning System (for Canteen, IPR) – 25.5 TR x01 nos.	25.5 TR	8-12 hrs
28.	Dx Type Centralize Air Conditioning System (for HVPS Lab) – 15 TR x02 nos.	30 TR	8-12 hrs
29.	Dx Type Centralize Air Conditioning System (for APPS Lab) – 25.5 TR x01 nos.	25.5 TR	8-12 hrs
30.	Dx Type Centralize Air Conditioning System (for RHVPS Lab, Utility building, first floor) – 34 TR x01 nos.	34 TR	8-12 hrs
31.	Dx Type Centralize Air Conditioning System (for diff. Hall and labs in FCIP, Gandhinagar) – 17 TR x01 nos., 11 TR x01 nos. and 8.5 TR x 2 nos.	45 TR	8-12 hrs
32.	Air Washer and Scrubber Units (for Canteen, IPR)	Diff. capacities	8-12 hrs
33.	Air washer Unit (for Workshop, IPR)	18000 CFM	8-12 hrs
34.	Ventilation Systems (for various plant rooms / Utility Halls / Cryogenic Hall/N2 Baking plant/ other places)	Diff. capacities	8-12 hrs

35.	Kitchen Exhaust Units (for Guest house and student facility bldg.) 6400 CFM x 2 nos.	6400 CFM each	8-12 hrs
36.	HVPS Cooling Tower and CT Pumps with accessories	1000 LPM	8-12 hrs

Sr. No.	Description	Qty.	Capa.	Make	Model	Applications/ details
1.	**KBAC Plant** **Location: Kitchen Basement AC Plant Room**					
a.	Screw type, skid mounted water Chiller Package units with in house safety controls, sensors, gauges and Auto loading /unloading devices consists of following equipments:	3	125 TR	YORK	YEWS130SA53DS3	For comfort Air-conditioning of Aditya hall, Aditya Control room, BETA Lab, Seminar Hall, Library and ground floor offices.
	i) Compressor	3	125 TR	YORK		R-134a based screw type semi hermetic single compressors with instruments and controls like pressure transducers, temperature controller and sensors, motorized valve for loading /unloading, crankcase heater, flow switch, DP switch, refrigerant level sensor etc.
	ii) Condenser	3	125 TR	YORK		Shell and Tube type
	iii) Chiller (Evaporator)	3	125 TR	YORK		Flooded type
	iv) Motor for comp.	3	88 KW	YORK		This is sealed type refrigerant cooled motor mounted on compressor shaft with gear mechanism with soft starter.
	v) Micro Processor Control Panel	3		YORK		This panel gives the status of chilling machine with LCD display and houses the soft starter and other Power / control contactors and electronic controls/circuits. This panel is mounted on each chilling machine.
b.	Chiller Water Pump Sets	3	25 HP	M&P	ET-20/CAT-B2	Back pull out pumps with CG make 25 HP/ 3 Ph/1475 rpm motor, drive package.
c.	Cooling Water Pump Sets	3	15 HP	M&P	ET-19/CAT-B	Back pull out pumps with CG make 15 HP/ 3

						Ph/1460 rpm motor, drive package.
d.	Drain Water Pumps	2	2 HP	CG	DWMJ22	Drain water pumps used to drain the water from the condensate collection pits at KBAC plant room.
e.	Air Handling Units					
	i) Library area	1	17000cfm	Thermflow	THA-11with Sidemen's TEFC/ 12.5 Hp/ 4P motor	With drive package, metallic/ PE pre filters, 3 way diverting valve with actuator, sensors and temperature controllers, valves etc. Insulated Ducting, canvass, and grilles, fresh air filters, dampers, electrical solenoid operated fire dampers etc.
	ii) Seminar Hall	1	10000 cfm	Thermflow	THA-11 with Sidemen's TEFC/7.5 Hp/4P motor	As mentioned above
	iii) Beta Lab.	1	15000 cfm	Thermflow	THA-9 with Sidemen's TEFC/12.5 Hp/4P motor	As mentioned above
	iv) Aditya Hall-A	1	18000 cfm	Weathermake	WH-11 with KEC TEFC/12.5 Hp/4Pmotor	As mentioned above
	v) Aditya Hall-B	1	15000 cfm	Weathermake	WH-7 with KEC TEFC/12.5 Hp/4P motor	As mentioned above
	vi) Aditya Control room	1	5000 cfm	Weathermake	WH-3 with KEC TEFC/5 Hp/4P motor	As mentioned above
	vii) Room no.37, FFL of main bldg.	1	6400cfm	Batliboi	AHU-6 with TEFC/7.5 Hp/4P motor	As mentioned above
f.	Fan Coil units	53	2 TR	Batliboi	Horizontal	Side throw, 1/12 hp/ 3-speed motor, selector switch, prefilters, isolation valves at Inlet/Outlet of chilled water line.
g.	Cooling Towers	2	350 TR	Advance	A Series	FRP induced draft type, 114 CM/Hr with belt driven 10 hp/ SIEMENS/ 1450 rpm fan motor including float valves, isolation valves etc.
h.	Insulated Chilled water and cooling water MS piping	Lot				This covers entire Interconnected water piping between above listed all equipments like

						chillers, condensers, AHUs', FCUs', pumps, CTs', heat exchangers, expansion tank, etc. Also, this will cover all necessary fittings, instruments and controls mounted in the piping like Gate, Globe Butterfly, Balancing valves, NRVs', Pot strainers, Y-strainers, pressure and temperature Gauges, Pressure and temperature transmitters, purge valves, vent valve, flow switches, modulating valves, float valves, expansion tank and its connected valves. etc. fitted in the piping of the plants.
i.	Main Electrical MCC Panel	1				Electrical panel with 800 amps drawn-out type incomer TPN ACB. This Panel accommodates feeders of 3 Nos. 125 TR Compressors Motors, 8 Nos. Water Pumps, 2 Nos. Cooling Tower Fan Motors, spare feeders, annunciation cum indication panel, with all electrical, mechanical & electronic, parts/controls and other accessories installed, with all internal/external wiring (control, power and earthling) for all of above equipments/items concerned.
2.	**TBAC Plant** **Location: Tokamak Basement Plant Room**					
a.	Chiller Package Units and ancillaries	2	100 TR	Blue Star		For comfort Air-conditioning and cooling of Aditya and LVPD experimental devices.
	i) Compressor	2	100 TR	Kirloskar	AC 1270	R-22 based reciprocating type compressors with drive package.
	ii) Condenser	2	100 TR	Blue Star	CDS-41305	Shell and Tube type
	iii) Chiller (Evaporator)	2	100 TR	Blue Star	YCH101	Shell and Tube type
	iv) Motor for	2	120 hp	Sidemen's	200L	SPDP/3P/1500 rpm/

	comp.					star delta starter with drive packages.
	v) Refrigerant piping	2 set				This includes shut off valves, drier, filters, site glass and copper piping with gauge panel boards.
b.	Controls 2 sets					
	i) Expansion valves	4	52 TR	Sporlan		
	ii) RSV	2		Sporlan	P-180	
	iii) HP/LP Cut outs	2		Indfoss	MP-15	
	iv) OSS	2		Indfoss	MP-55	
	v) Operating Thermostat	6		Honeywell	T678A	2 nos. with USV and 1 no with RSV in each plant
	vi) AFT	2		Honeywell		
	vii) Refrigerant pres. gauges	6				HP-2 nos, LP-2 nos, OP-2 nos,
	viii) Condenser & Chiller diff. Press. Switches	4		Indfoss	IPSD-50	
	ix) Water press. Gauges	35		H. Guru / Fiebig		4" dial type
	x) Water temp. Gauges	24		H. Guru Fiebig		Stem type / Dial type
	xi) USV	6				3 nos. in each plant for loading and unloading of compressor.
	xii) Conductivity, pH meter	2 Nos				
	xii) CCH	2	200 Watts			1 no. in each compressor
c.	Chiller Pumps	3	15 HP	Beacon	3DM8	Monoblock pumps/ 3 Q/2900 rpm
d.	Cooling water pumps	3	25 HP	KBL	3UPIM15	Split casing type with TEFC motor, drive package.
e.	Cooling Towers	2	125 TR	Paharpur	1868P	FRP, induced draft type, 114 CM/Hr with 10 hp/TEFC/750 rpm ABC fan motor.
f.	Insulated Chilled water and un-insulated cooling water MS piping	Lot				This covers entire Interconnected water piping between above listed all equipments like chillers, condensers, AHUs', FCUs', pumps, experimental devices,

						CTs', heat exchangers etc. this will cover all necessary fittings and controls mounted in the piping like valves, strainers, pressure and temp. Gauges, purge valves, flow switches, modulating valves, float valves, expansion tank and its connected valves etc. fitted in the piping of the plants.
g.	Main Electrical panel	1			Floor mounted type	Electrical panel with incomer 400 amps MCCB. This panel accommodates feeders of 2 nos. Compressors Motors, 6 Nos. Water Pumps, 4 Nos. Cooling Tower Fan Motors, and 4 nos. D.M. Water pumps, 2 nos. raw water pumps, annunciation cum indication panel, with all electrical, mechanical & electronic, parts/controls and other accessories installed, with all internal/external wiring (control, power and earthling) for all of above equipments/items concerned.
3.	**SST1 Air conditioning Plant Location: MEL Basement**					
a.	Screw type, skid mounted water Chiller Package units with in house safety controls, sensors, gauges and Auto loading /unloading devices consists of following equipments:	3	125 TR	Dunham Bush (02 nos.) / Daikin (01 nos.)	WCFX15E1D1C (Dunham Bush)/ PFS13510BRY (Daikin)	For comfort Air-conditioning of SST1 Building. Which includes Tokamak Hall, R.F. & NBI bay, control room and Diagnostic halls. **Note:** This plant can be also run as an alternate for the cooling of cryogenic experimental devices in addition to the Air-conditioning. **Note: 02 nos. of Dunham Bush make Screw Chillers may be replaced with new**

						chillers in about 01 year.
	i) Compressor	3	125 TR	Dunham Bush / Daikin		R-22 (Dunham Bush)/ R134a (Daikin) based screw type hermetically sealed (Dunham Bush)/ Semi-hermetic (Daikin) compressors with instruments and controls like pressure transducers, temperature controller and sensors, motorized valve for loading unloading, photo sensor, crankcase heater, refrigerant level sensor etc.
	ii) Condenser	3	125 TR	Dunham Bush/ Daikin		Shell and Tube type
	iii) Chiller (Evaporator)	3	125 TR	Dunham Bush/ Daikin		Flooded type
	iv) Motor for comp.	3	83 KW	Dunham Bush/ Daikin		Refrigerant cooled motor mounted on compressor shaft with gear Mechanism.
	v) Micro processor Panel	3		Dunham Bush/ Daikin		This panel gives the status of chilling machine with LCD display and houses the soft starter and other Power / control contactors and electronic controls/circuits. This panel is mounted on each chilling machine.
b.	Chiller Pumps	3	25 HP	Beacon	BWP 100/400	Back pull out pumps with KEC make 25 HP/ 3 Ph/1500 rpm motor, drive package. **Note: These 03 nos. of Beacon make Chiller Pumps may be replaced with new Chiller pumps in about 01 year.**
c.	Cooling water pumps	3	15 HP	Beacon	BWP 80/260	Back pull out pumps with KEC make 15 HP/ 3 Ph/1500 rpm motor, drive package **Note: 03 nos. of Beacon make Condenser water Pumps may be replaced with new Cooling water pumps in about 01 year.**
d.	D.M. Water	2	25 HP	KBL		Pump with 25

