

	<p style="text-align: center;"><b>INDIAN INSTITUTE OF TECHNOLOGY MADRAS</b> Chennai 600 036</p> <p>Telephone : [044] 2257 8356/9760      FAX : [044] 22570545/8366 E-mail: <a href="mailto:arpp@iitm.ac.in">arpp@iitm.ac.in</a></p>	
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Dr. Chandramouli P.,  
Project Coordinator

Ref: MEE/DC/1/2017  
Dated: 20.01.2017

Limited Tender No: MEE/DC/1/2017

**Tender submission due date: 06.02.2017, 3:30pm**

**Technical Bid opening meeting on: 08.02.2017, 2:30pm**

Dear Sir/Madam,

On behalf of the Indian Institute of Technology Madras, offers are invited for the supply of “Mechanical Design for a Portable Horizontal Axis Hydrokinetic Turbine” conforming to the specifications given in **(Annexure-I)**:

**Instructions to the Bidder**

- (i) **Preparation of Bids:** - The Limited tenders should be submitted under two-bid system (i.e.) Technical bid and Financial bid.
- (ii) **Delivery of the tender:** - The tender shall be sent to the below-mentioned addresses either by post or by courier so as to reach the following address before the due date and time specified in our Schedule:  
**Dr. Chandramouli P., Department of Mechanical Engineering, IIT Madras-600 036.**
- (iii) **Opening of the tender:** - The offer/Bids will be opened by a committee duly constituted for this purpose. The technical bids will be opened first and it will be examined by a technical committee which will decide the suitability of the bid as per our specifications and requirements. The bidders will be invited for opening of Technical bids. In respect of opening of financial bid, those bidders who are technically qualified only will be called for.
- (iv) **Prices:** - The price should be quoted in net per unit (after breakup) and must include all packing and delivery charges to **Department of Mechanical Engineering**. The offer/bid should be exclusive of taxes and duties, which will be paid by the purchaser as applicable. However the percentage of tax & duties should be clearly indicated.

The price should be quoted without custom duty and excise duty, since I.I.T. Madras is exempt from payment of excise duty, and the custom duty will be paid at concessional rate against duty exemption certificate.

In case of import supply, the price should be quoted on EX-WORKS and CIP basis indicating the mode of shipment.

- (v) **Agency Commission:** - Agency commission, if any, will be paid to the Indian agents in Rupees on receipt of the equipment and after satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in Tender even in the case of 'Nil' commission. The tenderer should indicate the percentage of agency commission to be paid to the Indian agent. The foreign Principal should indicate about the percentage of payment and it should be included in the originally quoted basic price, if any.
- (vi) **Terms of Delivery:** - The item should be supplied to our Departments as per Purchase Order. In case of import supply, the item should be delivered at the cost of the supplier to our Institution. The Installation/Commissioning should be completed as specified in our important conditions.
- (vii) **Technical Bid Opening:** The technical bid will be opened on 08.02.2017, 2:30 pm at the Conference room, Department of Mechanical Engineering, IIT Madras and the financial bids of those tenders who are technically qualified will be opened at a later date upon intimation to them.
- (viii) IIT Madras reserves the full right to accept / reject any tender at stage without assigning any reason.

Yours sincerely,

*Chandramouli.P*

Prof. Chandramouli P.

## SCHEDULE

### Important Conditions of the tender

1. The due date for the submission of the tender is **06.02.2017, 3:30pm.**

The offers / bids should be submitted in two bids systems (i.e.) Technical bid and Financial bid. The Technical bid should consist of all technical details / specifications only. The Financial bid should indicate item-wise price for each item and it should contain all Commercial Terms and Conditions including Taxes, transportation, packing & forwarding, installation, guarantee, payment terms, pricing terms etc. **The Technical bid and Financial bid should be put in separate covers and sealed.** Both the sealed covers should be put in a bigger cover. The Limited Tender for supply of **“Mechanical Design for a Portable Horizontal Axis Hydrokinetic Turbine”** should be written on the left side of the Outer bigger cover and sealed.

2. **Performance Security:-** The successful bidder should submit Performance Security for an amount of 5% of the value of the contract/supply. The Performance Security may be furnished in the form of an Account Payee DD, FD Receipt from the commercial bank, Bank Guarantee from any nationalized bank of India will be an acceptable.

