TATA INSTITUTE OF FUNDAMENTAL RESEARCH

Autonomous Institution of the Department of Atomic Energy, Government of India
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Ref.: TIFR/PD/CF18-22/180591 July 12, 2018

NIT cum Tender Document (TWO PART PUBLIC TENDER) for the following works:

Supply, Installation, Testing / Commissioning of Split casting horizontal type Centrifugal condenser water Pumps with motor / Allied works for Central AC plant Service and all related works including civil foundation, electrical etc. as per enclosed specifications at TIFR, Mumbai .

Tender No.	TIFR/PD/CF18-22/180591
Estimate Cost	Rs. 19,00,000/-
Tender Fee	Rs. 500/- by way of Demand Draft in favour of Registrar, TIFR, Mumbai
EMD	Rs. 38,000/- by way of Demand Draft in favour of Registrar, TIFR, Mumbai
Type of Tender	Two Part Public Tender
Time of Completion Job	Within 8 Months
Contact Persons .	Shri Rajesh Sharma (Tel : 22782533) Technical services for any technical clarifications.
Last Date for Submission of Tender	28/07/2018 on or before 1730 Hours
Date of Opening Technical Bid (Part "I")	30/07/2018 at 1500 Hours (Only Technical Bid Part "I")

Both Technical Bid (Part I) and Financial Bid (Part II) to be submitted within the due date and time in separate envelopes and marked on top as Part I and Part II. These two sealed envelopes should be further put in one Master Envelope superscribed with the Tender No., Due Date in Bold Letters.

All prospective bidders are requested to visit our website regularly for any such updates/corrigendums.

Please see attached sheet for conditions of tender.

TATA INSTITUTE OF FUNDAMENTAL RESEARCH
Technical Services

Supply, installation, testing & commissioning of Horizontal Split casing type Centrifugal Pumps with compatible motor & allied works for Condenser Water Service of AC Plant Room at TIFR, Colaba, Mumbai – 400 005

Contractor's Signature Date:

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Note: **1) Sr. No. 5 above is to be filled and submitted with Technical Bid (Part-'I')**

2) Sr. No.6 i.e. 'Bill of Quantities' is to be filled and submitted along with the Financial Bid (Part-'II')

Contractor's Signature Date:

CONDITIONS OF TENDER

1. Sealed item rate tenders in **two part bid system** (Financial & technical bid) are invited from the specialized firm having working experience in Government/public sector undertakings / very large private organization of repute for **Supply , Installation , Testing & Commissioning of Horizontal Split casing type Centrifugal Pumps with compatible motor for Condenser Water (AC Plant) Service at TIFR, Colaba, Mumbai-05**

2. There are two separate sealed envelope for Financial (Part-'II') & Technical Bid (Part-'I').Both the sealed envelopes should be put in another envelope duly sealed. Tenders in sealed envelopes duly super scribed with the Financial or technical part as the case may be, Tender No. and due date, etc. and addressed to the Purchase Officer, Tata Institute of Fundamental Research, Homi Bhabha Road, Colaba, Mumbai – 400 005.

3. Technical Bid i.e. part 'I' should contain;
   a) Total Estimated Cost – Rs. 19,00,000.00
   b) Earnest Money Deposit (EMD) – Rs. 38,000.00
   c) Tender Fee of Rs. 500/-
   d) Proof of Experience in carrying out **similar nature of work**
   e) List of similar work in hand and works carried out by them for last 5 years indicating annual turnover, the agency for whom executed, value of work, etc.
   f) Performance Certificates/Copy of POs
   g) <u>Tenderers who wish to quote for this work should have done minimum three similar nature of job having comparable value in government/Autonomous body/PSUs. Out of the three jobs one job should be of value not less than Rs. 15,20,000.00 or two jobs should be of value not less than Rs. 11,40,000.00 each or three jobs should be of value not less than Rs. 7,60,000.00 each , executed during last 3 years.</u>
   h) Bidder should be manufacturer or their authorized dealer and should enclose documentary proof of Dealership with the Original Equipment Manufacturer (OEM) of Pump.
   i) The offered pumps should be similar to existing pumps, which is to be replaced, i.e. "Horizontal Split Casing centrifugal pump". Modification of existing piping for inlet & out let connection to offered pump is not allowed. The offer pump should be completely interchangeable.
   j) list of Technical Staff with at least 3 years of experience in the similar nature of work
   k) PAN No.
   l) The bidders should visit site to assess the nature & magnitude of work before quoting

   (**<u>Only those bids satisfying the conditions mentioned in the point no. 3.f) , 3.g) & 3.h) shall be processed.</u>**)

Contractor's Signature Date:

4. Quotations must be submitted in duplicate giving complete details; in particular, the offers should clearly specify whether taxes are included or excluded. In case of excluded, then please specify applicable taxes, make, offered, warranty/guarantee terms, completion period, etc. in the 'Technical part' of the bid.

5. In the event the due date declared is a holiday, the tender will be opened on the following working day.

6. This tender documents/form is not transferable.

7. Tenders containing erasures or alterations will not be considered.

8. Tenders which do not comply with the above conditions are liable to be rejected.

9. The Institute will not defray any expenses whatsoever incurred by the Bidders for the preparation of bids.

10. In case Bidder finds discrepancies or omissions from the specifications or other documents or has any doubt as to their meaning, he shall at once request in writing to the Purchase Officer, TIFR, who will for interpretation/clarification issue interpretation and clarifications as he may consider necessary in writing as an addendum. Copies of such addenda, if issued, shall be signed by the Bidder and shall form a part of his bid. Verbal clarifications given shall not be binding on the Institute.

11. Before submitting the bids, the Bidders shall make themselves fully conversant with the technical specifications, Site conditions and other documents as attached so that no ambiguity arises at a later date in this respect.

12. The owner reserves the right to postpone the date of submission and opening of bids.

13. The bidders shall quote in English their rates/prices both in figures, as well as in words against each item of the work as detailed in the enclosed Schedule of Quantities. In the event of any discrepancy between the quoted rates/prices in words and that quoted in figures, the rates/prices quoted in words shall govern.

Contractor's Signature Date:

14. The bidders must return the complete set of bid document. Each page of the bid document must be signed and dated by the bidder. Any bid not so signed and dated is likely to be rejected. All writing shall be in ink only. Any corrections in the entries in the Schedule of Quantities of this bid document, shall be initialed and dated by the bidder before submission of the bid. No parts of the bid document shall be altered, overwritten or amended by the Bidder

15. The Institute shall be under no obligation to accept the lowest or any tender received in response to this tender notice and shall be entitled to reject any tender without assigning any reason whatsoever.

Contractor's Signature Date:

GENERAL CONDITIONS OF CONTRACT

1.0 Definition of Terms :

1.1. In constructing these general conditions and the specifications the following works shall have the meanings herein assigned to them unless there is something in the subject or context inconsistent with such construction.