	Pumps for Cryogenic experimental devices					hp/TEFC/4P motor, coupled type, The pump will circulate D.M. water to the experimental device for cooling purpose through 1250 KW PHE. This pump is primary side cooling pump. **Note:** This system works as a standby unit to the main cooling system for Cryogenic. This will work in conjunction with Screw chilling plant at partial load.
e.	Air Handling Units					
	i) MEL area	1	19860cfm	Ethos	Double skin type	With drive package, metallic pre-filters, 3 way diverting valve, isolations valves and thermostat with control panel. Insulated Ducting, canvass, and grilles, fresh air filters, dampers, electrical limit switch operated fire dampers and fire alarming panel with ionization type smoke detector with KEC make TEFC/ 15 Hp / 4P motor.
	ii) Diagnostic Lab.	1	10000 cfm	Ethos	Double skin type	As per mentioned above but with 10 HP motor
	iii) Central Control Room	1	15350 cfm	Ethos	Double skin type	As per mentioned above but with 10 HP motor. This unit also has 16 nos. Dyna make bag type micro filters of 1 micron.
	iv) N.B.I. First floor	1	14000 cfm	Ethos	Double skin type	As per mentioned above but with 10 HP motor
	v) Tokamak Basement	1	8950 cfm	Ethos	Double skin type	As per mentioned above but with 10 HP motor
	vi) R.F. First floor	1	17000 cfm	Ethos	Double skin type	As per mentioned above but with 15 HP motor
	vii) Tokamak Hall	1	19000 cfm	Ethos	Double skin type	As per mentioned above but with 15 HP motor
f.	Cooling Towers	2	150 TR	Paharpur	3870	FRP, induced draft type with 7.5 HP/3 Ph/900 rpm motor of ABB make and belt drive package, float valve, drain, quick fill arrangements. **Note: These 02 nos. of**

						Paharpur make cooling towers may be replaced with new Cooling towers in about 01 year.
g.	Insulated Chilled water and cooling water MS piping	Lot				This covers entire interconnected water piping between above listed all equipments like chillers, condensers, AHUs', pumps, CTs', heat exchangers etc.. Also, this will cover all necessary fittings and controls mounted in the piping like Gate & Globe valves, NRVs', BFVs', Balancing valves, Pot strainers, Y-strainers, pressure and temp. Gauges purge valves, flow switches, modulating valves, float valves, expansion tank and its connected valves. etc. fitted in the piping of the plants.
h.	Electrical Panels for above utilities:					
	i) Main Electrical Panel	1			Floor mounted type	Main Electrical panel comprising of 800 amp MCCB in main incoming feeder and 3 x 400 amp MCCB for screw chiller packages main supply along with 6 feeders for chilled / condenser water circulation pumps and 2 feeders for cooling tower fan motors., 2 for cryogenic D.M. Water pumps with all electrical, mechanical & electronic, parts/controls and other accessories installed in side the panel, with all internal/external wiring (control, power and earthling). **Note: This main electrical panel may be replaced with new electrical panel in about 01 year.**
	ii) Status indication panel	1			Floor mounted type	This indicates the status of screw chiller packages, pumps, AHUs' with

						remote ON/OFF facilities with all electrical, mechanical & electronic, parts/controls and other accessories installed in side the panel, with all internal/external wiring (control, power and earthling).
	iii) Local Control panel for AHUs'	7			Wall mounted type	Starter panel for AHU motor with all electrical, mechanical & electronic, parts/controls and other accessories installed in side the panel, with all internal/external wiring (control, power and earthling)
4.	Air Cooled Package units for Administration and Purchase section	2	7.5 TR	Fedders Lloyd	P25EK99	Package units consists of Sealed compressors, Air cooled condensers, cooling coil, blower unit, drive package, pre filters, interconnected refrigerant piping with safety/controls, electrical panel with power & control wiring and earthling. S.A/R.A ducts, grilles, insulation, canvass connections. Note: Each Package has 2 circuits of 3.75 TR with 2 nos. sealed compressors. This includes the main electrical panel with 100 amps incomer MCB and different feeders for each unit.
5.	Air Washer System for He-Compressor plant room	1	40000 CFM	ACCEL	Fan Model: CF-42 DIDW	A complete set of centrifugal blower with 30HP motor, belt drive package, fresh air filters, evaporative cooling cellulose pads, SS water tank, 2 nos. of water circulating pumps, ducting, grilles, fire dampers with limit switch, ionized type smoke detector with fire alarm panel and wall mounted electrical panels houses the

						feeder for the motor with all electrical, mechanical & electronic, parts/controls and other accessories installed in side the panel, with all internal/external wiring (control, power and earthling)
6.	**D.M. Water Cooling Plants for various Cooling Systems Location: TBAC Plant room**					
a.	Cation-Anion Unit	1	6 CMPH	Ion Exchange	CA-600	This unit generates D.M. water of <30 micro-S, which is used through M.B. Unit to the various experimental devices as a secondary cooling media. This includes all interconnected piping, valves, Degasser, air blower and Neutralizing pumps, instruments like rotameter, conductivity meter, sensors, gauges and necessary controls etc, with up flow filer **Note: The operation, maintenance and regeneration with required quantity of chemical will be in the scope of the successful AMC contractor. Resin replacement will be in IPR scope if needed.**
b.	Mixed Bed Unit	1	40 CMPH	Ion Exchange	MB-1000	This unit maintains the conductivity of D.M. water <1micro-S. The water coming from Cation- Anion unit is circulated through Mixed Bed unit before passing to various experimental devices. This includes all interconnected piping, valves, instruments like rotameter, conductivity meter, pH meter, sensors, gauges and necessary controls etc. **Note: The operation,**

						maintenance and regeneration with required quantity of chemical will be in the scope of the successful AMC contractor. The resin replacement of the unit shall be carried out by IPR as and when required.
c.	Raw water Pump	2	2 HP			With coupled motor. These are meant for feeding water to the inlet of Cation-Anion unit. This will include interconnected piping, valves, gauges etc.
d.	D.M. Water Pumps for LVPD experimental devices	2	15 HP	Johnson		Pump with 15-hp/TEFC/4P motor, coupled type, The pump will circulate D.M. water from storage tank to the experimental device for cooling purpose through 240 KW PHE.
e.	DM Water Pumps for Aditya Experimental devices	2	3 HP	Flowchem		BPO (Back Pull Out) type centrifugal pump, 180 lpm @ 25 m head. The pump will circulate D.M. water from storage tank to the experimental device for cooling purpose through 13 KW PHE. This pump is primary side cooling pump.
f.	DM Water Pumps for Basic lab Experimental devices	2	7.5 HP	CRI		Vertical mono block centrifugal pump, 265 lpm @ 58 m head. The pump will circulate D.M. water from storage tank to the experimental device for cooling purpose through 50 kW PHE. This pump is primary side cooling pump.
g.	DM Make up water pumps	1	3 HP	Johnson	CCR 25-160	These are used for make-up of D.M. water Make up tank. These pumps are coupled type with 3 HP motor and drives set.
h.	Drain water pump	1	2 HP	Beacon	1-1/2 DM6 LD162	This is Monoblock type pump and is used to

						drain out water from the pit at TBAC plant.
i.	D.M. Water storage tank for Aditya and LVPD-Cryogenic experimental devices.	1	45000 Liters		Made out of SS sheet, cubical type	This tank has a partition in to two. 15000 liters for Aditya and 30,000 liters for LVPD & Cryogenic D.M. Water Storage.
j.	D.M. Make up tank for Aditya D.M. water storage tank	1	2000 liters		Made out of SS sheet, cubical type	This is used for the make up of Aditya storage tank. This shall include all necessary fittings, valves, glass indicator with inter connected SS piping.
k.	D.M. Make up tank for R.F experiments' D.M. Water storage tank	1	1000 liters		Made out of SS sheet, cubical type	This is used for the make-up of D.M. water storage tank made for R.F experimental devices. This includes all necessary fittings, valves; Digital Level indicator with inters connected SS piping.
l.	D.M. water and cooling water SS & MS piping	Lot				This covers entire Interconnected water piping between above listed all equipments like CTs', heat exchangers, experimental devices etc. This will cover all necessary fittings and controls mounted in the piping like valves, strainers, pressure and temp. gauges, purge valves, flow switches, Pressure regulating valves, float valves, etc. fitted in the piping of the plants. Note: This includes SS piping, fittings, valves, and flow meters with display units, temperature and press. Gauges fitted in the DM water circulation system meant for LVPD, Aditya and Cryogenic cooling systems

7.	**Chiller Package units for SST-1 Vacuum system experiments Location: Nr. SST-1 ECRH**					
a.	Chiller Package Unit (Industrial Water Cooler type) consists of following equipments:	1	9TR	Razvi		For cooling of SST-1 Vacuum system experiments. Evaporative tube embedded SS storage tank of 750 Ltrs, R 22 refrigerant. This also includes 200 Watts CCH, shut off valves, drier, filters, site glass, expansion valve and copper piping with gauge panel boards. Note: Package unit is having twin's individual circuit of 4.5 TR.
	i) Compressor	2	5 TR	Kirloskar-	AG series	R-22 based sealed reciprocating type compressor.
b.	Controls					
	i) Expansion valves	2	5 TR	Danfoss		
	ii) HP/LP Cut outs	2		Honeywell controls	YK 306	
	iii) Digital Temperature transmitter	1				
c.	Process Water Pumps	2	1 HP	Flowchem	PPM 25/125	All are Monoblock pumps. (1W+1S)
d.	Chilled water insulated piping	1	Lot			This covers entire interconnected water SS piping between above listed all equipments like chillers, pumps, experimental devices etc. Also, this will cover all necessary fittings and controls mounted in the piping like NRVs', BLVs', Y-strainers, pressure and temp. Gauges purge valves, flow switches, fitted in the piping of the system
e.	Local Control panel for Plant	1	No		Floor mounted type	Starter panel for above three plant with all electrical, mechanical & electronic, parts/controls and other accessories installed in side the panel and in SST1 hall, with all internal/external wiring (control, power

						and earthling)
8.	**Soft Water Plant at Pump House** **Location: Pump House**					
a.	Soft water plant	2	30 CMPH	Doshion		It generates soft water, which is circulated through cooling water lines to the various A.C. Plants and WCS plants. This includes entire interconnected piping, valves, tanks, instruments, gauges, level indicators in the tanks regenerates, hardness testing kit and consumables for regeneration. **Note: The operation, maintenance and regeneration of the soft water plants including supply of salt for regeneration will be in the scope of the successful AMC contractor. Approx. 1 to 2 regeneration of each plant will require in a month. The resin replacement of the unit shall be carried out by IPR as and when required.**
b.	Raw water Pumps	5	30 CMPH	Mather + Platt	Back pullout	The pump feeds water from raw/Fire water tank to soft water plant. Connected with 10 HP/4P/ABB motor, interconnected water piping, valves, NRVs', strainers, gauges etc.
c.	Soft Water Pumps	2	60 CMPH	Mather + Platt	Back pullout	The pump feeds water from soft water tank to overhead RCC tank. Connected with 15 KW/4P/Siemens motor, interconnected water piping, valves, NRVs', strainers, gauges etc.
d.	Drain Pump	1				The submersible pump of 1 HP for drain the water from water pit in the pump house
e.	Soft Water MS/ GI piping	Lot				This covers entire interconnected water piping between above listed pumps, storage and raw water tanks and Soft water plant etc. Also, this will cover all necessary fittings and

						controls mounted in the piping like Gate & Globe valves, NRVs', BFVs', strainers, pressure and temp. Gauges purge valves, flow switches etc. fitted in the piping of the plants.
f.	Local Control panel	1			Floor mounted type	Starter panel for 5 nos. raw water, 2 nos. soft water pumps and one submersible pump motors with all electrical, mechanical & electronic, parts/controls and other accessories installed in side the panel, with all internal/external wiring (control, level sensor & switch, power and earthling)
g.	Status indication panel	1			Floor mounted type	This indicates the status of raw water and soft water pumps and the level of soft water, over head tanks with remote ON/OFF facilities with all electrical, mechanical & electronic, parts/controls and other accessories installed in side the panel, with all internal/external wiring (control, level sensor & switch, power and earthling)
9.	**R.F. Water Cooling systems for various RF & other experimental system Location of plant: MEL Basement & TBAC Plant room**					
	D.M. Water cooling system for R.F. lab. Various experimental set ups like (ICRH, ECRH, Upper and lower body systems)	1 set	240 KW			Note: The operating and maintaining of the system will be in the scope of the successful AMC contractor. IPR will coordinate with Operation Supervisor of successful tenderer for operation of RF Cooling system.
a.	D.M. Water pumps	2	2.2 KW	Johnson	CCR 32-160 R6M2L3	This is for the circulation of D.M. water through Mixed Bed unit to D.M.Water storage tank. Pump is with 3 HP/4P motor, drive packages.
b.	D.M. Water pump	1	10 HP	Johnson	CCR50-200 R6M2L3	This is for the circulation of D.M. water through Mixed Bed unit to D.M.Water storage tank. Pump is with

