



**INTERDISCIPLINARY CENTRE FOR ENERGY RESEARCH**  
**Indian Institute of Science**  
**BANGALORE**

**PRAVEEN C. RAMAMURTHY**  
**Professor**

**Inquiry Number:** ICER/TDR/22-23-0004

**Dated:** 3/8/2022

**Request for Quote for the procurement of Humidity Chamber to measure solar cells/mini modules testing under environmental conditions**

**Indian Institute of Science, Bangalore**  
**(Last Date: August 12<sup>th</sup>, 2022)**

The Interdisciplinary Centre of Energy Research (ICER), Indian Institute of Science Bangalore, invites tenders for the supply of a “Humidity Chamber to measure solar cells/ mini modules testing under environmental conditions”. This Invitation for Bids is open to all domestic (India-based) manufacturers, Indian OEM or its authorized Indian distributors only. This is an RFQ (Request for Quote) for setting a humidity chamber for testing under environmental conditions at IISc, Bangalore. Below are the procedure and conditions for the same.

**Procedure & Other conditions:**

1. The decision of the purchase committee will be final.
2. Any questions can be directed to the undersigned at [praveen@iisc.ac.in](mailto:praveen@iisc.ac.in).
3. The quotation should address The Chairman ICER, Attention: Prof. Praveen C Ramamurthy, Interdisciplinary Centre for Energy Research, Indian Institute of Science, Bangalore – 560 012.
4. The deadline for submission of hardcopy of the quotes is **1000 hours (IST) on August 12<sup>th</sup>, 2022**. The quotes should be addressed to the undersigned at the address given below.
5. Vendors will be required to submit a technical proposal and a commercial proposal in two separate sealed envelopes. Only vendors who meet the technical requirement will be considered for the commercial negotiation.
6. The technical proposal should contain a compliance table with four (4) columns. The compliance table should list all the items in the requirements section given below, in the same order. The first column should describe your compliance in a “Yes” or “No” response. If “No”, the second column should state the extent of the deviation. The “third” column should state the reasons for the deviation if any. The fourth column can be used to compare your tool with that of your competitors or provide details as requested in the technical requirements table below. Any other feature that you would like to bring to the attention of the purchase committee, can be listed at the end of the compliance table.
7. The technical specifications given below are “highly desired”. However, the committee reserves the right to lower technical specifications, to obtain a more competitive price.
8. The commercial proposal should have the price of the item. All the accessories needed for the tool to function as per the technical specification must be listed. Please provide itemized quotes for the tool and any other attachments/software.
9. The validity period of the quotation should be at least 90 days.
10. The commercial bid must include the price of the item in Indian currency FOR -IISc-Bangalore.
11. Necessary training to operate the procured setup and required literature support should be provided without additional cost.
12. Your quotation should indicate the terms of delivery, delivery schedule, entry tax, and payment terms.
13. The final instalment will be made only after satisfactory installation and demonstration of critical capabilities.

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14. Vendors should undertake to support the system with spares and software bug fixes, if any, for the next 5 years.
15. Please indicate the warranty provided with the tool. A warranty of 3 years or more is preferred. No travel claims must be made by the vendor for servicing during the warranty/guarantee period.
16. Provide itemized cost for required spares for 2 years of operation. For sake of this calculation, the vendor may assume active tool usage of 50 hours/ week. This number will be used to estimate the life cycle cost of the tool.
17. The vendor should be able to repair and maintain the equipment, once it is installed in India. Clarify if periodic (preventive) maintenance can be done by a trained on-site engineer (i.e. IISc employee) or requires a specialist from the OEM.
18. If the maintenance can be done by training an IISc employee, please specify the cost of this training, as an additional option.
19. If maintenance must be done by OEM, as an additional option, provide the cost of an annual maintenance contract (AMC) for 3 years, post-warranty. The AMC must cover 1 scheduled and 1 emergency visit per year. It must also indicate who will service the AMC, an Indian agent or the OEM. The AMC cost must also include an itemized list of spares that are essential for the scheduled visits.
20. The vendor should have a good track record of delivering such equipment to universities/research institutions in India and high-rank institutions worldwide. The RFQ must include references of 3 previous installations in the last 5 years, preferable in India. Please provide the names and contact addresses of the referees, so that the committee can contact them independently.
21. Vendors are encouraged to highlight the advantages of their tools over comparable tools from the competitors.
22. The quote should come only from Indian Original Equipment Manufacturer (OEM) or their Indian authorized distributor.
23. Conformity checks at multiple combinations of temperature and humidity after installation. This will ensure calibration and deviations from expected set-values. A certificate of conformity checks shall be issued.

## **Humidity Chamber**

The humidity Chamber is a vital testing instrument for analysing the prolonged effect of humidity on components to fix its quality parameters. The instrument is not subjected to only one industry application. It is used in solar cells/mini modules, pharmaceuticals, ageing polymer samples, etc. Temperature and humidity testing help to determine the behaviour of the solar cells in severe test conditions and environments that involve fluctuating environments, high temperatures, and different relative humidity. The tests can be done with constant temperature and humidity in a static state and can be done in a dynamic state where the moisture is used to induce a failure of the components or materials.



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The higher the temperature of the chamber, it means that the air is capable of handling more moisture at a given temperature. The relative humidity is the ratio of the amount of moisture in the air to the moisture it can hold. It means that relative humidity changes with the temperature change. Hence, a stable temperature helps to ensure a stable level of relative humidity.

We are seeking a Humidity Chamber to test solar cells/mini modules to test under various environmental conditions. The Humidity Chamber should have the following specs.

1. It should be a table-top system (<60 kg) that can be powered by a 230 V 50/60 Hz electrical output.
2. Minimum internal size 350 mm X 400 mm (to place a mini-module solar panel). The maximum internal dimensions can be 100 mm more than the specified dimensions but not anything more than that.
3. The temperature and humidity range should vary from 25 °C to +90 °C and 30% to 90% respectively with an RH accuracy of > 2% RH and temperature accuracy of > ±2 °C.
4. Communication should be by either Ethernet LAN or by USB. It should be able to store at least 6 months of data.
5. The heating should be uniform with all 6 sides of heating with an accuracy of > ±2 °C.
6. The interior should be made of stainless steel and the total volume of the interior should not exceed 60L capacity. Also, a fully insulated stainless steel door must be provided with a glass door on the inside for sample viewing without disturbing the condition.
7. An entry port of around ±45mm must be provided for introducing external connections on either of the sides.
8. There should be a twin display with a PID microprocessor controller with auto safety cut-off when either the temperature or humidity overshoots. Also, the timer should not start until the desired temperature and humidity values are not attained.
9. The overall dimension of the humidity chamber must not exceed w x h x d: 600mm x 800mm x 600mm.
10. Expected to be in continuous operation for minimum of 10 days before break.