1.2 The term `Contractor'/`Supplier'/`Bidder'/`Vender' shall mean the Tenderer whose tender has been accepted by the Owner and shall include the Tenderer's heirs, successors and assigns approved by the Purchaser:

1.3 The `Purchaser' shall mean Tata Institute of Fundamental Research, Homi Bhabha Road, Colaba, Mumbai – 400 005 and shall include the Purchaser's heirs, successors and assigns.

1.4 The term `Sub-Contractor' shall mean the firm or persons named in the contract for any part of the work or any person to whom any part of the work has been sublet with the consent in writing of the Chief Engineer and shall include his heirs, successors and assigns approved by the Purchaser.

1.5 The Term `Inspector' shall mean any person appointed by/or on behalf of the Purchaser to inspect supplies, stores or work under the contract or any person deputed by the Inspector for the purpose.

1.6 The term `Particulars' shall mean, the following :

a) Specifications
b) Drawing
c) Sealed Pattern denoting a pattern sealed and signed by the Inspector.
d) Proprietary make denoting the produce of an individual firm.
e) Any other details governing the construction manufacture and/or supply as existing for the contract.

Contractor's Signature Date:

1.7 The term `Engineer' shall mean Engineer, Central Services, Tata Institute of Fundamental Research, Colaba, Mumbai or some other person for the time being or from time to time duly appointed in writing by the Owner to act as Engineer for the purpose of the Contract or in default of such appointment the Purchaser.

1.8 The term `Specification' shall mean the specifications annexed to or issued with these Conditions of Contract.

1.9 The term `Site' shall mean the place or places at which the Equipment is to be delivered or work done by the Contractor shall include where applicable the lands and buildings upon or in which the works are to be executed and shall also include the place or places at which fabrication and other work is being carried out by the Contractor.

1.10 `Electrical Equipment', `Stores', `Work' or `Works' shall mean and include equipment and materials to be provided and work to be done by the Contractor under the Contract.

1.11 The `Contract' shall mean acceptance of the work order placed on contractor/supplier under section (2) of these conditions and shall include these conditions of Contract, Specifications, Schedule, Drawing, Letter of Intent of the Purchaser and any subsequent amendments mutually agreed upon.

1.12 `Tests on Completion' shall mean such tests are prescribed by the specifications or have been mutually agreed to between the Contractor/Supplier and the Purchaser to be made before the equipment is taken over by the Purchaser.

1.13 `Writing' shall include any manuscript, typewritten or printed statement under or over signature or seal as the case may be. Words importing `person' shall include firms, companies, corporations and association of individuals whether incorporate or not.

1.14 Words importing singular shall also include plural and vice versa where context requires.

2.0 <u>Contract</u>:

2.1 Contractor/Supplier/Manufacturer should send their acceptance letter on receipt of `Letter of Intent' or work order within stipulated period. On expiry of said period or exorbitant delay in commencing or executing the work, the Purchaser shall not be liable to any claim from the Contractor/ Supplier for work entrusted to and may revoke the contract.

Contractor's Signature Date:

3.0 Work at Site

3.1 Access to the works shall be allowed only to the Contractor/Supplier, Sub-Contractors or his duly appointed representatives. The Contractor/ Supplier shall not object to the execution of other works by other contractors or tradesman and shall afford them every facility for execution of their several works simultaneously with his own.

3.2 Work at the Purchaser's premises shall be carried out at such time as the Purchaser may approve but the Purchaser shall give the Contractor/ Supplier all reasonable facilities for the same. The Contractor/Supplier shall provide sufficient fencing, notice boards etc. to guard the works and warn the public.

3.3 The Contractor shall obey Central, local and State regulations and enactment pertaining to workmen and labour and the Engineer shall have the right to enquire into and decide all complaints on such matters. The Contractor should comply with the Minimum Wages Act and should also ensure that safe practices are followed by his people at site.

4.0 Delays:

4.1 The Contractor/Supplier shall not be entitled to any compensation for any loss suffered by him on account of delays in commencing or executing the work, whatever the cause for such delays may be, including delays in procuring Government controlled or other materials and delay in obtaining instructions and decisions from Chief Engineer. The Contractor shall, however, merit extension of time as hereinafter mentioned.

5.0 Taking Over:

The equipment when erected at site shall be deemed to have been taken over by the Purchaser when the Engineer will have certified in writing that the equipment has fulfilled the contract conditions.

6.0 Extension of Time:

6.1 If the Contractor/Supplier is delayed in the progress of work by changes ordered in the work, or by any cause, which the Engineer shall decide to justify the delay, then the time of completion shall be extended by a reasonable time. No such extension shall be allowed unless requested for extension is made in writing by the Contractor/Supplier to the Engineer within 15 days from the date of occurrence of the delay.

Contractor's Signature Date:

7.0 Liquidated Damages:

7.1 For all delays, which do not, merit any extension of time, the Contractor/ Supplier shall attract 0.5% penalty per week or part thereof subject to a maximum of 5% of the total contract value. The amount of liquidated damages shall be recoverable from the payment due to the Contractor/Supplier.

7.2 The deduction of liquidated damages shall not, however, absolve the Contractor/Supplier of his responsibility and obligations under the contract to complete the work in its entirety and shall also be without prejudice to action by the Purchaser under clause: `Termination of Contract by the Purchaser'. After that the same shall be completed by the Institute at the Contractors/Suppliers risk and cost.

8.0 Other Damages:

8.1 The Contractor/Supplier/Manufacturer shall be responsible for all injury to persons, animals or things and for all damage to the works, structure of, and decorative work in the property which may arise from operation or neglect of himself or any of his Sub-Contractor or of his or Sub-Contractor's employees, whether such injury or damage may arise from carelessness, accident or any other cause whatever in any way connected with the carrying out of this contract. This clause shall be held to include any damage to buildings, whether immediately adjacent or otherwise, any damage to roads, streets, foot paths, as well as all damage caused to the works forming the subject of this contract by frost or other inclemency of weather. The Contractor/Supplier shall indemnify the Purchaser and hold him harmless in respect of all and any expenses on property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts of Government or otherwise and also in respect of any award of compensation or damages consequent upon such claim.

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

Contractor's Signature Date:

8.3 The Contractor/Supplier/Manufacturer shall indemnify the Purchaser against all claims which may be made against the Purchaser, by any member of the public or other party, in respect of anything which may arise in respect of the works or in consequence thereof and shall, at his own expense, effect and maintain, until the work has been 'taken over' under clause 5.0.

8.4 The Contractor/Supplier/Manufacturer shall also indemnify the Purchaser against all claims which may be made upon the Purchaser whether under the Workmen's Compensation Act or any other statute in force during the currency of this contract or at common law in respect of any employee of the Contractor/Supplier or of any of his sub-contractor and shall at his own expense effect and maintain until the work has been `Taken Over', with an approved office.