						10 HP/4P motor, drive packages.
c.	D.M. Water pumps	2	30 HP	Johnson	CCR 65-200 R6M2L3	This is for the circulation of D.M. water from storage tank to various R.F. experimental set ups through PHE. Pump is with 30 HP/4P motor, drive packages.
d.	D.M. Water pumps with single VFD unit	2	60 HP	Johnson	CCR 80-250 R6M2L3	This is for the circulation of D.M. water from storage tank to various R.F. experimental set ups through PHE. Pump is with 60 HP/4P motor, drive packages and operated through Variable Speed Drive unit from 0 to 50 Hz frequency to control the flow across various exp. devices.
e.	S.S Water Piping	1 lot				This includes all interconnected SS piping between pumps, tanks, PHE, and various experimental set ups along with all necessary fittings, valves like BFVs', NRVs', strainers, Breathing valve, pressure safety valve, flow meter with display unit, level sensor with display, and sensors, rotameter, pressure and temperature gauges etc.
f.	Cooling Towers	2	125 TR	Paharpur	1868P	FRP, induced draft type, 114 CM/Hr with 10 hp/TEFC/750 rpm ABC fan motor.
g.	Cooling water pumps	2	11 KW	Cromp. & Greaves	MBR 15.2 D	These are Monoblock type pumps required to circulate cooling water as a primary media through PHE to cool down the D.M. water. This includes the entire interconnected M.S. piping between cooling towers and PHE along with all necessary fittings and controls mounted in the piping like Gate & Globe valves, NRVs', BFVs', Pot strainers, Y-strainers, pressure and temp. Gauges purge valves; float valves, etc. fitted in the

						piping of the plants.
h.	Drain water Pump	2	2 HP	KBL	SP-1MM	This is Monoblock type pump and is used to drain out water from the pit of D.M.Water Pumps.
i.	Mixed Bed Unit	1	15 CMPH	Ion-Exchange	MB-600	This unit is used to maintain the conductivity of D.M. water< 1 mS. This unit includes Air blower, resin tank, interconnected rubber lined piping, valves/fittings, Digital conductivity indicator, sensors, level indicator, rotameter etc. **Note: The operation, maintenance and regeneration with required quantity of chemical will be in the scope of the successful AMC contractor. The resin replacement of the unit shall be carried out by IPR as and when required.**
j.	De-Oxygenation unit	1	15 CMPH	Ion-Exchange	350CM	This unit is used to maintain the oxygen content of D.M. water < 0.5 ppm which is required to be circulated through some experimental set ups This unit includes the main tank with interconnected piping, valves/fittings, Digital indicator, sensors, rotameter , motorized stirrer etc. **Note: The operation, maintenance and regeneration with required quantity of chemical will be in the scope of the successful AMC contractor. The resin replacement of the unit shall be carried out by IPR as and when required.**
k.	Electrical panel for above plant	1				This is the main electrical panel with incomer as 250 amps MCCB and feeders for various D.M.Water pumps listed above with annunciation cum indication panel, all electrical, mechanical & electronic,

						parts/controls and other accessories installed in side the panel, with all internal/external wiring (control, power and earthling)
10.	**Chiller Package Unit for Beta Lab Experimental Device Location: Near Beta Lab.**					
a.	Chiller Package Unit consists of following equipments:	1	7.5 TR	Voltas		For cooling of Beta Lab. Experimental device
	i) Compressor	2	7.5 TR	Voltas	06D024	R-22 based semi-sealed, reciprocating type compressors. 1 compressor acts as a stand by unit. With refrigerant cooled sealed motor 11.25 KW.
	ii) Condenser	1	7.5 TR	Voltas	9 ABB	Air cooled tube and fins type
	iii) Chiller (Evaporator)	1	7.5 TR	PAT	DX	Shell and Tube type
	iv) Refrigerant piping	1set				This includes shut off valves, drier, filters, site glass and copper piping with gauge panel boards.
b.	Controls					
	i) Expansion valves	1	7.5 TR	Sporlan	TEV05	
	ii) HP/LP Cut outs	1		Indfoss	MP-15	
	iii) OSS	1		Indfoss	MP-55	
	iv) Operating Thermostat	1		Honeywell	T678A	
	v) AFT	1		Honeywell		
	vi) Refrigerant pres. gauges	4		H. Guru/ Fiebig		HP-2 nos, LP-2 nos,
	vii) Chiller diff. Press. Switches	1		Indfoss	IPSD-50	
	viii) Water press. Gauges	2		H. Guru/ Fiebig		4” dial type
	ix) Water temp. Gauges	1		Fiebig		Stem type
	x) USV	2				1 no. In each compressor
	xi) CCH	2	40 Watts			1 no. In each compressor
c.	Chilled Water Pumps	4	2 HP	Beacon	1-1/2 DM6-LD	All are Monoblock pumps. 2 are for primary chilled water circuit and 2 nos. are for secondary Water-cooling circuits.

d.	Chilled Water Storage Tank	1	1000 liters	Sintex	Cylindrical type	Insulated chilled water tank for the storage purpose
e.	Chilled water insulated piping	1	Lot			This covers entire interconnected water piping between above listed all equipments like chillers, pumps, , experimental devices etc.. Also, this will cover all necessary fittings and controls mounted in the piping like NRVs', BFVs', Y-strainers, pressure and temp. Gauges purge valves, flow switches, fitted in the piping of the plants.
f.	Local Control panel for Plant	1	No		Floor mounted type	Starter panel for above plant with all electrical, mechanical & electronic, parts/controls and other accessories installed in side the panel, with all internal/external wiring (control, power and earthling)
11.	**Chiller Package units for First face wall experiment & LVPD experiment MEL Lab. & Nr. Utility building.**					**Location: Outside of**
a.	Chiller Package Unit (Industrial Water Cooler type) consists of following equipments:	2	9TR	Razvi		For cooling of LVPD, First face wall Experimental devices and ECRH System. Evaporative tube embedded SS storage tank of 750 Ltrs, R 22 refrigerant. This also includes 200 Watts CCH, shut off valves, drier, filters, site glass, expansion valve and copper piping with gauge panel boards. Note: Each package unit is having twin's individual circuit of 4.5 TR.
	i) Compressor	4	5 TR	Kirloskar-	AG series	R-22 based sealed reciprocating type compressor.
b.	Controls					
	i) Expansion valves	4	5 TR	Danfoss		

	ii) HP/LP Cut outs	4		Honeywell controls	YK 306	
	iii) Digital Temperature transmitter	2				
c.	Chilled Water Pumps for LVPD & First Wall System	4	1 HP	CG	2850 rpm	All are Monoblock pumps. 2 nos. working and 2 no. Standby
d.	Chilled water insulated piping	2	Lot			This covers entire interconnected water piping between above listed all equipments like chillers, pumps, experimental devices etc.. Also, this will cover all necessary fittings and controls mounted in the piping like NRVs', BFVs', Y-strainers, pressure and temp. Gauges purge valves, flow switches, fitted in the piping of the all three plants (First face wall experiment & LVPD experiment Device)
e.	Local Control panel for Plant	2	No		Floor mounted type	Starter panel for above three plants with all electrical, mechanical & electronic, parts/controls and other accessories installed in the panel with all internal/external wiring (control, power and earthling)
12.	**Chiller Package unit for Vacuum Furnace experiment Device Location: Outside of Pump House**					
a.	Chiller Package Unit (Industrial Water Cooler type) consists of following equipments:	1	10 TR	Air Tech Engineers		
	i) Compressor	1	10 TR	Copeland	Model-ZR12M3-TWD-551	R-22 based sealed scroll type compressor.
	ii) Condenser	1				Air cooled tube and fins type
	iii) PHE (SS Plate type heat exchanger)	1			DX	This PHE installed in chiller package and connected to in build tank is having capacity of 200 liters water storage.

	iv) Refrigerant piping	1 set				This includes shut off valves, drier, filters, site glass and copper piping with gauge panel boards.
	v) Condenser fan motor	3		CG	410 W	This includes the fan blade and motors.
b.	Controls					
	i) Expansion valves	1	10 TR			
	ii) HP/LP Cut outs	1				
	iii) Digital Temperature transmitter	1				
	iv) Refrigerant pres. gauges	2		H. Guru / Fiebig		HP-1 nos, LP-1 nos,
	v) Chiller diff. Press. Switches	1				
	vi) Water press. Gauges	3		H. Guru/ Fiebig		4" dial type
	xii) CCH (Heater)	1				
c.	Chilled Water Pumps	1	5 HP	KBL		Mono block pumps.
d.	Chilled water insulated piping	1	Lot			This covers entire interconnected water piping between above listed all equipments like Tank, pumps, PHE and experimental devices etc.. Also, this will cover all necessary fittings and controls mounted in the piping like NRVs', BFVs', 3 way diverting valves, solenoide valves, Y-strainers, pressure and temp. Gauges, purge valves, flow switches, fitted in the piping of the plant.
e.	Local Control panel for Plant	1	No		Inbuilt	Starter panel for above plant with all electrical, mechanical & electronic, parts/controls and other accessories installed in the package with all internal/external wiring (control, power and earthling)
13.	**Chiller Package unit for LASER experiment Device Location: Outside Laser Lab, SST1 Building**					
a.	Chiller Package Unit (Industrial	1	15 TR	Air Tech Engineers		For cooling of LASER experiment Device.

	Water Cooler type) consists of following equipments:					
	i) Compressor	3	5 TR	Kirloskar	Model-KCG-562 HAE	R-22 based sealed reciprocating type compressor.
	ii) Condenser	1				Air cooled tube and fins type
	iii) PHE (SS Plate type heat exchanger)	3			DX	This PHE installed in chiller package and connected to in build tank is having capacity of 200 liters water storage.
	iv) Refrigerant piping	3 set				This includes shut off valves, drier, filters, site glass and copper piping with gauge panel boards.
	v) Condenser fan motor	4		CG	410 W	This includes the fan blade and motors.
b.	Controls					
	i) Expansion valves	3	5 TR			
	ii) HP/LP Cut outs	3				
	iii) Digital Temperature transmitter	1				
	iv) Refrigerant pres. gauges	6		H. Guru / Fiebig		HP-3 nos, LP-3 nos,
	v) Chiller diff. Press. Switches	3				
	vi) Water press. Gauges	3		H. Guru/ Fiebig		4" dial type
	xii) CCH	3				1 no. In each compressor
c.	Chilled Water Pumps	1	3 HP	Grundfos		Mono block pumps.
d.	Chilled water insulated piping	1	Lot			This covers entire interconnected water piping between above listed all equipments like Tank, pumps, PHE and experimental devices etc.. Also, this will cover all necessary fittings and controls mounted in the piping like NRVs', BFVs', Y-strainers, pressure and temp. Gauges, purge valves, flow switches, flow meter fitted in the piping

						of the plant.
e.	Local Control panel for Plant	1	No		Inbuilt	Starter panel for above plant with all electrical, mechanical & electronic, parts/controls and other accessories installed in the package with all internal/external wiring (control, power and earthling)
14.	**Chiller Package unit for LASER experiment Device (New procured) Location: Terrace of MEL Lab**					
	Chiller Package Unit (Industrial Water Cooler type) for LASER device.	1	15 TR			For cooling of LASER experiment Device. Skid based three circuit of Danfoss make5 TR capacity with R22 refrigerant, 02 nos. of Flowmatics make 0.5 HP Water process pump of flow capacity 33 lpm @1.5 bar, control panel, temperature controller, storage tank, condensing coils, condenser fans etc.
15.	**Chiller Package units for DFD (Diverter and First wall Technology Development Division) Location: IPR and IPR-Extension lab, GIDC, Gandhinagar (One at each location).**					
	Chiller Package Unit (Industrial Water Cooler type) for DFD system.	2	10 TR	Frigidaire Refrigeration		For cooling of DFD experimental Device. Skid based twin circuit of 5 TR x 2 capacity for each Industrial water cooler with R22 refrigerant, Water process pump of 20 lpm @7.8 bar, water circulating pump, control panel, temperature controller, SS storage tank, condensing coil, condenser fans etc.
16.	Air Cooled Package unit for Computer Hall-Mezz. Floor	1	10 TR	Batliboi	BB1OAC5M	A package unit consists of 2 nos. individual 5 TR refrigerant circuits with 2 nos. Sealed compressors, Air-cooled condensers, cooling coil, blower unit, drive package, pre filters, and interconnected refrigerant piping with safety/controls, electrical panel with power & control wiring and

