Department of Metallurgical and Materials Engineering

Indian Institute of Technology, Madras, Chennai – 600 036

Enquiryu. No.	MET	2015	001	PARS

Date: 26.11.15

Due Date : 15.12.15

Dear Sirs,

1. Quotations are invited **in duplicate** for the various items shown below / overleaf / enclosed list.
2. The Quotations duly sealed and superscribed on the envelope with the reference No. and due date, should be addressed to the undersigned so as to reach him on or before the due date stipulated above.
3. The Quotations should be valid for sixty days from the due date and the period of delivery required should also be clearly indicated.
4. If the item is under DGS & D Rate contract, Rate Contract Number and the price must be mentioned. It may also please be indicated whether the supply can be made direct to us at the Rate contract price. If so, please send copy of the R.C. (Please note that we are not Direct Demanding Officers).
5. Relevant literature pertaining to the items quoted with full specifications (and drawing, if any) should be sent along with the Quotations, wherever applicable. Samples if called for, should be submitted free of charges, and collected back at the supplier's expenses.
6. **Local Firms:** Quotations should be for free delivery to this Institute. If Quotations are for Ex-Godown, delivery charges should be indicated separately.
7. **Firms Outside Chennai** : Quotations should be for F.O.R Chennai. If F.O.R. consignor station, freight charges by passenger train / lorry transport must be indicated. If Ex-Godown, packing, forwarding and freight charges must be indicated.
8. The rate of Sales / General Taxes and the percentage of such other taxes legally leviable and intended to be claimed should be distinctly shown along with the price quoted. Where this is not done, no claim for Sales / General Taxes will be admitted at any stage and on any ground whatsoever. **The taxes leviable should take into consideration that we are entitled to have Concessional Sales Tax applicable to non-Government Educational Institutions run with no profit motive for which a concession. Sales Tax Certificates will be issued at the time of final settlement of the bill.**
8. Goods should be supplied carriage paid and insured.
9. Goods shall not be supplied without an official supply order.
10. Payment: Every attempt will be made to make payment within 30 days from the date of receipt of bill / acceptance of goods, whichever is later.

Yours faithfully,

Four Point Probe resistance unit - 1 No. Enclosed with offer.
As per Specification Enclosed. & Comply Sheet Enclosed to be filled along
Please Send Technical bid & Commercial bid Seperately.
The Sealed Quotations to be Sent to : Dr. Paramuraman before due date.

for ~~The Head of the Department~~
The Project Co-ordinator
Met. & Materials Engineering
IIT Madras, Chennai – 600 036

PROJECT CO-ORDINATOR
DEPT. OF METALLURGICAL & MATERIALS ENGG.
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*Strike Out whichever is not applicable.

Four point probe resistance unit

Equipment justification: The four point probe unit will be used to measure resistivity and sheet resistance of thin metals films, grown by thermal evaporation. This will be used to follow the temperature dependence of resistance and hence study dewetting on thin films. The equipment has been proposed as part of the NRB project.

Project no: RB/14-15/138/NRBX/PARS

PI: Parasuraman Swaminathan, MME dept., IIT – Madras

Technical requirements:

A four point probe resistance unit with the following specifications:

1. Capable of sheet resistance measurement on thin films of metals and doped metal oxides. Film thickness will be less than 100 nm.
2. **Specify probe diameter, material, tip radius, and spacing**. Probe should not cause punch through the metal film.
3. A sheet resistance range of at least 5.0 m to 2 M Ohm/sq. A larger range is preferred.
4. A resistivity measuring range of at least 10 μOhm-cm to 200 KOhm-cm. A larger range is preferred.
5. Measurement accuracy and repeatability should be less than 1%.
6. An option of inputting film thickness to directly calculate resistivity. If not, the resistivity calculation formula should be included in the manual.
7. The instrument should be able to able to measure wafers of size 200 mm. The stage size should be specified in the specs.
8. The instrument should have its own readout system or should be able to interface with standard digital multimeter systems supplied by Agilent or Keithley. For systems without a readout system, all cables necessary for making electrical connections to the digital multimeters should be supplied.
9. The measurement unit must have a proper shielding, in the form of an enclosure. The enclosure should have openings for measurement cables. The quote should also include the cost of the enclosure.
10. List of institutions (government labs, universities, private R&D units) where this unit has been supplied.

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TECHNICAL COMPLIANCE STATEMENT For-

Four point probe resistance unit – 1-No.

The following points should be complied by the quotations:

Sl #	Tender Specifications	Whether Complies Yes	Whether Complies No
1	**Specify probe diameter, material, tip radius, and spacing**. Probe should not cause punch through the metal film.		
2	A sheet resistance range of at least 5.0 m to 2 M Ohm/sq. A larger range is preferred. **Range should be specified in the specs.**		
3	A resistivity measuring range of at least 10 µOhm-cm to 200 KOhm-cm. A larger range is preferred. **Range should be specified in the specs.**		
4	The instrument should have its own readout system or should be able to interface with standard digital multimeter systems supplied by Agilent or Keithley.		
5	The measurement unit must have a proper shielding, in the form of an enclosure		

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