**Only after submission of Performance Security, Purchase Order/Work Order will be released / L.C will be opened.**

**Performance Security in the form of Bank Guarantee:-** In case the successful bidder wishes to submit Performance Security in the form of Bank Guarantee, the Bank Guarantee should be routed through the Beneficiary Bank to the end user bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee from a Nationalized Bank of India.

The Bank Guarantee should remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the supplier including the warranty obligations.

3. If an Indian agent is involved, the following documents must be enclosed:  
Foreign principal's proforma invoice indicating the commission payable to the Indian Agent and nature of after-sales service to be rendered by the Indian Agent.
  - ✓ Copy of the agency agreement with the foreign principal and the precise relationship between them and their mutual interest in the business.
  - ✓ The enlistment of the Indian agent with Director General of Supplies & Disposals under the Compulsory Registration Scheme of Ministry of Finance.
4. The offer/bids should be sent only for a machine that is available in the market and supplied to a number of customers. A list of customers in India and abroad with details must accompany the quotations. Quotations for a prototype machine will not be accepted.
5. Original catalogue (not any photocopy) of the quoted model duly signed by the principals must accompany the quotation in the Technical bid. No prices should ever be included in the Technical bid.
6. Documentary proof for the claimed position and repetition accuracies must be obtained from the principals and submitted along with the relevant pages of the standards.
7. Compliance or Confirmation report with reference to the specifications and other terms & conditions should also be obtained from the principal.
8. **Validity:** Validity of Quotation not less than 90 days from the due date of tender.
9. **Delivery Schedule:-** The tenderer should indicate clearly the time required for delivery of the item. In case there is any deviation in the delivery schedule, liquidated damages clause will be enforced or penalty for the delayed supply period will be levied.
10. **Risk Purchase Clause:-** In the event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from other sources on the total risk of the supplier under risk purchase clause.
11. **Payment:-** No Advance payment will be made for Indigenous purchase. However 90% Payment against Delivery and 10% after installation are agreed to wherever the installation is involved. In case of import supplies the payment will be made only through 100% Letter of Credit i.e. (90% payment will be released against shipping documents and 10% after successful installation wherever the installation is being done).
12. **Advance Payment:-** No advance payment is generally admissible. In case of specific percentage of advance payment is required, the Foreign Vendor has to submit a Bank Guarantee equal to the amount of advance payment and it should be routed through the

Beneficiary Bank to the end user Bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee through a Nationalized Bank of India.

- 13. On-site Installation:** - The equipment or machinery has to be installed or commissioned by the successful bidder within 15 to 20 days from the date of receipt of the item at site of IIT Madras.
- 14. Warranty/Guarantee:** - The offer should clearly specify the warranty or guarantee period for the machinery/equipment. Any extended warranty offered for the same has to be mentioned separately. (for more details please refer our Technical Specifications).
- 15. Late offer:** - The offers received after the due date and time will not be considered. The Institute shall not be responsible for the late receipt of Tender on account of Postal, Courier or any other delay.
- 16. Acceptance and Rejection:** - I.I.T. Madras has the right to accept the whole or any part of the Tender or portion of the quantity offered or reject it in full without assigning any reason.
- 17. Do not quote the optional items or additional items unless otherwise mentioned in the Tender documents / Specifications.**
- 18. Disputes and Jurisdiction:** -
  - a. **Settlement of Disputes:** Any dispute, controversy or claim arising out of or in connection with this PO including any question regarding its existence, validity, breach or termination, shall in the first instance be attempted to be resolved amicably by both the Parties. If attempts for such amicable resolution fails or no decision is reached within 30 days whichever is earlier, then such disputes shall be settled by arbitration in accordance with the Arbitration and Conciliation Act, 1996. Unless the Parties agree on a sole arbitrator, within 30 days from the receipt of a written request by one Party from the other Party to so agree, the arbitral panel shall comprise of three arbitrators. In that event, the supplier will nominate one arbitrator and the Project Coordinator of IITM shall nominate one arbitrator. The Dean IC&SR will nominate the Presiding Arbitrator of the arbitral tribunal. The arbitration proceedings shall be carried out in English language. The cost of arbitration and fees of the arbitrator(s) shall be shared equally by the Parties. The seat of arbitration shall be at IC&SR IIT Madras, Chennai..
  - b. **The Applicable Law:** This Purchase Order shall be construed, interpreted and governed by the Laws of India, Court at Chennai shall have exclusive jurisdiction subject to the arbitration clause.
  - c. Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Chennai in Tamil Nadu.