8.5 The Purchaser, with the concurrence of the Engineer, shall be at liberty and is hereby empowered to deduct the amount of any damages compensation costs, charges and expenses arising or accruing from or in respect of any such claims or damages from any sums due to or become due to the Contractor/Supplier.

9.0 Guarantee & Defects Liability Period :

9.1 The Contractor/Supplier/Manufacturer shall guarantee that all equipments shall be free from any defect due to the defective materials and bad workmanship and that the equipment shall operate satisfactorily and that the performance and efficiencies of the equipment shall be not less than the guaranteed values. The guarantee shall be valid for a period of 12 months after the date of commissioning as certified by Chief Engineer. Any parts found defective shall be replaced free of all costs by the Contractor/Supplier. The services of the Contractor's/Supplier's personnel if requisitioned during this period for such work shall be made available free of any cost to the Purchaser.

9.2 If the defects be not remedied within a reasonable time, the Purchaser may proceed to do so at the Contractor's/Supplier's risk and expense without prejudice to any other rights.

9.0 Terms of Payment :

10.1 Unless otherwise agreed to in writing between the Purchaser and the Contractor/Supplier, payment for the delivery/commissioning of the equipment/works approved by the Inspector will be made as follows:

a) 65% of the contract price of each consignment delivered as soon as possible after site inspection.
b) 25% of contract price after erection.

Contractor's Signature Date:

c) 10% of the contract price after testing and commissioning, as soon as possible after final inspection and test.
d) In addition to his other remedies under the law and those conditions, the Purchaser shall have lien on each consignment in respect of which 65% has been paid to secure refund of this amount in the event of the same becoming refundable under the terms of the contract or under the law and to secure payment of any other dues under the contract or under the law.
e) In a), b) and c) above, Security Deposit @ 2.5% of the billed value shall be deducted. The Security Deposit will be released on expiry of the defect liability period of 12 months reckoned from the date of commissioning.

11.0 a)Contractor/manufacturer/supplier should quote the basic price of material. Taxes, Delivery charges, Transit insurance if any should be indicated separately.

b) Transit Insurance: The Transit Insurance from the point of dispatch to the site of erection in TIFR, will be in the scope of Supplier and the cost shall be indicated separately.

12.0 **Scope**:

12.0.1 These specifications cover the supply of material as per the enclosed details and quantities and supervision of erection and commissioning of the material.

12.0.2 The Contractor/Manufacturer/Supplier shall quote for all the materials along with accessories as mentioned in the enquiry.

12.0.3 All the supply shall be in accordance with relevant I.S. Specifications and recognized standards.

12.2 **Technical Data Sheet**:

All the tenderers are instructed to fill up the enclosed Technical Data Sheet of materials and submit with the Technical Bid (Part 'I').

12.3 **Inspection & Testing of Material**:

12.3.1 Contractor/Manufacturer/Supplier shall submit the lists of Type Tests and Routine Test conducted on the material in Technical Data Sheet.

Contractor's Signature Date:

12.3.2 All the materials will be tested at factory as per IS Standards of material by our Engineers before despatch at the cost of Contractor/Manufacturer/Supplier.

12.3.3 Contractor/Manufacturer/Supplier shall inform the concerned Engineers for inspection and testing in accordance and fix up suitable date for the same.

12.4 **Test Certificates**:

Contractor/Manufacturer/Supplier shall submit the Test Certificates of all materials.

12.5 **Delivery of Material**:

12.5.1 **Packing**:

The Contractor/Manufacturer/Supplier shall be held responsible for loading at factory and unloading at TIFR of all equipments and for the stores being sufficiently and properly packed for transport by rail, road, sea or air so as to ensure their being free from any loss or damage on arrival at destination. The packing and marking of packages shall be done by and at the expenses of Manufacturer/Supplier. Each package shall contain a packing note quoting purchase order number and detail of the contents.

12.5.2 All the materials must be delivered at site i.e. Tata Institute of Fundamental Research, Homi Bhabha Road, Colaba, Mumbai – 400 005. The unloading & positioning of all equipments at the designated locations specified by Chief Engineer will be in the scope of supplier. The supplier shall arrange for handling equipments, labour for rigging etc. as required.

12.5.3 Material must be delivered at site in all respects as mentioned in the Purchase Order.

12.6 **Guarantee**:

If during the period of guarantee any fault or defect arises, the material shall be replaced/repaired immediately free of cost, as well as any replacement of accessories required shall be done free of cost.

12.8 Mistake in Drawing:

The Contractor/Supplier shall be responsible for and shall pay for any alterations in works due to any discrepancies, errors or omission in the drawings or other particulars supplied by him whether such drawings or particulars have been approved by the Purchaser or not.

12.9 Responsibility for Completeness:

Any fittings or accessories which may not be specifically mentioned in the specifications but which are usual or necessary are to be provided by the Contractor/Supplier without extra charge and the equipment must be complete in all details.

Contractor's Signature Date:

12.10 Rejection of Defective Equipment:

If the Equipment after the acceptance thereof be discovered to be defective, notwithstanding that such defects could have been discovered at the time of inspection or found to have failed to fulfill the requirements of the contract or developed defects after the erection within a period of 12 months from the date of erection, even if such erection is done by the Purchaser, he shall be entitled to give a notice on the Contractor/Supplier setting forth details of such defects or failure and the Contractor/Supplier shall, provided such notice is given within a period of 14 months from the date of such erection or acceptance, forthwith make the defective equipment good or alter the same to make it comply with the requirements of the contract at his own cost and further if in the opinion of the Purchaser, the defects are of such a nature that the defects cannot be made good or required without impairing the efficiency or workability of the equipment or if in the opinion of the Purchaser the Equipment cannot be repaired or altered to make it comply with the requirements of the Contract, the Contractor/Supplier shall, provided a notice given by the Purchaser in this behalf within a period of 14 months from the date of erection or acceptance thereof, remove and replace the same with the equipment conforming to the stipulated particulars, in all respects at the Contractor's/Supplier's own cost. Should he fail to do so within a reasonable time, the Purchaser may reject and replace at the cost of the Contractor/Supplier shall be carried out by the Purchaser within a reasonable time with Equipment of the same particulars or if Equipment conforming to the stipulated particulars are not in the opinion of the Purchaser readily procurable, such opinion being final, then with the nearest substitutes.

In the event of such rejection the Purchaser shall be entitled to use the Equipment in a reasonable and proper manner for a time reasonably sufficient to enable him to obtain replacement equipment as herein before provided.

12.11 Inspection and Final Tests:

All tests necessary to ensure that the Equipment complies with the particulars and guarantee shall be carried out at such place or places as may be determined by the Inspector. Should, however, it be necessary for the final test as to performance or guarantee to be held over until the Equipment is erected at site they shall be carried out within one month of completion of erection.

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12.12 Intimation about Delivery :

If the Purchaser shall have notified the contractor/supplier in writing that the former is not ready to take delivery, no equipment or materials shall be forwarded until an intimation in writing shall have been given to the Contractor/Supplier by the Purchaser that he is ready to take delivery.