						earthling. S.A/R.A ducts, grilles, insulation, canvass, fire dampers, smoke detectors. This also includes a Main electrical panel with incomer SFU/MCCB.
17.	Air Cooled Package unit for R.F. Lab.- Ground & First Floor	1 1 2	10TR 15 TR 7.5 TR	Blue star	DPA-1202 DPA-1803 DPA-901	Package units consists of Sealed compressors, Air cooled condensers, cooling coil, blower unit, drive package, pre filters, interconnected refrigerant piping with safety/controls, electrical panel with power & control wiring and earthling. S.A/R.A ducts, grilles, insulation, canvass connections. Note: 10 TR Package has 2 circuits of 5TR with 2 nos. compressors, 15 TR Package has 3 circuits of 5 TR with 3 nos. sealed compressors, where as in 7.5 TR Package single circuit with single sealed compressor of 7.5 TR.
18.	Air Cooled Package unit for Admin Annexure	2	10 TR	Batliboi	A1000A2H5	As mentioned above. This also includes a Main electrical panel with incomer SFU/MCCB.
19.	Air Cooled Package unit for Negative NBI in Utility, FF	2	17 TR	Voltas	DPUASC170CD	Package unit consists of 2 nos. individual 8.5 TR refrigerant circuits with 2 nos. Sealed scrolled compressors, Air-cooled condensers, cooling coil, blower unit, drive package, pre filters, and interconnected refrigerant piping with safety/controls, inbuilt microprocessor control, electrical panel with power & control wiring and earthling. S.A ducts, grilles, insulation, canvass. This includes the main electrical panel

						with 125 amps incomer TP MCCB and different feeders for each unit.
20.	Air cooled Package unit for Control room of Aditya Hall (1W+1S)	2	11 TR	Voltas	DPUASC110	As mentioned above. This also includes a Main electrical panel with incomer SFU/MCCB, remote controller panel and junction box.
21.	Air Cooled Package unit for Seminar Hall, FCIPT,Gandhi nagar	2	11 TR	Voltas	DPUASC110	Package unit consists of 2 nos. individual 5.5 TR refrigerant circuits with 2 nos. Sealed scrolled compressors, Air-cooled condensers, cooling coil, blower unit, drive package, pre filters, and interconnected refrigerant piping with safety/controls, inbuilt microprocessor control, electrical panel with power & control wiring and earthling. S.A/RA ducts, fire damper, fresh air damper, grilles, duct insulation, canvass. This includes the main electrical panel with 100 amps incomer TP MCCB and different feeders for each unit.
22.	Air Cooled Package unit for IPR-Extension lab, GIDC, Gandhinagar	4	11 TR	Bluestar	DPA1322R1	As mentioned above. This also includes 02 nos. of main electrical panel with incomer MCCB for 04 Package AC.
23.	**Ductable Split ACs for Guest House & Student Facilities at IPR**					
a.	Ductable Split AC for Student Facility Building (For GF dining area)	01	7.5 TR (2.5TRx3 Circuit)	Hitachi		1 nos. indoor unit, 1 nos. outdoor unit Indoor unit (2.5TRx03 Circuit), condensing unit consists of 03 no. individual 2.5 TR refrigerant circuits with Scroll compressor, Air-cooled condenser, Service valves, HP/LP switches, Filter drier, canvas connection, ducting, dampers, grills and other accessories and interconnected refrigerant

						piping to Indoor unit with safety/controls, remote control for temperature adjustment, electrical panel with power & control wiring and earthling.
b.	Ductable Split AC for Student Facility Building, (For Gymnasium area)	01	5.5 TR	Hitachi		1 nos. indoor unit, 1 nos. outdoor unit and other details Details as per above
c.	Ductable Split AC for Student Facility Building (For Indoor Sports area)	01	5 TR (2.5TRx2 Circuit)	Hitachi		2 nos. indoor unit, 1 nos. outdoor unit and other details Details as per above
d.	Ductable Split AC for Guest House Building (GF Dinning & FF conference hall)	02	5 TR (2.5TRx2 Circuit)	Hitachi		2 nos. indoor unit, 1 nos. outdoor unit and other details Details as per above.
24.	**Ductable Split ACs for IPR-Extension lab, GIDC, Gandhinagar**					
a.	Ductable Split AC for Labs in IPR-Extension Lab Building (GF and LIGO area)	02	8.5 TR	Carrier		1 nos. indoor unit, 1 nos. outdoor unit with single circuit condensing unit consists of Scroll compressor, Air-cooled condenser, Service valves, HP/LP switches, Filter drier, canvas connection, ducting, dampers, grills and other accessories and interconnected refrigerant piping to Indoor unit with safety/controls, remote control for temperature adjustment, electrical panel with power & control wiring and earthling.
b.	Ductable Split AC for Labs in IPR-Extension Lab Building (GF and LIGO area)	10	5.5 TR	Carrier		Details as per above
25.	**Ductable Split ACs for Canteen at IPR**					
a.	Ductable Split AC for canteen at IPR	02	5.5 TR	Carrier		Details as per above
26.	**VRV/ VRF Air Conditioning system for LHCD Lab**					

a.	Condensing Unit (Outdoor unit)	02	12 HP TR	TOSHIBA		VRV/ VRF condensing (outdoor) units of 12 HP TOSHIBA make with hermetically sealed highly efficient Scroll Compressors, condenser coils, fans, inverter, microprocessor controller, interconnected refrigerant pipes, electric panel, control wires and power cables etc.
b.	Ductable Indoor Unit	02	8 TR	TOSHIBA		Ceiling mounted ductable unit of 8 TR cooling capacity, 3000 CFM@270 Pascal air flow with cooling coil, centrifugal fan, filter, EEV (Electronic expansion valve), corded remote controller, interconnected refrigerant pipes etc.
c.	Wall mounted indoor Unit	04	1.65 TR	TOSHIBA		Wall mounted indoor unit of 1.65 TR cooling capacity with cooling coil, blower motor, filter, cordless remote controller, EEV (Electronic expansion valve), interconnected refrigerant pipes etc.
d.	HRV unit for fresh air supply	01	203 CFM	TOSHIBA		HRV (Heat recovery ventilator) unit of 203 CFM @ 80% efficiency with fresh air blower, exhaust air blower, air to air non-flammable cross flow heat exchanger etc.
e.	Central remote control unit	01		TOSHIBA		Central remote control unit for controlling the all indoor units, outdoor units and HRV unit including interconnected control and power cables etc.
27.	**Dx type Centralize air conditioning system at canteen, IPR**					
f.	Air Handling Units (AHU)	01	25.5 TR, 8000 CFM	Zeco		With drive package, pre-filters, multi circuit cooling coil, expansion valve and thermostat. Insulated Ducting, SA damper, canvass, grilles, fresh air filters & dampers, fusible link type fire damper.

g.	Condensing Units	03	8.5TR	Carrier		Condensing units consists refrigerant circuits with Scroll compressor, Air-cooled condensers, Service valves, HP/LP switches, microprocessor based internal control panel, Filter driers, other accessories and interconnected refrigerant piping to AHU with safety/controls, remote control for temperature adjustment, control panel with control wiring and earthling.
h.	Electrical Panel for Dx type AC system	01				This is the main electrical panel with incomer TPN MCCB, DOL/ Star-delta starters, MCBs for AHU, various Condensing Units with indication panel, all electrical, mechanical & electronic, parts/controls and other accessories installed inside the panel, with all internal/external wiring/ cabling (control, power and earthling).
i.	Control Panel for Dx type AC system	01				This is the main PLC based control panel for AHU and Condensing Units with indication panel to control the temperature, run time equalizer etc and remote operation push switch. This includes all electrical, mechanical & electronic, parts/controls and other accessories installed inside the panel, with all internal/external wiring/ cabling (control and earthling).
28.	**Dx type Centralize air conditioning system for HVPS lab**					
a.	Air Handling Units (AHU)	02	15 TR, 6000 CFM	Zeco		Details as mentioned above in respective column.
b.	Condensing Units	04	8.5TR	Hitachi		Details as mentioned above in respective column.
c.	Electrical Panel for Dx type AC	01				Details as mentioned above in respective

	system					column.
d.	Control Panel for Dx type AC system	04				Details as mentioned above in respective column.
29.	**Dx type Centralize air conditioning system for APPS lab**					
a.	Air Handling Units (AHU)	01	25.5 TR, 8000 CFM	Citizen		Details as mentioned above in respective column.
b.	Condensing Units	03	8.5TR	Carrier		Details as mentioned above in respective column.
c.	Electrical Panel for Dx type AC system	01				Details as mentioned above in respective column.
d.	Control Panel for Dx type AC system	01				Details as mentioned above in respective column.
30.	**Dx type Centralize air conditioning system for RHVPS lab**					
a.	Air Handling Units (AHU)	01	34 TR, 13500 CFM	Citizen		Details as mentioned above in respective column.
b.	Condensing Units	04	8.5TR	Carrier		Details as mentioned above in respective column.
c.	Electrical Panel for Dx type AC system	01				Details as mentioned above in respective column.
d.	Control Panel for Dx type AC system	01				Details as mentioned above in respective column.
31.	**Dx type Centralize air conditioning system at FCIPT, GIDC, Gandhinagar**					
a.	**Air Handling Units (AHU)**					
	i) Admin & Library Area	01	11 TR, 4400 CFM	Citizen		Details as mentioned above in respective column.
	ii) Staff area	01	17 TR, 6800 CFM	Citizen		Details as mentioned above in respective column.
	iii) Basic experimental Lab.	01	8.5 TR, 3400 CFM	Citizen		Details as mentioned above in respective column.
	iv) SPIX/ XPS Lab	01	8.5 TR, 3400 CFM	Citizen		Details as mentioned above in respective column.
b.	**Condensing Units**					
	i) For Admin & Library area AHU	02	5.5TR	Carrier		Details as mentioned above in respective column.
	ii) For Staff area AHU.	02	8.5 TR	Carrier		Details as mentioned above in respective column.

	iii) For Basic Experimental Lab. AHU.	01	8.5TR	Carrier		Details as mentioned above in respective column.
	iv) For SPIX/ SPX Lab AHU.	01	8.5TR	Carrier		Details as mentioned above in respective column.
c.	Electrical Panel for Dx type AC system	01				Details as mentioned above in respective column.
32.	Air Washer and Scrubber Unit (Kitchen Exhaust) for canteen, IPR					
	i) Air Scrubber (Kitchen Exhaust) Unit	1	15000 cfm	Citizen		With drive package Double skin scrubber (Kitchen exhaust) unit with water spray nozzle, filter, strainer, eliminator, SS kitchen hoods with accessories, damper. This includes insulated ducting, pre-filters, water tank, float valve, 2 HP pump and connected water piping and necessary valves/fittings/strainer etc.
	ii) Air Washer Unit	1	13500 cfm	Citizen		With drive package Double skin air washer unit with fills, water spray nozzle, filter, strainer, eliminator, with accessories. This includes insulated ducting, damper, pre-filters, water tank, float valve, 2 HP pump and connected water piping and necessary valves/fittings/strainer etc.
	iii) Electric panel	1				This is the main electrical panel with incomer TPN MCCB, DOL/ Star-delta starters for air washer, kitchen exhaust unit and associated pumps as mentioned above with indication panel, all electrical, mechanical & electronic, parts/controls and other accessories installed inside the panel, with all internal/external wiring/ cabling (control, power and earthling).

