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Prof. Kothandaraman Ramanujam
Project Coordinator

Ref: CHY/KOTH/2019-20/010/SPLX
Dated: 20.01.2020

Limited Tender No: CHY/KOTH/2019-20/010/SPLX

Due Date: 11.02.2020, 4:00pm

Pre-Bid meeting: - Not required.

Bid opening meeting on Due Date: 12.02.2020, 3:00pm

Dear Sir/Madam,

On behalf of the Indian Institute of Technology Madras, offers are invited for the supply of "**HIGH CURRENT BATTERY CYCLER FOR REDOX FLOW BATTERY**" conforming to the specifications given in **(Annexure-I).**

Terms and Conditions of Limited Tender

1. **Preparation of Bids:** - The Limited tenders should be submitted under **Two bid system** (i.e.) Technical- and -Financial bid.
2. **Delivery of the tender:** - The tender shall be sent to the below-mentioned addresses either by post or by courier (duly sealed and super scribed on the envelope with the reference No and due date) so as to reach the following address before the due date and time specified in our Schedule:

   Prof. Kothandaraman Ramanujam,
   Department of Chemistry
   IIT Madras
   Chennai - 600 036.
3. **Price:** - The price should be quoted in net per unit (after breakup) and must include all packing and delivery charges to **Department of Chemistry.**
   a. The offer/bid should be exclusive of taxes and duties. The percentage of tax & duties should be clearly indicated separately. IIT Madras is eligible for concessional GST and relevant certificate will be issued.
   b. In case of import supply, the price should be quoted without custom duty. IIT Madras is exempted from levy of IGST on Imports and eligible for concessional custom duty (not exceeding 5%) and the price should be quoted on EX-WORKS and CIP (stating the Cost, Insurance, Freight separately) and indicating the mode of shipment.
4. **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.
5. **Catalogue**: Original catalogue (not any photocopy) of the quoted model duly signed must accompany the quotation in the Technical bid
6. **Late offer**: - The offers received after the due date and time will not be considered

7. **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).
8. **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.
9. **On-site Installation**: - The equipment or machinery has to be installed or commissioned by the successful bidder within number of days (as prescribed by PI's) from the date of receipt of the item at site of IIT Madras.
10. **Warranty/Guarantee**: - The offer should clearly specify the warranty or guarantee period for the machinery/equipment.
11. **Validity:** Validity of Quotation not less than 60 days from the due date of tender
12. **Technical Bid Opening:** The technical bid will be opened on **12.02.2020, 3:00pm** at the Department of Chemistry, IIT Madras and the **financial bids** of those tenders who are technically qualified will be opened at a **later date under intimation to them**.
13. **Performance Security: -**The successful bidder should submit Performance Security for an amount of 5% of the value of the contract/supply within 21 days from the issue of work/purchase order. The Performance Security should be furnished in the form of an Account Payee DD / FD Receipt from the commercial bank (or) Bank Guarantee from any nationalized bank in India.
14. **Accept /Reject**: IIT Madras reserves the full right to accept / reject any tender at stage without assigning any reason.
15. **Settlement of Disputes:** 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.
16. **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.
17. **Unsolicited offers**: "This notice is being published **for information only** and is not an open invitation to quote in this limited tender. Participation in this tender is by invitation only and is limited to the selected registered suppliers. Unsolicited offers are liable to be ignored. However, suppliers who desire to participate in such tenders in future may apply for registration as per procedure." The Website for Registration of vendors is **http://web.iitm.ac.in/supplier/** and the mail address for queries is " workflow@rt.iitm.ac.in ".

Yours sincerely,

Prof. Kothandaraman Ramanujam,
Department of Chemistry
IIT Madras
Chennai - 600 036.

ANNEXURE – I

HIGH CURRENT BATTERY CYCLER FOR REDOX FLOW BATTERY CHARACTERIZATION

CHARGE / DISCHARGE CHANNEL POWER REQUIREMENTS:

Voltage RANGE – 0-80V
Current RANGE – +/- 60 Amps
Max power - 750watts or more
2 or 4 terminal connections to RFB system accepted.

Additional cell voltage monitoring:

Minimum channels: 4 or more.
Voltage 0-10V (along with main charge / discharge channel)

Temperature Measurement:

Minimum at 4 points we need to measure temperature 10 – 140 Degree
Isolated thermocouples: K Type
Resolution - 0.1 deg C,
Range: - 0 to 1000 deg C
Additional / Auxiliary voltage monitoring:

Peristaltic pump & Controller

Fully automated peristaltic pump: - 2 Nos

- Max flow: 500ml / min,
- Min: 5ml / min
- Viscosity of the medium: 1-1.2g CC
- Tubing to be provided to withstand Vanadium electrolyte

Software

Software must be integrated and comprehensive to control Charge / discharge unit, peristaltic pump, temperature measuring, Cell voltage monitoring etc.
Software logs all the data from the Pump speed, battery Charge/ discharge unit info, temp & Auv voltage monitoring
Only one single software to be provided integrated with following hardware to control & data acquisition.

- Peristaltic pump control integrated
- Temperature measurement integrated
- User defined techniques to draw / apply current/ Voltage to the battery in controlled manner. (CC-CV technique), Constant Voltage / current to be included.

- While performing charge / discharge function, at the same time monitoring all other functions like – pump flow rate / temperature, in the same software screen to be provided.
- Data from the temp sensors / charge- discharge unit / peristaltic pump/ Aux. Voltage are recorded on real time with time stamp.
- An emergency switch to be (push button) integrated in the software to stop all devices operation at once, in case of any emergencies.
- All logged data to be exported to Excel or similar programs for further analysis.
- Options for measuring the EIS to be provided with 3rd party or external hardware

All software control should be synchronized one software screen – i.e. while monitoring the voltage / current data, temp & voltage data – automatically to be programmable to set safety points during operation.

Additional:

- All supplied hardware like battery charge / discharge station, peristaltic pump, weighting balance supporting electrolyte bottles, gas flow controllers to purge electrolyte bottle, power supply & control electronics to be fitted / mounted on a frame as per the safety norms.
- Two sets of Electrolyte Reservoirs (250mL each) with Teflon/Non-Corrosive Cap (air tight) with inlet/outlets ports and ports for inert gas purging and releasing
- Additional Two sets of Electrolyte Reservoirs 500mL each should be provided as spare along with ports fitted on their caps
- The reservoir must be resting on Digital Weighing Scale/Machine – 2 nos. (independent), Digital Readout, Backlit LCD display, Capacity 1 - 10 Kg, Readability 0.1 - 2 gm, Optional RS-232C data interface
- A flexible silicone pad heater (removable) or suitable should be provided around the reservoir along with the temperature controller having + or – 0.5^{o} accuracy. Temperature range is RT to 60^{o}C.
- All components like pumps, electrolyte reservoirs, drain and purge valves should be non-metallic and able to handle 5M sulfuric acid system containing 2 M VO_2^+ electrolyte
- Atleast two three way vales or appropriate valves required to drain the electrolyte from the reservoir if need be and to fill the reservoir directly. These valves may be manually operable.
- While submitting technical bid, a chart showing how the system will look like including all critical components to be submitted
- A detailed compliance certificate explaining how your system meets the above said specification is must.

Warranty: 3 years