12.13 Delay in erection:

Wherever erection of an equipment or machinery is the responsibility of the Contractor/Supplier as a term of the contract and in case the Contractor fails to carry out the erection as and when called upon as to do within the period specified by the Purchaser, the Purchaser shall have right to get the erection done through any source of his choice. In such an event, the Contractor/Supplier shall be liable to bear any additional expenditure that the Purchaser may incur towards erection. The Contractor/Supplier shall, however not be entitled to any gain due to such an action by the Purchaser.

12.14 Definition of Equipment:

The word `Equipment' wherever, it appears in these `Special Conditions of Contract' governing supplier of Equipments in this Tender shall mean all switchgears, panels, etc. or parts thereof or what the Contractor/Supplier agrees to supply under Contract as specified in the work order.

13.0 Termination of Contract by the Purchaser:

13.1 If the Contractor/Supplier commits any `Act of Insolvency' or shall be adjudged an Insolvent or shall have an order for compulsory winding up made against him or pass effective resolution for winding up voluntarily, or if the Contractor/Supplier shall suffer any payment under this contract to be attached by or on behalf of any of the creditors of the Contractor/ Supplier, or shall assign the Contract without the prior consent in writing of the Engineer, or shall charge or encumber this Contract or any payments due or which my become due to the Contractor there under, or if the Engineer shall certify in writing to the Purchaser that the Contractor/Supplier –

a) has abandoned the Contract,

or

Contractor's Signature Date:

b) has failed to commence the works, or has without any lawful excuse these conditions suspended the progress of the works for seven days after receiving from the Engineer written notice to proceed,

or

c) has failed to proceed with the work with such due diligence and failed to make such due progress as would enable the works to be completed in accordance with the approved programme of work,

or

d) has failed to remove materials from the site or to pull down and replace work for seven days after receiving from the Engineer written notice that the said materials or work were condemned and rejected by the Engineer under these conditions,

or

e) has neglected or failed persistently to observe and perform all or any of the acts matters or things by this contract to be observed and performed by the Contractor for seven days after written notice shall have been given to the Contractor/ Supplier requiring the Contractor/Supplier to observe or perform the same,

or

f) has to the detriment of good workmanship or in defiance of the Engineer's instructions to the contrary sub-let any part of the contract.

Then and in any of the above said causes, the Purchaser with the written consent of the Engineer may, notwithstanding any previous waiver, after giving seven days notice in writing under the provisions of this clause to the Contractor/Supplier, determine the contract but without prejudice to the powers of the Engineer or the obligations and liabilities of the Contract, the whole of which shall continue to be in force as if the contract has not been so determined and as if the work subsequently executed has been executed by and on behalf of the Contractor/ Supplier.

13.2 After the issue of such notice, the Contractor/Supplier shall not be at

liberty to remove from site any equipment, tools and materials belonging to him which shall have been placed thereon for the purpose of the works and the Purchaser shall have lien upon such equipments, tools or materials to subsist from the date of such notice and until the notice shall have been complied with.

13.3 If the Contractor/Supplier shall fail to comply with the requirements of said notice for seven days after such notice has been given, the Purchaser shall have the power to enter upon and take possession of the works and site and all equipment, tools and materials thereon, and to engage any other person, firm or agency to complete the works, utilizing the equipment, tools and materials to the extent possible. The Purchaser shall not in any way be responsible for damage or loss of the tools, equipment and materials and the Contractor/Supplier shall not have any compensation therefore.

13.4 Upon completion of the works, the Engineer shall certify the amount of expenditure properly incurred consequent on and incidental to the default of the Contractor/Supplier as aforesaid and such amount shall be deducted from the payments due to the Contractor/Supplier, including the Security Deposit. If the said amount exceeds the payment due to the Contractor/Supplier, the Purchaser shall be at liberty to dispose off any of the Contractor's/Supplier's materials, tools or equipment and apply the proceeds for the payments due from the Contractor/Supplier and recover the balance by process of law.

13.5 After the works have been completed after the amounts due to the Contractor/Supplier, the Engineer shall give notice in writing to the Contractor/Supplier to remove the surplus equipment and material from site. If such equipment and materials are not removed within a period of 14 days after such notice, the Purchaser shall have the power to remove and sell the same holding the proceed less the cost of removal and sale, to the credit of the Contractor/Supplier. The Purchaser shall not be responsible for any loss sustained by the Contractor/Supplier from the sale of the equipment and material.

14.0 Contractor's Representative:

14.1 The Contractor shall employ at least one qualified representative whose name shall have previously been communicated in writing to the Engineer and approved by him to supervise the erection. Any written order or instructions given to the representative shall be deemed to have been given to the Contractor/Supplier. The Engineer shall be at liberty to object to any particular representative/or any persons employed by the Contractor/Supplier on the work and the Contractor/Supplier shall remove the person objected to, on the receipt of the Engineer, in writing, a request requiring him to do so and shall provide in his place another

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competent representative acceptable to the Engineer.

The Contractor's/Supplier's representative shall be a qualified electrical/ mechanical engineer and possessing adequate site experience in similar nature of works.

15.0 Security Deposit:

15.1 Earnest Money Deposit (EMD):

Every Bidder has to pay EMD of Rs. 38000/- by Demand Draft in favor of the Registrar, Tata Institute of Fundamental Research along with the offer. Quotation received without EMD shall be rejected and no correspondence whatsoever will be entertained.

For successful tenderer the EMD shall be returned to the contractor, without any interest, after receiving of Performance Guarantee and placing order on successful bidder. Unsuccessful Tenderers EMD will be refunded after placing the order on successful tenderer.

15.1 **Security Deposit:** Deductions towards Security Deposit shall be made from running bills @ 2.5% of the billed amount. The Security Deposit shall be released after the defect liability period of 12 months reckoned from the date of completion as certified by Chief Engineer.

15.2 **Performance guarantee:** The tenderer, whose tender is accepted, will be required to furnish a performance guarantee of 5% of the tendered amount within 7 (seven) working days from the date of intimation. This guarantee shall be in the form Demand Draft / Pay Order / Banker's cheque issued by a Scheduled Bank.

The performance guarantee shall be returned to the contractor, without any interest, after recording of the completion certificate for the work by the competent authority.

16.0 Completion Time:

Unless otherwise agreed in writing between the Purchaser and the Contractor/Supplier, **the work shall be completed in all respects within Eight months (including holidays) from the date of Purchase order/Letter of Intent** issued to Contractor/Supplier by the Purchaser.

17.0 Delivery of material at site:

The Contractor/Supplier/Manufacturer shall arrange for safe transit and delivery of material at site & unload the material at site.