33.	Air Washer Unit for Workshop	1	18000 cfm	Citizen		With drive package Double skin air washer unit with fills, water spray nozzle, filter, strainer, eliminator, with accessories. This includes insulated ducting, damper, pre-filters, water tank, float valve, 2 nos. 1 HP pump and connected water piping and necessary valves/fittings/strainer etc.
34.	**Ventilation Systems for various plant rooms / Utility Halls / Compressor Hall/other labs**					
a.	Ventilation System for KBAC plant room	1	6000 cfm	PAT		This ventilation system is for the plant room only. This consists of one no. Centrifugal blower unit, 5 HP/ 4P motor with pre filters, S.A. insulated ducting, diffusers/grilles, canvass connection, 2 nos. exhaust fans of 1 HP with local control panel, power cabling/earthling.
b.	Ground Floor of Utility Building	2 sys	20000 cfm	Patel Airtemp	PB-84	A complete set of centrifugal blower with 10 HP motor, belt drive package, fresh air filters, ducting, grilles, fire dampers with limit switch, ionized type smoke detector with fire alarm panel and wall mounted electrical panel houses the feeder for the motor with all electrical, mechanical & electronic, parts/controls and other accessories installed in side the panel, with all internal/external wiring (control, power and earthling)
c.	First Floor of Utility Building	2 sys	17500 cfm	Patel Airtemp	PB-84	As mentioned above
d.	Screw Chiller plant room	1 sys	11000 cfm	Patel Airtemp	PB-62	As mentioned above but with 7.5 HP motor.
e.	Air Exhaust Unit for Nitrogen	01	5000 cfm	Chauhan Engineering		A complete set of Single Skin Cabinet type

	Baking Plant Room					exhaust air unit with 2 HP motor, belt drive package, ducting, grilles and wall mounted electrical distribution board and Star-Delta starter for the motor with all electrical, mechanical & electronic, parts/controls and other accessories.
f.	Air Exhaust Unit for Compressor hall	01	15000 cfm	Citizen		A complete set of Single Skin Cabinet type exhaust air unit with 5 HP motor, belt drive package, ducting, grilles and wall mounted electrical panel with all electrical, mechanical & electronic, parts/controls and other accessories.
g.	**Roof Extractors for exhaust**					
	i) First floor of Utility Building	11	600mm dia	Patel Airtemp	DH-62	Fans are mounted at the terrace of Utility Bldg.
	ii) Cryogenic Hall	6	750 mm dia	Patel Airtemp	DH-75	Fans are mounted at the terrace of cryogenic Bldg.
h.	**Exhaust Fans**					
	i) Ground Floor of Utility Building	27	300 mm dia	GEC Alstom	GPMN-38061	Used for the exhaust of entire hall
	ii) Screw Chiller Plant room	4	380 mm dia	GEC Alstom	GPN-45061	Used for the exhaust of the plant room
	iii) He-Compressor Plant room	10	4000 CFM	GEC	GPN-45061	For exhaust air from the plant.
	iv) SST Water Cooling Plant room	11	300 mm dia	GEC Alstom	GPMN-38061	For exhaust air from the plant.
	v) Nitrogen Baking Plant room	3	450 mm dia, 2500 CFM	GEC Alstom	GPMN-38061	For exhaust air from the plant.
	vi) Nitrogen Baking Plant room	1	300 mm dia, 720 cfm	GEC Alstom	GPMN-38061	For exhaust air from the plant.
i.	**Electrical Panels for above equipments**					
	i) Local Control panel for Ventilation systems mentioned as	7			Wall mounted type	Starter panel for Blower motor with all electrical, mechanical & electronic, parts/controls and other accessories

	item no. 14 A & 14 B					installed in side the panel, with all internal/external wiring (control, power and earthling)
	ii) Local Control panel for Ventilation systems mentioned as item no. 14 C	1			Wall mounted type	It houses feeders for fan motor including incomer SFU with all electrical, mechanical & electronic, parts/controls and other accessories installed in side the panel, with all internal/external wiring (control, power and earthling)
	iii) Local Control panel for First floor of Utility Building	1			Floor mounted type	It houses feeders for 11 nos. roof extractors (of utility first floor) with all electrical, mechanical & electronic, parts/controls and other accessories installed in side the panel, with all internal/external wiring (control, power and earthling)
	iv) Local Control panel for Roof extractors Cryogenic Hall	1			Wall mounted type	It houses feeders for 6 nos. roof extractors (of Cryogenic Hall) with all electrical, mechanical & electronic, parts/controls and other accessories installed inside the panel, with all internal/external wiring (control, power and earthling)
35.	Kitchen exhaust unit for Guest House and Student Facility	2	6400 cfm	Ethos		A complete set of Single Skin Cabinet type Kitchen Exhaust Unit with 5 HP motor, belt drive package, ducting, SS Kitchen Hoods and wall mounted motor starter with all electrical, mechanical & electronic, parts/controls and other accessories.
36.	**Cooling tower and CT pumps for HVPS System**					
	i) Cooling Tower	1	170 TR	Mihir	CM 9/7.5D/5	Induced draft counter flow FRP cooling tower with all accessories.
	ii) CT fan motor	1	5 HP	Navyug		TEFC induction motor of 5 HP for

						cooling tower fan.
	iii) CT Pumps	2	15 HP	Grundfoss		Back Pull Out pump with 15 HP motor of 1000 lpm @ 30 m head.
	IV) Electric Panel	1				Main electrical panel with incomer TPN MCCB, DOL/ Star-delta starters for CT fan and CT pumps and spare feeder with indication panel, all electrical, mechanical & electronic, parts/controls and other accessories installed inside the panel, with all internal/external wiring/ cabling (control, power and earthling).

ANNEXURE – II

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PLANTS MAINTENANCE SCHEDULE

(For equipments covered under item S. No. 1 to 36 as per Annexure-I.b)

1. COMPRESSOR:

a. OPEN / SEMI HERMETIC COMPRESSOR (SCREW/RECIPROCATING TYPE)

Daily:
- Cleaning
- Checking lubrication oil (level & leakage) and maintain the level by make up if any.
- Checking and recording the operating parameters

Monthly:
- Check condition and alignment of compressor drive set of open compressor.
- Lubricate motor bearings (quarterly)
- Check operation of safety controls, shut off valves / angle valves and instruments

Yearly:
- Inspect oil for discoloration or contamination after initial charges as per manufacturers
- The Lubricating oil to be change every year preferably during winter maintenance.

Repairs: The Seal assembly, Supply and discharge valves, Items involved in stoppage of refrigerant / oil leakages, Expansion valves can be repaired and made functional. If they are found not repairable, then need to be replaced by the contractor with new one.

Replacement of Items: The following items, if found faulty need to be replaced **by the contractor with new one** –

Suction valve spring, connecting rod, bearing inserts, main bearings, cylinder sleeves, various rings, gasket sets, O ring sets, aluminum packing set, suction disc, star washer, seal cover plate, DV disc, DV guide assembly, DV spring, valve plate, oil pump assembly, DV guide lock washer, piston pins, piston pin lock rings, Connecting rod assembly, regulating valve, oil filter, felt filters, various brass & thrust washers, loading / unloading fork with piston assembly, hydraulic relays, internal lubrication tubing, capacity control valve, belt, sight glass, etc. The cost of these items to be borne by the contractor.

Note: Repairs or replacement of Crankshaft and crankcase of compressor will not be in the scope of contractor.

b. HERMETIC COMPRESSOR (SCREW /SCROLL/ RECIPROCATING TYPE)

Daily:
- Cleaning
- Checking lubrication oil (level & leakage) and recharging
- Checking operating parameters

Monthly: Check operation of safety controls & instruments and

Yearly:
- Inspect oil for discoloration or contamination.
- The Lubricating oil to be change every 2 year preferably during winter maintenance.

Repairs: The Motorized valves can be repaired and made functional. If they are found not repairable, then need to be replaced **by the contractor** with new one.

Replacement of Items: The following items, if found faulty need to be replaced **by the contractor** with new one –
The Sight glass, solenoid valves, NRV etc.

Note:

1. In case of failure of sealed scroll/reciprocating compressor, the faulty compressor has to be replaced by factory-repaired compressor **by the contractor**. However, final acceptance of any repaired / replaced compressor by the contactor shall be decided by the designated engineer / Section Head/ Division Head / Project Leader after testing in the respective system at IPR. In case the original manufacturer do not exist or model is changed, then the other available compatible makes or model of the compressor shall be got approved from the concerned engineer or Section Head/ Division Head /Project Leader and installed at no extra cost.

2. **Repairing of screw compressor will not be in the scope of contractor. However, necessary labour required to carrying out the work like dismantling faulty compressor from the skid, refitting the repaired compressor, pressure testing and re-commissioning the system after repairs with the supply of gas and oil shall be under the scope of contractor.**

2. CONDENSER / EVAPORATOR OF ALL CENTRAL CHILLING PLANTS & COOLING COILS OF AHUs

Daily: Check entering and leaving water temperatures, refrigerant pressures and all others parameters.

Monthly: Check cooling tower water being circulated for the suspended particles, algae formation, if. Find so; refill the circuit with fresh water.

Yearly:
- Check tubes and if require, de-scaling shall be carried out by the contractor using special chemicals.
- Check pressure setting of safety control switches.
- Drain the chilled water and refill the water system with air purging
- Check for operation of safety valves.

Repairs: The following items can be repaired and made functional by the contractor. If they are found not repairable, then need to be replaced by the contractor.
- All types of valves including gate, butterfly, globe, ball, diverting, balancing, float, needle, angle, shut off valves etc.

- Welding/brazing of leakage points, minor leaks etc.

Replacement: The water box gaskets have to be replaced **by the contractor**, whenever head is opened for brushing / de-scaling.

Note: The repairs or replacement of damaged shell or body of the heat exchanger will not be in the scope of contractor. If more than 10 tubes are found leaked in the shell, the same shall be repaired or replaced by IPR.

3. ALL PUMPS (CONDENSOR, CHILLERS, PROCESS, WATER TREATMENT PLANT, ETC.)

Daily: Check gland packing and mechanical seals for leakage

Monthly:
- Check the alignment and conditions of coupling to prevent damage to shaft and impeller
- Lubricate bearings with grease gun.
- Replace gland thread/ mechanical seal if required
- Check lubricant oil level / make up the oil (in case of oil lubricated pumps)

Yearly:
- Inspect shaft, shaft sleeves, bearing, bearing housing etc.
- Over hauling of all pumps. At the time of overhauling, the damaged parts need to be replaced by the contractor

Repairs: The Impeller and shaft can be repaired and made functional. If they are found not repairable, then need to be replaced by new one by the contractor.

Replacement: The Packing, mechanical seal, bush, bearing, Shaft sleeves, coupling etc. if found faulty need to be replaced with new one **by the contractor.**

Note: The repairs or replacement of damaged casing of pump will not be in the scope of contractor.

4. INSTRUMENTS & CONTROLS

- Monthly checking of operation of all controls, sensors, measuring devices, electronic control cards etc.
- Readjustment of control if necessary

Repairs: Motorized valves, flow meter with sensor & display, conductivity meter with sensor & display, pH meter with sensor & display, modulating valve with actuator, oxygen meter with sensor & display, rotameter can be repaired and made functional. If they are found beyond repairable, then need to be replaced by new one **by the contractor**.

Replacement: The items- Refrigerant level sensor, water level sensor, photo sensor, pressure transducer, thermostat, temperature controller with sensor and display, thermocouple, temperature gauge, sight glass, solenoid valves, pressure gauge, oil safety switch, HP/LP cut out, DP switch, flow switch, crank case heater, thermostatic expansion valve, thermostat (operating & antifreeze) smoke detector, air stat, safety valve, limit switch, humidistat, etc if found faulty need to be replaced with new one **by the contractor**.

5. REFRIGERANT PIPING:

Monthly: Check for leaks at the joints with soap solution test.

Yearly:
- Check valves for wear at the valve disc and seat.
- Check the insulation for breaks in the vapour barrier and other possible locations.

Repairs: Refrigerant piping can be repaired and made functional. If it is found beyond repairable, then need to be replaced by new one **by the contractor**.

Replacement: The items- check valves in Refrigerant piping, if found faulty need to be replaced with new one **by the contractor**.

6. WATER PIPING, VALVES & FITTINGS (MS & SS - BOTH ABOVE AND UNDER GROUND PIPINGS)

Daily: Check for leakages.

Monthly:
- Check for leaks at the joints.
- Check for leakage from valve glands.
- Clean Y-Strainers & pot strainers.

Yearly:
- Check for the damage in insulation
- Checks for the rusting in the pipes
- Check valves for wear at the valve disc and seat
- Replace gland thread if needed.
- Cleaning of pipe header from inside by opening end cover / flange

Repairs: The following items can be repaired and made functional. If they are found beyond repairable, then need to be replaced by **new one by the contractor**.

