

**Indian Institute of Technology Delhi**  
**Hauz Khas, New Delhi-110016 (India)**

**NOTICE FOR INVITING QUOTATION**

**Date: 16-01-2013**

**Due date: 30-01-2013**

**NIQ Ref. No.: IITD/CES/2012-2113/Current-voltage measurement set-up for Solar Cells**

**General description:** Current-voltage measurement set up for Solar Cell consists of solar simulator and source meter. Optional items like software for measurement and sample stage.

**(a) Solar Simulator specifications:**

Beam illumination area : 2 inch x 2 inch  
 Lamp type : Xenon  
 Operation : CW  
 Lamp wattage : 150 W  
 Typical power output : 100 mW/cm<sup>2</sup>  
 Shutter : Manual and/or automatic

Performance Parameter	Organization		
	IEC	JIS	ASTM
Spectral Match (fraction of ideal percentage)	0.75 – 1.25	0.75 – 1.25	0.75 – 1.25
Non-uniformity of irradiance	<5%	±3%	<5%
Temporal Instability Short Term	0.5%	≤±1%	2%
Temporal Instability Long Term	2%	NA	NA

IEC - International Engineering Consortium, JIS - Japanese Industrial Standards, ASTM - American Standards for Test and Measurement

**Technical Parameters for power supply of solar simulator**

Line regulation : 0.01%  
 Light ripple : < 1% rms

**(b) Source meter specifications:**

S.No.	Name of article & full specification	Numbers
1.	<b>Dual Channel Source Meter</b> Desired Technical Specifications <b>Number of Channels</b> : 2 <b>Voltage Source</b> : 100 mV to 40 V (resolution 5 $\mu$ V at 100 mV) <b>Current Source</b> : 100 nA to 10 A (resolution 1 pA at 100 nA) <b>Current Measurement</b> : 100 nA to 10 A (resolution 1 pA at 100 nA) <b>Voltage Measurement</b> : 100 mV to 40 V (resolution 5 $\mu$ V at 100 mV)	<b>One</b>

**Optional items** (to be quoted under the optional category)

(c) Sample holder and manual contacting stage suitable for all types of solar cells, e.g. dye sensitized solar cells (sandwich configuration), silicon solar cells and polymer/organic solar cells.

(d) Air Mass 1 Filter, UV Filters, IR filter – suitable for use with the quoted solar simulator.

**(e) I-V measurement software:**

- (1) Measurement of Dark & Light IV curves,  $V_{OC}$ ,  $I_{SC}$ ,  $P_{MAX}$ ,  $V_{MAX}$ , *Fill Factor (FF)*,  $R_S$ ,  $R_{SH}$  and *Efficiency*
- (2) Wide range of measured current values (+/-10 $\mu$ A up to +/-10A), and voltage values (+/-100 mV up to +/-20 V)
- (3) Programmable & fully automated measurement sequences
- (4) Reference cell database
- (5) User inputs: Device name, cell area, number of cells, scan speed & direction, voltage range, number of data points, comments
- (6) Output data in ASCII format
- (7) Automatic adjustment of current range and user selectable current limit

Note: Item prices (a) to (e) to be quoted separately in the commercial bid.

## **TERMS and CONDITIONS:**

**The quotations, in sealed envelope marked as “IITD/CES/2012-2013/ Current-voltage measurement set-up for Solar Cells”** Address: Vamsi K. Komarala, Room No. 350B, Block-V, Centre for Energy Studies, IIT Delhi, Hauz Khas, New Delhi-110 016 **should reach before 5 pm on 30-01-2013.**

1. The prices quoted must include **CIF New Delhi Airport** charges.
2. **Technical and financial bids should be enclosed in separate sealed envelopes and clearly marked.**
3. Institute reserves the right to accept/ reject all/ any quotation without assigning any reason thereof.
4. List of users in India could be provided.
5. The delivery period should be clearly indicated in the quotation.
6. Submitted quotations should clearly mention the validity period, preferably for a minimum of **3 months**.
7. Incomplete and conditional submitted tenders would be summarily rejected.
8. The mode of payment should be clearly indicated. The preferred mode of payment is through irrevocable LC.
9. In case the quotation is being submitted by authorized agent of the principal manufacturing company, the AUTHORISED SALES AGENCYSHIP certificate from the PRINCIPALS should be furnished along with the quotation. Quotations without this authorization certificate will be rejected.
10. The quotation should include comprehensive **warranty for how long and service for how long**.
11. Special discount/rebate wherever admissible keeping in view that items are being procured for educational purpose in respect of Public Institution of national importance may please be indicated.
12. Vendors should attach the relevant brochure/leaflet for the models/options quoted. Without the relevant brochure/leaflet the tender will be rejected.

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