18.0 The quotation should be valid for 90 days after opening of the Technical Bid.

19.0 Measurements:

All the measurements of quantities shall be done by the Contractor at his own cost in the presence of Chief Engineer or any authorized person

deputed by him who will certify the routes, length and quantities etc. for the purpose of determination of the amount payable.

20.0 Manufacturer/Contractor/Supplier should submit operation and maintenance manual & spare part list for all equipments.

21.0 Manufacturer/Contractor/Supplier should provide training for operation and maintenance free of cost for equipments supplied.

22.0 Contractor:

22.1 Contractor should submit

a) Xerox of Income Tax Returns for last three years.
b) Xerox of Service Tax Registration/Works Contract Tax Registration.
c) Xerox of Electrical Contractor Licence No.
d) Xerox of Sales Tax/VAT Registration.
e) PAN No.

along with quotation.

23.0 All the equipments supplied should not be manufactured on or before 6 months from the date of issue of Purchase Order to the Contractor/Manufacturer/Supplier.

Contractor's Signature Date:

GENERAL INFORMATION TO BIDDERS

1. On behalf of Tata Institute of Fundamental Research , bids are invited for **Supply , Installation , Testing & Commissioning of Centrifugal Pumps with compatible motor for Condenser Water (AC Plant) Service at TIFR, Colaba, Mumbai-05**

2. **The new pumps shall replace existing condenser pumps nos. 1 &2 of AC Plant room. The existing pumps are Horizontal Split Casing type. The offered pumps shall be similar to existing pump i.e. Horizontal Split casing type. The existing pumps are working with negative suction with suction piping within the trench. New pump shall use existing suction & discharge piping connection without any modification in piping**. It is important that the bidder must satisfy himself before quoting that the information provided in the tender is sufficient for him. **The tenderers must visit the site and take the actual measurement before quoting.**

3. Bidder shall furnish the data called for in technical data sheets to facilitate correct evaluation of his bid in a most expeditious manner. It is in the interest of the **bidder to submit the bid in above manner with complete technical details, failing which it is likely that his bid may not be considered.**

4. Bidder shall be deemed to have carefully examined the specification in its complete form and to have fully informed and satisfied himself as to the details, nature, character and quantities of the work to be carried out, site conditions, and other pertinent matters and details.

5. It is the intent of the owner/purchaser to incorporate these specification documents in the final contract order for the supply of material, equipment and services. Bidders are required to review these documents and clearly state in their proposals the acceptance of the same. *Exceptions, if any shall be clearly stipulated in appropriate bidding schedule. The final contract between purchaser and vendor shall be subjected to such changes, if any, mutually agreed upon by purchaser and vendor and included in the main text of the contract/order.*

6. Bidder shall clearly specify all the deviations with respect to this specification in the appropriate schedule.

7. SCHEDULE OF QUANTITIES TO BE FURNISHED BY VENDORS

7.1 All equipments mentioned in the Schedule of Quantities should conform to the respective technical specifications. Only main items of the tender have been brought out specifically in this schedule, however all accessories as per specification or otherwise should be furnished at the time of quotation with cost of individual item

Contractor's Signature Date:

7.2 Tenderers are required to fill in unit rates for all the items mentioned in the Schedule of Quantities and any additional items quoted by them in the Financial Bid. In absence of the unit rates, the offer may be considered as invalid.

7.3 All the equipments supplied shall be as per the Approved Make mentioned specifically item wise in tender.

8. ITEMS TO BE FURNISHED BY THE PURCHASER:

8.1 Following shall be furnished by the purchaser:

8.1.1 Building and trenches.

8.1.2 Water and power for testing and commissioning.

9. SERVICES SUPPLIED BY PURCHASER DURING ERECTION:
The purchaser will provide for the contractor following services during the performance of work.

9.1 Temporary electric power at 415 V, 3 ph., 50 Hz at one point only which will be within 50 M of location of works free of cost. Water shall be provided free of cost for testing and commissioning.

9.2 The contractor shall make his own arrangement for supply, erection and dismantling on completion of works of his temporary distribution system, distribution panels and other equipments he may require to take the power from the purchaser's supply points.

9.3 The contractor's temporary distribution system shall be subjected in every respect to the approval of the purchaser and shall be arranged so as to avoid any interference with other operations on the site.

9.4 The purchaser will not hold himself responsible for the consequences of any interruptions to the continuity of the power supply or power system voltage and frequency fluctuations.

9.5 The electric power shall not be used for heating purposes.

10. There is no EOT crane or mono rail to assist in erection work. Tenderer should provide suitable derricks & tripods for lifting heavy load. In case if the scaffolding require during the erection work, the same shall be in the scope of the contractor.

11. PROJECT & SERVICE SUPPORT, SPARES & TOOLS:

11.1 **The bidder should have full fledged Project office & Service centre with adequate technically qualified competent staff to provide services (Project & after sales) in Mumbai Metropolitan Region limits.**

11.2 The tenderer shall furnish complete set of tools & wrenches for making adjustments, repairs & preventive maintenance including those required for erection.

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12. **Safe custody and storage**

Safe custody of all Materials, Equipment ,etc. supplied by the contractor shall be his own responsibility till the final taking over by the owner. He should therefore, employ sufficient staff for watch and ward at his own expenses. The owner may however, allows the contractor to use the plant room / weather maker rooms, etc. for temporary storage of his equipment if such spaces are ready and available.

13. COMPLETION DRAWINGS (FINAL DRGS) & MANUALS:

On completion of work, contractor shall submit the soft copy along with four sets of as-built drawing in hard copy. These shall include

a. Detailed drawing showing equipments location & other details, pipe route, etc. as installed.

b. Manufacturer' Start-up, operation and maintenance manuals of supplied items

c. Test results

d. Contractor instruction for routine maintenance of the work.

e. List of recommended spares & Catalogues of major equipments

f. Commissioning reports with setting parameters

g. Warranty certificates by OEM

Contractor's Signature Date:

Specification

SECTION – I
CENTRIFUGAL PUMP

1.1 This Section covers supply, installation, testing & commissioning of Centrifugal Pump, motors & accessories and fittings as detailed in Schedule of Quantities.

1.2 Codes & Standards: The design manufacture and testing shall conform to the following codes and standards (latest edition) or any other relevant standards.

IS 1520 – 1970	Horizontal Centrifugal Pumps for Fresh water.
IS 5120 – 1968	Technical requirement for special roto-dynamic pump
IS 210 – 1970	Grey Iron castings.
IS 318 – 1962	Leaded Tin Bronze ingots & castings.

1.3 Construction:

1.3.1 **The Pumps shall be Horizontal Split casing type & shall be Kirloskar Brothers/Armstrong/Flowmore/KSB make**. The pumps shall be provided with Civil foundation, Structural steel hot dipped galvanized Base Plate, Coupling, etc. Each pump shall be provided with a drain plug.

1.3.2 Pumps shall be equipped **with bronze impeller, stainless steel shaft** , sleeves, seals, antifriction heavy duty ball bearings and flexible coupling with rubber bushes & coupling bolts.