- All types of valves including gate, globe, ball, butterfly, non-return, balancing, float, purging, needle valves etc.
- Insulation breaks in piping, tank, etc.
- Leakages in pipes, flanges, joints and fittings, valve glands / seat and pinholes in piping & storage/expansion tanks have to be repaired. If replacement of pipes, flanges, gaskets, glands/ seat and fittings are required, it will be in contractor's scope.

7. A.H.U. / CENTRIFUGAL BLOWERS / AIR WASHAER/ KITCHEN EXHAUST/ ROOF EXTRACTORS/ EXHAUST FANS/ BLOWER UNIT OF PACKAGE AC UNITS

Monthly:
- Check condition of drive coupling, sleeves. Belts, pedestal bearings and alignment
- Check condition of vibration isolators.
- Check proper locking of inspection doors and their leakages.
- Clean Air filters, check for proper drainage of condensate.
- Clean and wash the cooling media of Air Washer (Cellulose Pads) with proper chemicals/ solutions.
- Clean and wash the kitchen hoods of kitchen exhaust with proper chemicals/ solutions.

Yearly:
- Inspect housing and wheel for rust and accumulation of dirt / suspended particles.
- Check fan wheel for damage and evidence of cracks of the blades
- Check bearings for wear and apply fresh lubricant

- Check and tighten mounting bolts
- The drain tray of all AHU units should be painted once in a year with two coats of synthetic enamel paint or as and when required by IPR.
- Maintenance of pumps of air washer systems.

Repairs: Shaft, Canvass connection, belt guard, filter frame, blower can be repaired and made functional. If they are not repairable, then need to be replaced by new one **by the contractor**.

Replacements
The faulty Belt, bearing, shaft sleeves, runner / fan blade/ impeller of package unit, vibration isolator, air filters and drive packages etc. if found faulty, need to be replaced with new one **by the contractor**.

Note: Repairs or replacement of damaged housing of AHU / Centrifugal blowers / roof extractors/ exhaust fans/ blower unit of package AC will not be in the scope of the contractor.

8. DUCT/ DAMPERS (FIRE/VOLUME CONTROL) & GRILLS

- Check for any air leakage in the duct
- Check for any insulation damage for ducts.
- Check for disconnected and loose linkages
- Check for functional operation of dampers and grilles. Lubricate pins of dampers, grilles, wherever required.
- Check louvers for any damage and cleaning shall be followed
- Dismantling and Re-fixing of few duct pieces inside Helium Compressor Hall shall be carried out if required.

Repair:
- Repairing in the duct as per standard practice like riveting the joints, provided felt or gasket in the joints, patch work in the duct, insulation of the duct etc. If insulation of the duct gets damaged, the contractor shall rectify/ replace insulation for proper functioning.
- Canvass / damper / grills

Note: Repairs or replacement of damaged housing of dampers (fire/volume control) and grills will not be in the scope of the contractor.

9. COOLING TOWER:

Daily:
- Cleaning
- Check for operation of float valve, quick fill valve, equalizer connection

Monthly:
- Check cooling water being circulated for the suspended particles, algae formation, if. Find so; refill the circuit with fresh water.
- Check cooling water being circulated for the hardness as in PPM. If it is more than 8 ppm, blow down water partially and make up with fresh soft water.
- Drain the water and clean the sump of cooling tower
- Clean pot strainer/Y-strainer
- Check the condition of fills, if required, clean the fills with detergent/ suitable cleaning agents.
- Check for operation of shut off valves.
- Check for belt tension, oil level in the gearbox assembly.

Repairs:

The following items can be repaired and made functional. If they are found not repairable, then need to be replaced new one **by the contractor**.

- Water line leakage.
- All types of valves including float valve, quick fill valve, drain valve, etc.
- Gear box, strainer, eliminators
- Repairs of FRP panel / basin.

Replacement
The following item, if found faulty, need to be replaced with new one **by the contractor**.

- Bearings, Blades of fan, fills, eliminators, nozzle, distribution channels.

NOTE: Repairs or replacement of damaged housing of cooling tower will not be in the scope of contractor.

10. FAN COIL UNIT:

Quarterly:
- Cleaning air filter, strainer.
- Motor bushing oiling
- Cleaning drain pan & tray
- Check for the operation of fan speed regulator
- Check for the drainage of condensate.

Yearly:
- Cleaning of cooling coil by wire brush.

Repairs
The following items can be repaired and made functional. If they are found beyond repairable, then need to be replaced by new one by the contractor.

- Water line leakages
- Welding, brazing & flaring
- Fan motor rewinding
- Drain pan, motor mounting arrangement, insulation of chilled water line and drain line

Replacement: Strainer, runner bearings, bushings, connector strips, capacitors, selector switch, inlet / out let valves, if found faulty, need to be replaced with new one **by the contractor**.

Note: Repairs or replacement of damaged housing of unit will not be in the scope of contractor.

11. ELECTRICAL MAINTENANCE:

a. MOTOR (COMPRESSOR, PUMP, AHU, FCU, BLOWER, COOLING TOWER, DEGASSER ETC.)

Daily:
- Cleaning of motor

Quarterly:
- Lubricate bearings.
- Check for proper glanding & tightness of connections

Yearly:

- Dismantle the motor and apply grease on the bearings. Check for cleanliness of air passages, windings, remove dust dirt and grease, which may cause Flashing.
- Inspect visually the starter windings and measure insulation resistance.
- Inspect coil condition in the slots, condition of wedges and movement and evidence of coil looseness
- Inspect coil condition in the end winding, coil surface, distortion and insulation swelling
- Inspect rotor for cracked bars and rings for correction to bars
- Check air gap uniformity and record as indication of bearing wear

Repairs: The Rewinding of motor, Rotor & stator can be repaired and made functional. If they are found not repairable, then need to be replaced **by the contractor**.

Replacements: Bearings, Shaft sleeves, Cooling fan, Gland, Terminal box, Glands, Studs & Lugging, if found faulty, need to be replaced with new one **by the contractor**.

Note: Repairs or replacement of damaged casing of motor will not be in the scope of contractor.

b. <u>ELECTRICAL PANELS (POWER, ANNUNCIATION, FIRE, MICROPROCESSOR PANEL OF SCREW CHILLER) AND THEIR CABLING & WIRING:</u>

Daily:

- Check for any tripping, chattering in the electrical parts, abnormal noise, overheating in the panels
- Check whether indication lamps are working
- All circuit boards for healthy contact minor repairs/services/cleaning etc.

Monthly:

- Check for the proper working of all ammeters, voltmeters, Hour meters, KWh meters, overload relays, contactors malfunction etc.
- Clean the panels from inside with the help of the blower/ vacuum cleaners (Quarterly)
- Check all the cables for overheating, tightness of the glands, lugs & crimping.
- Check the fuse-link & fuse holders.
- Check the control wiring of the panel along with the controls for the proper functioning and tripping at the preset parameters.
- Check and maintain the soft starter, Microprocessors panel of Screw chiller packages.
- Check and maintain variable speed drives for RF cooling pumps

Yearly:

- Check the operation of ACB, MCCB, MCB, Isolators, SFU and servicing of the same.

Repairs: ACB, MCCB, isolators, Contactors, Bus bar, Cable termination with glands, Various electronic cards like AO, AI, DO, DI, AM & motherboards can be repaired and made functional. If they are found not repairable, then need to be replaced by the contractor.

Replacements: **Fuse links, ACB, MCCB, MCB, overload relay, single phase preventer, push buttons, indicating lamps, voltmeter, ammeter, kWh meter, no volt coils, selector switches, solenoid valves, fuse holders, relays, timer, limit switches, cooling fans, capacitors, etc. items if found faulty, need to be replaced with new one by the contractor.**

Note: Repairs or replacement of damaged body of the panel will not be in the scope of the contractor.

12. <u>DX-TYPE AIRCONDITIONING UNITS/ AIR COOLED PACKAGE AC/ DUCTABLE AC:</u>

Quarterly:

- Check proper locking of inspection doors/cover and their leakages.
- Clean Air filters, check for proper drainage of condensate.
- Cleaning of air filters.
- Cleaning of Cooling Coil and Condenser with nylon wire brush and air blower.
- Inspect blower fan motor drive, check tension of V-Belt, bearings, alignments, vibration isolator, electrical connections etc.
- Lubrication, wherever necessary
- Check Electrical wiring in all respect for smooth operation of the unit.
- Check the operation of all controls.
- Check operating parameters like Room temperature, SA/RA temperature, current, voltage etc. and maintain the record.

Yearly:

- The drain tray of all DX-AHU/ packaged units should be painted once in a year with two coats of synthetic enamel paint or as and when required by IPR.
- Please refer earlier description covered for compressor, condenser, and blower, cooling coils, refrigerant piping and electrical maintenance.

Repairs and Replacements:

- Repairs or Replacements will be applicable whenever required, as mentioned under compressor, evaporator & condenser, instruments and controls, refrigerant pipes, drain piping, blowers, AHU, electrical maintenance etc. All such repair or replacement **in the contractor's scope**.

13. VRV/ VRF TYPE AIR CONDITIONING SYSTEM:

Fortnightly:

- Check operating parameters like Room temperature, SA/RA temperature, current etc. and maintain the record.

Monthly:

- Inspect fan motor drive, electrical connections etc.
- Check operating parameters and the operation of all controls.
- Lubrication, wherever necessary

Quarterly:

- Cleaning of air filters.
- Cleaning of Cooling Coil and Condenser with nylon wire brush and air blower.
- Cleaning of complete unit.
- Oiling / Greasing of fan motor.
- Check operating parameters and the operation of all controls.
- Lubrication, wherever necessary
- Check Electrical wiring in all respect for smooth operation of the unit.

Yearly:

- The drain tray of all ductable units should be cleaned properly and painted once in a year if required with two coats of synthetic enamel paint or as and when required by IPR.
- Please refer earlier description covered for compressor, condenser, and blower, cooling coils, refrigerant piping and electrical maintenance.
- Checking gas leakage in circuit, if any. If leakage found, need to rectify and do necessary service/replacement of parts and again charge the circuit for satisfactory performance of that circuit.

Repairs and Replacements:

- Repairs or Replacements will be applicable whenever required, as mentioned under compressor, evaporator & condenser, instruments and controls, blowers, electrical maintenance etc. All such repair or replacement **in the contractor's scope**.
- Rewinding of motor & gas charging.
- In case of any fault with electronic operating kit/ drive/EEV, complete kit/drive/EEV should be replaced.
- The mechanically / electrically failed sealed compressor should be replaced with factory repaired / new compressor. In the case of repaired compressor, the repair should be carried out at the supplier's / authorized dealer's factory.
- If electrical cable having any problem, it should be replaced by new one and after that electrical circuit shall be checked for smooth operation of the unit.

14. WATER TREATMENT PLANTS INCLUDING DM WATER PLANTS, MIXED BED UNITS, DEOXYGENATION UNIT, WATER SOFTENING PLANTS:

Daily:

- Check for operating parameters.
- Check the hardness (PPM as CaCO3) of outlet soft water from Water softening plant. When the hardness of outlet water more than 5 ppm, the Water Softening Plant get exhausted. The arrangement of test kit for testing the hardness of soft water, commercial salt for regeneration and regeneration of both water softening plant shall be in the **contractor's scope.**
- Also regular check for the conditions of Mixed bed, DM Plants and De-oxygenation plant. Whenever any of these plants got exhausted, then contractor has to perform regeneration of the Mixed bed, DM Plants and De-oxygenation plant. Supply of Acid and Caustic for regeneration is in the scope of the contractor.
- Resin replacement will be in IPR scope as and when required.

Monthly:

- Check for cleanliness of stirrer, HCL regeneration container etc.
- Check the operation of all valves / controls like, gauges, sensors, conductivity meter, level indicator, oxygen content indicator etc.
- Check proper working of air blower and degasser unit

Yearly:

- Check the condition of resins.
- Check the condition of various valves, pumps & piping.