**19.** All Amendments, time extension, clarifications etc., will be uploaded on the website only and will not be published in newspapers. Bidders should regularly visit the above website to keep themselves updated. No extension in the bid due date/ time shall be considered on account of delay in receipt of any document by mail.

**Acknowledgement:-** It is hereby acknowledged that the tenderer has gone through all the conditions mentioned above and agrees to abide by them.

**SIGNATURE OF TENDERER  
ALONG WITH SEAL OF THE  
COMPANY WITH DATE**

## **Technical Specifications for Mechanical Design for a Portable Horizontal Axis Hydro-kinetic Turbine**

### **Description:**

1. The horizontal axis hydro-kinetic turbine will be submerged in river water with suitable clearance below and above the structure. The turbine is designed for an output of about 500 W.
2. The turbine output will be coupled to an electric generator above water through a suitable drive.
3. The typical speed of the turbine is likely to be 70 to 100 rpm and the speed of the generator rotor should be 1050 to 1500 rpm.

### **Scope:**

To provide mechanical design for a portable horizontal axis hydro-kinetic turbine, including detailed engineering design (design of machine elements, selection of bearings and seals), with appropriate Finite Element Analysis (FEA) for optimised structure followed by production / fabrication drawings.

The scope includes the following:

- Design Failure Modes and Effects Analysis (DFMEA) with documentation of potential failure modes and remedial measures of various parts & sub-assemblies of the system.
- Component design should consist of:
  1. Rotor shafts and coupling design
  2. Drive train design
  3. Bearing loads & selection
  4. Support structure design
  5. Braking system
  6. Sealed enclosure with platform design
  7. Selection of Gaskets, Dampers.
  8. Mooring locations and lifting hooks
  9. Bolts / Welds Design
  10. Fatigue life calculations.
- Finite Element Analysis: Linear static/basic vibration for individual components and assemblies

- Geometric Dimensioning and Tolerancing (GD & T) analysis which includes calculations for parts and determination of dimensional variations in the assembly due to parts using tolerance stack up calculations.
- Manufacturing drawings with GD&T of the system including parts.

**Turbine design is outside the scope of the present tender. Required inputs for carrying out the above scope of work will be provided by IIT Madras.**

**Deliverables:**

- a) Concept drawings for turbine structural support system and drive train
- b) Calculations based on Finite Element Analysis (FEA) with appropriate validation
- c) Exhaustive reports on the detailed engineering design, FEA and GD & T will have to be provided.
- d) Finalization of materials in consultation with IIT Madras
- e) Detailed Production/ fabrication drawings to be given and identification of some potential fabricators should be offered.
- f) Assist in system integration.

**Pre-bid technical meeting:**

A **pre-bid technical meeting** will be held on **02/02/2017 at 11 am at MSB 211** to discuss technical aspects of the design. **Only those companies who attend this pre-bid meeting are eligible for submitting the tender.**

**Time:**

The project with all deliverables should be completed in **6 months**.

**Payment: Terms and Conditions**

- a) 30% after submission of a satisfactory concept design
- b) 30% after producing calculations based on Finite Element Analysis
- c) 30% after submission of fabrication drawings along with the names of few possible fabricators
- d) 10% after system integration and testing



**Tenders are to be submitted in separate sealed envelopes for the technical and financial offers as per two-bid system.**

**Important conditions for the tender:**

Participating tenderer should meet the following criteria for undertaking the project:

1. Experience in New Product Design and Development of related Mechanical Engineering Systems
2. Knowledge and proven adaptation of Failure Modes & Effects Analysis, Tolerance Stack Up Analysis, Design for Manufacture, Design for Assembly as a part of Design for Quality Process
3. Capabilities to perform Finite Element Analysis as a part of Design Validation to assess Life, Factor of Safety, Frequencies and other analyses as required based on FMEA considerations along with correlation experience to real-world test/ measurement
4. Proven expertise in design and development of mechanical power transmission systems
5. Experience in development of effective sealing system under specified operating conditions

**Supporting documents as proof of experience should be submitted along with the technical offer.**