1.3.3 Each pump shall be equipped with a TEFC squirrel cage induction motor of **'Siemens'** make operating on 415 V, 3 Phase, 50 Hz as mentioned in Section-II.

1.4 Drive

1.4.1 For drive motors refer to Section-II of Technical Specification.

1.4.2 Pump shall be directly coupled to motor through flexible coupling.

1.5 Accessories & Fittings:

1.5.1 Each Pump shall be complete with:

i) Flexible coupling, coupling guard, base plate for pump & motor.
ii) Lubrication fittings.
iii) Mechanical Seals.
iv) Suction & discharge pressure gauges of not less than 150 mm dia. & appropriate range.
v) Gauge cocks.
vi) Drain connection of 25 mm
vii) Test and/or air vent cocks.

Contractor's Signature Date:

1.6 Installation:

1.6.1 Pumps shall be installed as per manufacturer's recommendations. Pump set shall be mounted on concrete foundation block constructed by the Contractor as per approved drawings. The contractor shall ensure that the foundation bolts are correctly embedded and the pumps are properly leveled before grouting of foundation bolts. The isolation pad with G.I., sheets shall be supplied by the Contractor.

1.6.2 Pump sets shall be factory aligned. Whenever necessary site alignment is done, it shall be done by competent persons. Before the foundation bolts are grouted and the coupling bolts bolted, the base plate levels & alignment results shall be submitted to the Engineer.

1.7 Testing:

1.7.1 Tenderer shall submit the performance characteristics curves & family curves of the pumps and also shall check that the capacity & total head of the new pumps match the piping & equipment layout. Performance test and mechanical running test of the pumps shall be taken at works as well. Prior to the testing of performance of the pump on load at the site, the pump shall be tested for hydro tests and for impellers dynamic balance at the manufacturer's works in the presence of the Purchaser. Also during the load tests the maximum peak to peak amplitudes of pump vibrations either vertically or horizontally shall not exceed 15 microns apart from as measured in accordance with latest relevant I.S. specification for centrifugal pumps. These readings shall be taken & recorded/certified by the manufacturers of the pumps when the Purchaser respectively reports at the time of carrying out the tests.

These vibration readings for motor as well as for pump shall not exceed when the sets are mounted aligned on the common base plates and installed at the site and commissioned into service. **The site performance shall also be guaranteed in respect of output, head developed, noise and the vibration**.

1.7.2 On completion of the entire installation the contractor shall test these pump sets and the results in respect of characteristics output performance of the pump sets must be identical to those enclosed with the tender specifications.

1.7.3 The contractor shall furnish the required testing instruments & arrange for their connections as required.

1.7.4 - All expenses required for conducting the factory tests shall be borne by the manufacturer/contractor.

- **If the testing is to be carried out outside Mumbai Municipal limits, the contractor should arrange for boarding, lodging and travel of three engineers from TIFR.**

Contractor's Signature Date:

1.8 Painting:

1.8.1 After complete installation & testing of pump set, all accessories and fittings shall be given two coats of paint of the approved colour over initial painting already done in the factory.

2.0 Spare Parts:

2.1 The bidder shall offer a list of spare parts along with item wise cost for 2 years satisfactory maintenance of the pumps.

3.0 Instruction Books:

Supplier shall furnish copies of Instruction Manuals covering installation, operation, maintenance & trouble shooting of the pumps etc. Installation instructions shall include procedure for checking alignment of the motor shaft, coupling and base. Instruction shall also cover lubricating details including recommended inspection and replacement schedules, quantity of the lubricant required and specifications for the lubricant and its equivalent.

One copy of the above instruction manual shall be shipped with each pump set.

3.1 Data to be furnished with Tender:

In addition to the data required as per specifications under Part-'A' and Part-'B' the following information shall also be furnished with the tender.

a) Schedule of prices & delivery.
b) Performance characteristic curves & family curves of the pumps.
c) Schedule of Supplier's deviation (if any) from this specification.
d) Descriptive pamphlets of the pump sets along with motor.
e) List of accessories included in the scope of the supplier.
f) Material specification for motor shaft and bearings.
g) Material specification for pump shaft and bearings.

3.2 **The Base Plate of offered Pump & Motor should be suitable for installation of 45 KW (60HP) Motor. At present, the pump will run with 37 KW (50HP) Motor. However, future provision to be kept for installation of 45 KW motor.**

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4.1 **CONDENSER WATER PUMP**:

Application	-	Condenser Water, Air-conditioning
Model	-	As per manufacturer
Type	-	Horizontal Split Casing
Mounting	-	Horizontal
Total Head	-	23 Meters
Material	-	01 MOC
Service Fluid	-	Condenser water
Rate of Flow	-	116.67 liters/Sec.(420 CubM/Hr)
Casing (upper & lower)	-	Cast Iron Closed Grain FG 260 GR
Impeller	-	Bronze
Impeller rpm	-	1450
Shaft	-	Stainless Steel 431
To operate at	-	3 phase, 415 V AC $\pm$ 10%, 50 Hz electric supply
Make of pump	-	**Kirloskar Brothers /Armstrong/ Flowmore / KSB**
Quantity	-	2 Nos.

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Specification

SECTION – II

SQUIRREL CAGE TEFC INDUCTION MOTOR

1.1 This section covers supply, installation, testing & commissioning of Squirrel Cage TEFC Induction Motors as per details.

1.2 Codes & Standards: The design, manufacture & testing shall confirm to following standards (latest editions) or only other relevant standards.

IS 325-1996	Specification & Performance of three phase Induction Motor
IS 1231-1974	Dimensions of three phase foot mounted motors.
IS 2223-1983	Dimensions of three phase foot mounted motors.
IS 2253-1974	Mounting of Induction Motors.
IS 4691	Degree of protection by enclosures.
IS 1261-1990	Energy efficiency parameters.
IS 3202	Climate Proofing of electrical equipment.
IS 6362	Method of Cooling.
IS 4728	Terminal Marking.
IS 12075	Vibration Limits.
IS 12065	Noise level.
IS 4029	Guide for testing of three phase Induction Motor.
IS 4889	Method of determination of efficiency of rotating electrical machines.