Repairs and Replacements:

- Repairs and Replacements will be applicable whenever required, as mentioned under pumps, blowers, instruments and controls, piping, valves, electrical maintenance etc. All such repair or replacement in the **contractor's scope.**

15. GENERAL TERMS & CONDITIONS, APPLICABLE TO ALL PLANTS:

1. It is to be noted that **any damage occurs due to faulty operation or maintenance of the contractor** in the plant, the contractor has to carry out necessary repair with the supply of parts, consumables within minimum possible downtime and made functional. If they are found not repairable, then the same needs to be replaced **with new one without any extra cost.** This will be applicable to all equipments, instruments and controls covered in the scope of contractor as well as those equipments, instruments and controls which are part of the plant but not covered **in the scope of contractor.**

2. Not withstanding as to what is specifically stated under PLANT MAINTENACE SCHEDULE, it shall be responsibility of the successful tenderer to attend to all the preventive & routine maintenance and repairs and breakdown services including replacement of necessary parts and components.

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PLANTS MAINTENANCE SCHEDULE

(For equipments covered under item Sr. No. 1 to 36 as per Annexure-I.b)

1. **Chiller, Pumps, motors, piping, Instruments and controls, MB unit, De-Oxygenation unit, Electrical Panel etc:**
   Necessary repairs and replacement will be carried out **by the contractor** as per the details mentioned under Annexure-II.
2. **For Plate Heat Exchanger:** if leakages found in the PHE, the necessary repairs will be carried out **by the contractor** with the help of manufacturer (if required) without any extra cost.
3. **Replacement of damaged housing of pump, motor, PHE, electrical panel, MB and DO unit will not be in the scope of the contractor.**

GENERAL TERMS & CONDITION, APPLICABLE TO PLANT:

a) It is to be noted that **any damage occurs due to faulty operation or maintenance of the contractor** in the plant, the contractor has to carry out necessary repair with the supply of parts, consumables within minimum possible downtime and made functional. If they are found not repairable, then the same needs to be replaced **with new one without any extra cost.** This will be applicable to all equipments, instruments and controls covered in the scope of contractor as well as those equipments, instruments and controls which are part of the plant but not covered in the scope of contractor.

b) Notwithstanding as to what is specifically stated under PLANT MAINTENACE SCHEDULE, it shall be responsibility of the successful tenderer to attend to all the preventive & routine maintenance and repairs and breakdown services including replacement of necessary parts and components.

PART – B ANNEXURE - III

PRICE BID

ANNEXURE – IIIa

प्लाज़्मा अनुसंधान संस्थान
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SCHEDULE OF RATES - QUOTATION FORMAT (FOR FIRST YEAR)

(ANNUAL RATE FOR OPERATION AND MAINTENANCE CONTRACT FOR ABOVE DESCRIBED SYSTEM)
(TO BE RETURNED TO IPR DULY FILLED IN, SIGNED AND STAMPED)

Sr. No.	DESCRIPTION OF PLANTS/ SYSETMS		ANNUAL RATE, (excluding taxes and duties) (in Rs:)	
	Operation and Maintenance (From Sr. no. 1 to 9)		**Operation (A1)**	**Maintenance (B1)**
1.	KBAC plant	375 TR		
2.	TBAC plant	200 TR		
3.	SST1 Air conditioning Plant	375 TR		
4.	Air Cooled Package units (for Administration & Purchase section) - 7.5 TR x 2 nos.	15 TR		
5.	Air washer Unit (for He-Compressor Hall)	40000 CFM		
6.	D.M. Water Plants (for various Water Cooling plants)	6, 15 & 40 CMPH		
7.	Chiller Package units (for SST-1 Vacuum system experiments) –9 TR x 01 nos.	9 TR		
8.	Soft Water Plant at Pump house	30 CMPH		
9.	R.F. Water Cooling systems (for various RF & other experimental systems)	Diff. capacities		
	Total (Rs.)			
	Only Maintenance (From Sr. no. 10 to 36)		**Maintenance (C1)**	
10.	Chiller Package Unit (for Beta Lab Experimental Device)	7.5 TR		
11.	Chiller Package units (for First wall experiment & LVPD experiment Device) –9 TR x 02 nos.	18 TR		

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12.	Chiller Package unit (for Vacuum furnace experiments)	10 TR	
13.	Chiller Package Unit (for Laser Experimental Systems)	15 TR	
14.	Chiller Package Unit (new one for Laser Experimental Systems)	15 TR	
15.	Chiller Package Unit (for DFD at IPR and IPR-Extension Lab, GIDC, Gandhinagar) – 10 TR x 02 nos.	20 TR	
16.	Air Cooled Package unit (for Computer Hall, Mezzanine Floor) - 10 TR x01 nos.	10 TR	
17.	Air Cooled Package units (for R.F. Lab.- Ground. & First Floor)- 15 TR x01 nos., 10 TR x01 nos. and 7.5 TR x 2 nos.	40 TR	
18.	Air Cooled Package units (for Admin Annexure) - 10 TR x 2 nos.	20 TR	
19.	Air Cooled Package units (Negative NBI Lab, FF, Utility building) – 17 TR x 02 nos.	34 TR	
20.	Air cooled Package units (for Control room of Aditya Hall)- 11 TR x02 nos. (1W+1S)	22 TR	
21.	Air Cooled Package units (Seminar Hall, FCIPT, Gandhinagar)-11 TR x 2 nos.	22 TR	
22.	Air cooled Package unit (for IPR-Extension lab-Ground floor & first floor, GIDC, Gandhinagar) – 11 TR x04 nos.	44 TR	
23.	Ductable Split Air Conditioner (for Guest house and Student facility building) – 7.5 TR x01 nos., 5.5 TR x01 nos. and 5 TR x 3 nos.	28 TR	
24.	Ductable Split Air Conditioner (for IPR-Extension lab, GIDC, Gandhinagar)- 8.5TRx02 nos. and 5.5 TRx10 nos.	72 TR	
25.	Ductable Split Air Conditioner (for Canteen, IPR)-5.5TRx02 nos.	11 TR	
26.	VRV Air Conditioning system for LHCD Lab	24 HP	
27.	Dx Type Centralize Air Conditioning System (for Canteen, IPR) – 25.5 TR x01 nos.	25.5 TR	
28.	Dx Type Centralize Air Conditioning System (for HVPS Lab) – 15 TR x02 nos.	30 TR	
29.	Dx Type Centralize Air Conditioning System (for APPS Lab) – 25.5 TR x01 nos.	25.5 TR	

30.	Dx Type Centralize Air Conditioning System (for RHVPS Lab, Utility building, first floor) – 34 TR x01 nos.	34 TR		
31.	Dx Type Centralize Air Conditioning System (for diff. Hall and labs in FCIP, Gandhinagar) – 17 TR x01 nos., 11 TR x01 nos. and 8.5 TR x 2 nos.	45 TR		
32.	Air Washer and Scrubber Units (for Canteen, IPR)	Diff. capacities		
33.	Air washer Unit (for Workshop, IPR)	18000 CFM		
34.	Ventilation Systems (for various plant rooms / Utility Halls / Cryogenic Hall/N2 Baking plant/ other places)	Diff. capacities		
35.	Kitchen Exhaust Units (for Guest house and student facility bldg.) 6400 CFM x 2 nos.	6400 CFM each		
36.	HVPS Cooling Tower and CT Pumps with accessories	1000 LPM		
		Total (C1)		
			Operation (A1)	**Maintenance (B1+C1)**
Sub Total Amount for item no. 1 to 36 ***RUPEES IN FIGURES:***				
Sub Total Amount for item no. 1 to 36 ***RUPEES IN WORDS:*** ***OPERATION (A1) :*** ***MAINTENANCE (B1+C1) :***				

EXTRA TIME OPERATION CHARGES (For First Year): (excluding taxes and duties)

Sr. No.	Description of plants for extra hours operation.	Before 9.00 a.m. and / or after 5.30 p.m. on all working days (Monday to Saturday):			Sundays and Closed Holidays observed by IPR.		
		Approx. extra hours	Operation charges per hour (Rs.)	Amount	Approx. extra hours	Operation charges per hour (Rs.)	Amount
1.	For operation of SST1 Air conditioning Plant and related systems during extra hours. **(1 skilled operator & 1 semi-skilled operator)**	1600			400		
2.	For operation of KBAC Plant and related systems during extra hours. **(1 skilled operator & 1 semi-skilled operator)**	560			140		
3.	For operation of TBAC Plant and related systems during extra hours. **(1 skilled operator & 1 semi-skilled operator)**	240			60		
Total amount of Sr. 1 to 3 for extra hours operation charges for Before 9.00 a.m. and / or after 5.30 p.m. on all working days (Monday to Saturday) (D1)					**Total amount of Sr. 1 to 3 for Sundays and national holidays (E1)**		
Sub Total Amount for item no. 1 to 3 For extra hours operation ***RUPEES IN FIGURES (D1+E1):***							
Sub Total Amount for item no. 1 to 3 ***RUPEES IN WORDS (D1+E1):***							

Note: 1) Non compliance to technical as well as commercial terms and conditions mentioned in the tender, bid is liable to get rejected. Please contact us for any clarifications before bidding.

2) Please refer Annexure-III d for Taxes and Duties applicable

ANNEXURE –IIIb

प्लाज़्मा अनुसंधान संस्थान
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SCHEDULE OF RATES - QUOTATION FORMAT (FOR SECOND YEAR)

(ANNUAL RATE FOR OPERATION AND MAINTENANCE CONTRACT FOR ABOVE DESCRIBED SYSTEM)
(TO BE RETURNED TO IPR DULY FILLED IN, SIGNED AND STAMPED)

Sr. No.	DESCRIPTION OF PLANTS/ SYSETMS		ANNUAL RATE, (excluding taxes and duties) (in Rs:)	
	Operation and Maintenance (From Sr. no. 1 to 9)		**Operation (A2)**	**Maintenance (B2)**
1.	KBAC plant	375 TR		
2.	TBAC plant	200 TR		
3.	SST1 Air conditioning Plant	375 TR		
4.	Air Cooled Package units (for Administration & Purchase section) - 7.5 TR x 2 nos.	15 TR		
5.	Air washer Unit (for He-Compressor Hall)	40000 CFM		
6.	D.M. Water Plants (for various Water Cooling plants)	6, 15 & 40 CMPH		
7.	Chiller Package units (for SST-1 Vacuum system experiments) –9 TR x 01 nos.	9 TR		
8.	Soft Water Plant at Pump house	30 CMPH		
9.	R.F. Water Cooling systems (for various RF & other experimental systems)	Diff. capacities		
	Total (Rs.)			
	Only Maintenance (From Sr. no. 10 to 36)		**Maintenance (C2)**	
10.	Chiller Package Unit (for Beta Lab Experimental Device)	7.5 TR		
11.	Chiller Package units (for First wall experiment & LVPD experiment Device) –9 TR x 02 nos.	18 TR		
12.	Chiller Package unit (for Vacuum furnace experiments)	10 TR		
13.	Chiller Package Unit (for Laser Experimental Systems)	15 TR		
14.	Chiller Package Unit (new one for Laser Experimental Systems)	15 TR		

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15.	Chiller Package Unit (for DFD at IPR and IPR-Extension Lab, GIDC, Gandhinagar) – 10 TR x 02 nos.	20 TR	
16.	Air Cooled Package unit (for Computer Hall, Mezzanine Floor) - 10 TR x01 nos.	10 TR	
17.	Air Cooled Package units (for R.F. Lab.- Ground. & First Floor)- 15 TR x01 nos., 10 TR x01 nos. and 7.5 TR x 2 nos.	40 TR	
18.	Air Cooled Package units (for Admin Annexure) - 10 TR x 2 nos.	20 TR	
19.	Air Cooled Package units (Negative NBI Lab, FF, Utility building) – 17 TR x 02 nos.	34 TR	
20.	Air cooled Package units (for Control room of Aditya Hall)- 11 TR x02 nos. (1W+1S)	22 TR	
21.	Air Cooled Package units (Seminar Hall, FCIPT, Gandhinagar)- 11 TR x 2 nos.	22 TR	
22.	Air cooled Package unit (for IPR-Extension lab-Ground floor & first floor, GIDC, Gandhinagar) – 11 TR x04 nos.	44 TR	
23.	Ductable Split Air Conditioner (for Guest house and Student facility building) – 7.5 TR x01 nos., 5.5 TR x01 nos. and 5 TR x 3 nos.	28 TR	
24.	Ductable Split Air Conditioner (for IPR-Extension lab, GIDC, Gandhinagar)- 8.5TRx02 nos. and 5.5 TRx10 nos.	72 TR	
25.	Ductable Split Air Conditioner (for Canteen, IPR)- 5.5TRx02 nos.	11 TR	
26.	VRV Air Conditioning system for LHCD Lab	24 HP	
27.	Dx Type Centralize Air Conditioning System (for Canteen, IPR) – 25.5 TR x01 nos.	25.5 TR	
28.	Dx Type Centralize Air Conditioning System (for HVPS Lab) – 15 TR x02 nos.	30 TR	
29.	Dx Type Centralize Air Conditioning System (for APPS Lab) – 25.5 TR x01 nos.	25.5 TR	
30.	Dx Type Centralize Air Conditioning System (for RHVPS Lab, Utility building, first floor) – 34 TR x01 nos.	34 TR	
31.	Dx Type Centralize Air Conditioning System (for diff. Hall and labs in FCIP, Gandhinagar) – 17 TR x01 nos., 11 TR x01 nos. and 8.5 TR x 2 nos.	45 TR	
32.	Air Washer and Scrubber Units (for Canteen, IPR)	Diff. capacities	