1.3 SPECIFIC MOTOR REQUIREMENT

1.3.1	Prime mover For Chilled Water Pumps	- 2 Nos.
1.3.2	a) Type of Motor	- High Efficiency (IE 2) Squirrel Cage Induction Variable Frequency Drive (VFD) Motor
	b) Speed	- 1450 rpm
	c) **Make of Motor**	**- Siemens**
1.3.3	Connections	- Suitable for Star Delta operation
1.3.4	Supply	- 415 Volt, 50 Hz, 3 Phase AC
1.3.5	Rating	- 37KW / 50 HP
1.3.6	Rated Voltage	- 415 V AC ± 10%
1.3.7	Rated Frequency	- 50 Hz ± 5%
1.3.8	Combined Variations (voltage & frequency)	- ± 10% Absolute Sum
1.3.9	Rated Out Put	- Minimum 115% of pump input (driven equipment)

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1.3.10	Rated Speed (RPM)	- As per driven equipment
1.3.11	Efficiency of Motor	- Full load efficiency ≥ 92%
1.3.12	Power Factor of Motor	- Full load power factor ≥ 0.88
1.3.13	Degree of Protection	- IP55 as per IS 4691-1985
1.3.14	Enclosure	- Cast Iron TEFC
1.3.15	Insulation	- Class `F'
1.3.16	Ambient Temperature	- 45^0C
1.3.17	Temperature Rise by resistance Method	- 75^0C
1.3.18	Minimum rated Torque including as per IS 325 at rated voltage	- a) Breakdown - 200% b) Locked Rotor - 60% c) Pullup - 60% d) Overload time - 1 Hr. with 10% overload
1.3.19	Maximum starting current including tolerances as per IS 325 at rated voltage	- Not to exceed 6 times rated full load current with DOL Starter
1.3.20	Mounting	- As per requirement of driven equipment.
1.3.21	Reverse Rotation	- Not applicable.
1.3.22	Duty & Duty Cycle	- Suitable for operation with continuous running duty (S1). Suitable for 3 Cold starts or 2 hot starts in succession under rated load conditions. Starting sequence will be repeated after 30 minutes time relapses.
1.3.23	Frame	- Elegant looking rugged Cast Iron enclosure with integrally Cast feet.
1.3.24	Stator	- Fabricated steel construction with smooth outer surface with Class `F' insulated Copper coils.
1.3.25	Rotor	- Rotor shall be provided with high pressure Aluminium die cast rotors.
1.3.26	Space Heaters	- Anti condensation space heaters shall be provided for highly humid atmosphere (humidity 95%). Space heaters shall be suitable for 240 V, 50 Hz Single Phase AC Supply.
1.3.27	Terminal Box	- Separate Terminal Boxes shall be provided for each of the following a) Stator Leads

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	b) Space Heaters (Location of the Terminal Box will be as per site requirement and size of terminal box shall suit Aluminium/Copper cables.
1.3.28 Cooling Fan	- Bi directional Aluminium Alloy Casting Cooling fan shall be provided.
1.3.29 Grounding/Earthing	- 2 Nos. of earthing points shall be provided one on each side of frame.
1.3.30 Bearing	- NDE : Ball Bearing DE : Roller Bearing Regreasing facility on end brackets. Special care shall be taken to avoid entering of grease into stator winding.
1.3.31 Vibration	- Rotor shall be dynamically balance. Test Reading of vibrations at site with full load/partial load/ No load conditions shall be as follows: a) Axial < 20 microns b) Vertical < 20 microns c) Horizontal < 20 microns
1.3.32 Noise Level	- Motors shall be designed for low noise level as per IS 12065.
1.3.33 Over Speed	- Motor shall withstand a mechanical over speed of 120% rated speed continuously.
1.3.34 Momentary Overload	- Motor shall withstand a torque equivalent to 1.6 times the rated torque upto 15 seconds on rated power supply.
1.3.35 Drain Plug	- Properly sealed drain openings shall be provided for removal of accumulated water.
1.3.36 Installation Location	- Motor shall be suitable for: a) Location – Indoor b) Ambient temp: 45^0C c) Max. relative humidity: 90% at 40^0C d) Location: 100 mtrs. from coastal line.

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1.3.37	Suitability of motor with different starters	- Motor shall be suitable for starting/ running with DOL Starter, Star-Delta Starter, Soft Starter, VVVF Drives.
1.3.38	Painting & finishing	- Paint should be suitable to prevent corrosion arising of high humidity and salinity with proper treatment such as degreasing, anti rusting etc. Should not have any sharp or rough edge.
1.3.39	Spare Parts	- A comprehensive list of required spare parts with recommended maintenance procedures shall be furnished.

2.0 Inspection, Tests & Guarantee:

All the tests will be conducted by our Engineer/Engineers at the cost of Manufacturer/Supplier.

Each motor shall be tested at the works in presence of purchasers representative completely in accordance with the latest standards for routine and Type tests. Motor will be tested at Manufacturer's works for efficiency, power factor, noise level, vibration, performance tests, speed torque characteristics, shaft current tests. Each motor shall also be successfully tested on over speed at 120% rated speed.

In the event of failure of the motor or any part to fully meet any inspection or test requirement specified herein , the contractor shall notify the Purchaser or authorized representative if he wishes to repair and/or use such motor or part. If the repairs, including redesign, are likely to affect the result of tests or work previously completed, appropriate re-inspection and retesting shall be conducted at Contractor's expenses.

All routine tests mentioned in IS 325 shall be conducted by the manufacturer at his works in the presence of Purchaser's representative, who shall be notified prior to the performance of the above tests so that he may be present during the tests. Six (6) copies of test certificates shall be furnished to the purchaser for approval. Also, six copies of the test certificates of type tests, carried out by the manufacturer on motor with similar characteristics shall be furnished to the purchaser for approval.

Supplier shall be responsible for and perform all the necessary inspection & testing to ensure that the material, equipment & workmanship are in accordance with the stipulations of this specification.

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The Purchaser's inspector shall at all reasonable times have access to those parts of the sub supplier's works concerned with the manufacturer of the motors, for the purpose of witnessing tests and ascertaining compliance with the requirements of this specification. The purchaser shall also have the right to conduct at his expense any additional tests or inspection he deems necessary.

Supplier shall furnish materials specification certificates for motor shaft & bearing and he shall be in a position to correlate these certificates with the actual material used for the motors.

After receipt of the purchase order, the supplier shall furnish to the purchaser a detailed delivery schedule to enable Purchaser's Inspector to plan visits to the manufacturer's works for inspection and testing.

The Contractor shall supply to purchaser's representative a complete set of detailed drawings which will be used in the inspection during construction which will be retained at the factory and returned after completion of the contract.

Packing:

The motors shall be packed for dispatch to project site in strong wooden crates. The following information shall be clearly given on each box.

a) Purchaser
b) Purchase order no.
c) Equipment code no. if any.

4.0 Drawings:

The following drawings shall be submitted with the acceptance of Purchase Order:

a) Outline dimensions of assembled motor.
b) Dimensioned drawings of the terminal boxes showing the method of terminating the purchaser's incoming cables.
c) Dimensioned drawing of bearing.

As soon as the purchase order has been issued by the purchaser, supplier shall submit within 4 weeks, for the purchaser's approval 4 copies each of certified dimensioned outline drawings of the motors, terminal boxes & bearings. Outline drawings shall show over all and other essential dimensions and details regarding foundations. Supplier shall take up manufacture of the motors only after the drawings have been approved by purchaser. After execution of the order, 7 copies of as built drawings and one set of reproducible shall be supplied to the purchaser.