33.	Air washer Unit (for Workshop, IPR)	18000 CFM		
34.	Ventilation Systems (for various plant rooms / Utility Halls / Cryogenic Hall/N2 Baking plant/ other places)	Diff. capacities		
35.	Kitchen Exhaust Units (for Guest house and student facility bldg.) 6400 CFM x 2 nos.	6400 CFM each		
36.	HVPS Cooling Tower and CT Pumps with accessories	1000 LPM		
		Total (C2)		
			Operation (A2)	**Maintenance (B2+C2)**
Sub Total Amount for item no. 1 to 36 ***RUPEES IN FIGURES:***				
Sub Total Amount for item no. 1 to 36 ***RUPEES IN WORDS:*** ***OPERATION (A2) :*** ***MAINTENANCE (B2+C2) :***				

EXTRA TIME OPERATION CHARGES (For Second Year): (excluding taxes and duties)

Sr. No.	Description of plants for extra hours operation.	Before 9.00 a.m. and / or after 5.30 p.m. on all working days (Monday to Saturday):			Sundays and Closed Holidays observed by IPR.		
		Approx. extra hours	Operation charges per hour (Rs.)	Amount	Approx. extra hours	Operation charges per hour (Rs.)	Amount
1.	For operation of SST1 Air conditioning Plant and related systems during extra hours. **(1 skilled operator & 1 semi-skilled operator)**	1600			400		
2.	For operation of KBAC Plant and related systems during extra hours. **(1 skilled operator & 1 semi-skilled operator)**	560			140		
3.	For operation of TBAC Plant and related systems during extra hours. **(1 skilled operator & 1 semi-skilled operator)**	240			60		
Total amount of Sr. 1 to 3 for extra hours operation charges for Before 9.00 a.m. and / or after 5.30 p.m. on all working days (Monday to Saturday) (D2)					**Total amount of Sr. 1 to 3 for Sundays and national holidays (E2)**		
Sub Total Amount for item no. 1 to 3 For extra hours operation ***RUPEES IN FIGURES (D2+E2):***							
Sub Total Amount for item no. 1 to 3 ***RUPEES IN WORDS (D2+E2):***							

Note: 1) Non compliance to technical as well as commercial terms and conditions mentioned in the tender, bid is liable to get rejected. Please contact us for any clarifications before bidding.

2) Please refer Annexure-III d for Taxes and Duties applicable

ANNEXURE –IIIc

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SCHEDULE OF RATES - QUOTATION FORMAT (FOR THIRD YEAR)

(ANNUAL RATE FOR OPERATION AND MAINTENANCE CONTRACT FOR ABOVE DESCRIBED SYSTEM)
(TO BE RETURNED TO IPR DULY FILLED IN, SIGNED AND STAMPED)

Sr. No.	DESCRIPTION OF PLANTS/ SYSETMS		ANNUAL RATE, (excluding taxes and duties) (in Rs:)	
	Operation and Maintenance (From Sr. no. 1 to 9)		**Operation (A3)**	**Maintenance (B3)**
1.	KBAC plant	375 TR		
2.	TBAC plant	200 TR		
3.	SST1 Air conditioning Plant	375 TR		
4.	Air Cooled Package units (for Administration & Purchase section) - 7.5 TR x 2 nos.	15 TR		
5.	Air washer Unit (for He-Compressor Hall)	40000 CFM		
6.	D.M. Water Plants (for various Water Cooling plants)	6, 15 & 40 CMPH		
7.	Chiller Package units (for SST-1 Vacuum system experiments) –9 TR x 01 nos.	9 TR		
8.	Soft Water Plant at Pump house	30 CMPH		
9.	R.F. Water Cooling systems (for various RF & other experimental systems)	Diff. capacities		
	Total (Rs.)			
	Only Maintenance (From Sr. no. 10 to 36)		**Maintenance (C3)**	
10.	Chiller Package Unit (for Beta Lab Experimental Device)	7.5 TR		
11.	Chiller Package units (for First wall experiment & LVPD experiment Device) –9 TR x 02 nos.	18 TR		
12.	Chiller Package unit (for Vacuum furnace experiments)	10 TR		
13.	Chiller Package Unit (for Laser Experimental Systems)	15 TR		
14.	Chiller Package Unit (new one for Laser Experimental Systems)	15 TR		

INSTITUTE FOR PLASMA RESEARCH BHAT GANDHINAGAR

15.	Chiller Package Unit (for DFD at IPR and IPR-Extension Lab, GIDC, Gandhinagar) – 10 TR x 02 nos.	20 TR	
16.	Air Cooled Package unit (for Computer Hall, Mezzanine Floor) - 10 TR x01 nos.	10 TR	
17.	Air Cooled Package units (for R.F. Lab.- Ground. & First Floor)- 15 TR x01 nos., 10 TR x01 nos. and 7.5 TR x 2 nos.	40 TR	
18.	Air Cooled Package units (for Admin Annexure) - 10 TR x 2 nos.	20 TR	
19.	Air Cooled Package units (Negative NBI Lab, FF, Utility building) – 17 TR x 02 nos.	34 TR	
20.	Air cooled Package units (for Control room of Aditya Hall)- 11 TR x02 nos. (1W+1S)	22 TR	
21.	Air Cooled Package units (Seminar Hall, FCIPT, Gandhinagar)- 11 TR x 2 nos.	22 TR	
22.	Air cooled Package unit (for IPR-Extension lab-Ground floor & first floor, GIDC, Gandhinagar) – 11 TR x04 nos.	44 TR	
23.	Ductable Split Air Conditioner (for Guest house and Student facility building) – 7.5 TR x01 nos., 5.5 TR x01 nos. and 5 TR x 3 nos.	28 TR	
24.	Ductable Split Air Conditioner (for IPR-Extension lab, GIDC, Gandhinagar)- 8.5TRx02 nos. and 5.5 TRx10 nos.	72 TR	
25.	Ductable Split Air Conditioner (for Canteen, IPR)- 5.5TRx02 nos.	11 TR	
26.	VRV Air Conditioning system for LHCD Lab	24 HP	
27.	Dx Type Centralize Air Conditioning System (for Canteen, IPR) – 25.5 TR x01 nos.	25.5 TR	
28.	Dx Type Centralize Air Conditioning System (for HVPS Lab) – 15 TR x02 nos.	30 TR	
29.	Dx Type Centralize Air Conditioning System (for APPS Lab) – 25.5 TR x01 nos.	25.5 TR	
30.	Dx Type Centralize Air Conditioning System (for RHVPS Lab, Utility building, first floor) – 34 TR x01 nos.	34 TR	
31.	Dx Type Centralize Air Conditioning System (for diff. Hall and labs in FCIP, Gandhinagar) – 17 TR x01 nos., 11 TR x01 nos. and 8.5 TR x 2 nos.	45 TR	
32.	Air Washer and Scrubber Units (for Canteen, IPR)	Diff. capacities	

33.	Air washer Unit (for Workshop, IPR)	18000 CFM		
34.	Ventilation Systems (for various plant rooms / Utility Halls / Cryogenic Hall/N2 Baking plant/ other places)	Diff. capacities		
35.	Kitchen Exhaust Units (for Guest house and student facility bldg.) 6400 CFM x 2 nos.	6400 CFM each		
36.	HVPS Cooling Tower and CT Pumps with accessories	1000 LPM		
		Total (C3)		
			Operation (A3)	**Maintenance (B3+C3)**
Sub Total Amount for item no. 1 to 36 ***RUPEES IN FIGURES:***				
Sub Total Amount for item no. 1 to 36 ***RUPEES IN WORDS:*** ***OPERATION (A3) :*** ***MAINTENANCE (B3+C3) :***				

EXTRA TIME OPERATION CHARGES (For Third Year): (excluding taxes and duties)

Sr. No.	Description of plants for extra hours operation.	Before 9.00 a.m. and / or after 5.30 p.m. on all working days (Monday to Saturday):			Sundays and Closed Holidays observed by IPR.		
		Approx. extra hours	Operation charges per hour (Rs.)	Amount	Approx. extra hours	Operation charges per hour (Rs.)	Amount
1.	For operation of SST1 Air conditioning Plant and related systems during extra hours. (**1 skilled operator & 1 semi-skilled operator)**	1600			400		
2.	For operation of KBAC Plant and related systems during extra hours. (**1 skilled operator & 1 semi-skilled operator)**	560			140		
3.	For operation of TBAC Plant and related systems during extra hours. (**1 skilled operator & 1 semi-skilled operator)**	240			60		
Total amount of Sr. 1 to 3 for extra hours operation charges for Before 9.00 a.m. and / or after 5.30 p.m. on all working days (Monday to Saturday) (D3)					**Total amount of Sr. 1 to 3 for Sundays and national holidays (E3)**		
Sub Total Amount for item no. 1 to 3 For extra hours operation ***RUPEES IN FIGURES (D3+E3):***							
Sub Total Amount for item no. 1 to 3 ***RUPEES IN WORDS (D3+E3):***							

Note: 1) Non compliance to technical as well as commercial terms and conditions mentioned in the tender, bid is liable to get rejected. Please contact us for any clarifications before bidding.

2) Please refer Annexure-III d for Taxes and Duties applicable

- **Approximately 3000 extra hours of operation may be considered per year.**
- **Price Comparison shall be done on the basis of Total Amount for 3 years as well as Amount for Extra Working Hours.**
- **Skilled and semi-skilled operators will be same as mentioned in ANNEXURE-I.a. in Manpower Arrangement sub-heading.**
- **Refer Annexure-I & II for Details of equipment specifications & plants maintenance schedule respectively covered under the scope of this contract.**

Annexure - IIId

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We have understood the scope of work completely. The above rates have been quoted after fully understanding the job. We confirm that the above rates will be firm for a period of 3 years as per above from the date of awarding the contract. We also agree to all the terms and conditions of the Tender.

CONSOLIDATED AMOUNT QUOTED FOR OPERATION AND MAINTENANCE

Sr. No.	Particulars	AMOUNT (Rs.)					
		1ST YEAR Annexure IIIa		2ND YEAR Annexure IIIb		3RD YEAR Annexure IIIc	
		Monthly	Yearly	Monthly	Yearly	Monthly	Yearly
1.	Consolidated Operation Charges						
2.	Consolidated Maintenance Charges						
3.	**Yearly Total →**						
4.	Approx 3000 Extra Hours Amount	**For 1st Year**		**For 2nd Year**		**For 3rd Year**	
5.	**Total for 3 years (In figure)**						
6.	**Total for 3 years (In Words)**						

Please Fill or Tick the appropriate Columns

TAXES AND DUTIES			
Particulars	Applicable Rate (%)	Inclusive	Exclusive
Sales Tax / VAT			
Service Tax			
Others, if any			

GST/CST Regn. No.	Service Tax Regn. No.	PAN Card No.

(Please do not leave these columns blank. If it is not applicable to you please indicate "Not Applicable")

Date & Place:

Name and Signature of Bidder
(Office Seal)

INSTITUTE FOR PLASMA RESEARCH BHAT GANDHINAGAR