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5.0 Instruction Books:

Supplier shall furnish 5 copies of instruction manuals covering installation, operation, maintenance & trouble shooting of the motors. Installation instructions shall include procedure for checking alignment of motor shaft, coupling and base. Instruction shall also cover lubricating details including recommended inspection and replacement schedules, quantity of lubricant required and specifications for the lubricant and its equivalent.

One copy of the above instruction manual shall be shipped with each motor.

Contractor's Signature Date:

Guaranteed Performance Data for Motor

(TO BE FILLED & SUPPLIED BY TENDERER)

Sr.No.	Description	Condenser Water Pump Motor
1.	Make	
2.	Frame Size & rpm	
3.	Type No.	
4.	Degree of Protection	
5.	Rated KW/HP of motor	
6.	KW/HP actually required by Driven equipment (Pump)	
7.	Rated Voltage	
8.	Permissible voltage variation under normal working condition	
9.	Rated supply frequency	
10.	Permissible frequency variation under normal working condition	
11.	No. of phases	
12.	Stator winding a) Insulation	
	b) Conductor	
	c) Resistance per phase	
	d) Resistance between terminal	
	e) Connection (Star, Delta specify number of terminal)	
	f) Temperature rise (in detail)	
13.	At rated voltage & Frequency	
	a) Full Load Speed (RPM)	
	b) Full Load Current (A)	
	c) Starting current	
	d) Starting torque	
	e) Pull up torque	
	f) Break down torque	

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Sr.No.	Description	Condenser Water Pump Motor
14.	Efficiency a) At full Load	
	b) At 75% Load	
	c) At 50% Load	
15.	Power Factor a) At full Load	
	b) At 75% Load	
	c) At 50% Load	
16.	Starting a) Accelerating Time i) On no load	
	ii) On full load	
	b) Thermal Characteristic Curve i) Hot Start	
	ii) Cold Start	
	c) Current V/S Speed Curve	
17.	Starting duty cycle	
18.	Stall time: a) at rated operating temperature	
	b) at ambient temp.(40^0C & 95% relative humidity)	
	c) Limit of rotor Temp. used to determine stall time (^{0}C)	
19.	Overload Capacity a) Overload (in percentage of full load) & period of overload with complete performance.	
20.	Shaft a) Orientation	
	b) Breakdown torque	
	c) Permissible type of coupling to driven equipment	
	d) Height above foundation	
21.	Rotation a) Direction of rotation	
	b) Corresponding terminal designation	
22.	Body a) Material	
	b) Construction	

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Sr.No.	Description	Condenser Water Pump Motor
23.	Cooling a) Type of ventilation	
	b) Enclosure	
24.	Bearing No. a) Drive End	
	b) Non Drive end	
	c) Lubricant details with maintenance recommended	
25.	Terminal Box a) Type	
	b) Number of terminals	
	c) Recommended cable size of Aluminium Conductor for Star-Delta Operation	
26.	Suitability for VVVF drive operation a) Stator temp. rise curve	
	b) Rotor temp. rise curve	
22.	Space Heaters a) Location	
	b) Number	
	c) Wattage	
	d) Supply (voltage etc.)	
	e) Whether auto controlled	
	f) Arrangement of terminal connections	
	g) Recommended Cable size	
28.	Moment of Inertia (Kg.m.^{2})	
29.	Net weight of the motor	
30.	Weight of Copper in Stator	
31.	Weight of Aluminium rotor	
32.	Critical Speed	
33.	Motor reactance	
34.	Noise level a) Sound Pressure level L_{pfa} (dB)	
	b) Sound Power level L_{WA} (dB)	
35.	Whether offered motor is Variable Frequency Drive (VFD) motor	

Contractor's Signature Date:

Guaranteed Performance Data for Pump

(TO BE FILLED & SUPPLIED BY TENDERER)

Sr. No.	Particulars	To be filled by Bidder (Condenser Water Pump)
1.	Make of Pump	
2.	Model of Pump	
3.	Type of Pump	**Horizontal Split Casing**
4.	Material of Impeller	
5.	Material of casing	
6.	Material of Shaft	
7.	Dia. of Impeller	
8.	Suction/ discharge size in mm	
9.	Efficiency of pump at duty point %	
10.	Type of Coupling	
11.	Total rated Head in meters.	
12.	Flow rate (LPS)	
13.	Make of Pipes	
14.	Is performance witness test of pumps set at manufacturer's works as per tender spec. considered	YES/NO
15	Is offered model of pump interchangeable to existing pump without any pipe modification	YES/NO

Note: Please attach catalogue of pump and motor. Please also attach the performance curve of the quoted model of the Pump.

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BILL OF QUANTITIES

Sr. No.	Description in Brief	Qty.	Rate/ Unit	GST	Amount Rs.	Ps.
1.	Supplying, installing, testing and commissioning of electrical motor driven, **Kirloskar Brothers /Armstrong/ Flowmore / KSB make Horizontal Split casing type centrifugal Condenser Water Pump of capacity 116.67 LPS at 23 Meter head coupled to 37 KW capacity squirrel cage TEFC electrical 'Siemens' make induction type efficiency-2 (IE2) motor** suitable for operation at 415 V, 50 Hz. The pump should have 250mm size suction & 200mm size delivery & should be of cast iron construction **with bronze impeller**, **stainless steel shaft**, flexible coupling and **mechanical seal**. The complete unit shall be mounted on a common Galvanized structural steel base frame (suitable for 45KW motor) and includes accessories like foundation bolts, casting & pressure relief valve etc.	2 Sets				
2.	Supply of following Spare parts of Condenser Water Pump (mentioned in point no.1 above)					
2a)	Bronze Impeller suitable for the pump	1 No.				
2b)	SS Pump Shaft	1 No.				
2c)	Mechanical Seal for both Drive End (DE) & Non Drive End (NDE)	1 Set				
2d)	Wear Ring	1 Set				
2e)	Bearings of Motor for both Drive End (DE) & Non Drive End	1 Set				
2f)	Pump Bearing Housing DE & NDE	1 Set				

Note: - The cost of Item No.1 should be inclusive of factory performance Witness test of Pump with the same Motor and Travelling, boarding & lodging expenses of 3 engineers from TIFR, Mumbai to manufacturer works. The motor will be tested as per tender condition at manufacture's site (Siemens factory) then the same Motor will be delivered Manufacturer's works and coupled to the pump & tested for performance.

Contractor's Signature Date:

Sr. No.	Description in Brief	Qty.	Rate/ Unit	GST	Amount Rs.	Rs.
3.	**Buy Back of existing Kirloskar make Pump model UP200/30 with 55 KW** Motor and associated piping, valves, etc. on 'As is Where is' basis including Cutting, dismantling, lifting & shifting of existing pump with motor & connected pipe.	2 Sets				
	Total					
	Taxes(GST,etc.)					
	GRAND TOTAL					

Contractor's Signature Date: