



## CENTRE FOR NANO AND SOFT MATTER SCIENCES

Prof. U.R. Rao Road, Jalahalli, BENGALURU 560 013.

Autonomous Institution under the Dept. of Science & Technology, Govt. of India

### REQUEST FOR QUOTATION

CeNS/2016-17/PKS/F16

Date: 16<sup>th</sup> March 2017

The Centre invites a sealed quotation from your firm for the following item.

SL No	ENQUIRY NO & DATE	Description of Item	Qty
1)	CeNS/2016-17/PKS/F16 16/03/2017	<b>Thermal Evaporation System with Automated pumping system</b> Note: Detailed Specification in Annexure.	1 No

#### NOTE:

- (a) The sealed quotation bid containing **two separate sealed envelopes**, clearly marked as “Technical Specification” and “Price Bid”, respectively, along with Compliance Statement for all the specifications detailed in Annexure, should be submitted on or before 23rd March 2017 by 5.00PM through Speed Post / Courier / Registered Post.
- (b) The quotation may be addressed to the Director, Centre for Nano and Soft Matter Sciences PB No: 1329, Prof. U.R Rao Road, Jalahalli, Bangalore-560013. The same should be accompanied with a refundable Earnest Money Deposit of Rs.50,000/- in the form of a Demand Draft of Nationalized Bank, drawn in favor of “Centre for Nano and Soft Matter Sciences”, payable at Bengaluru.
- (c) The cost of Packing, Freight & Insurance should be indicated separately. A brochure giving technical details of the product should be enclosed. Quotation for imported equipment must be on basis of CIF (Bangalore).
- (d) Discount if any should be clearly mentioned.
- (e) Delivery schedule, warranty details must be clearly indicated.
- (f) Taxes & duties should be separately shown.
- (g) The quoted price should be valid for a minimum period of **3 months** from the date of issue.
- (h) **Terms of payment:**
  - i) For Imported Equipment:**
    - 1) 90% through Letter of Credit with usance period of 30 days on proof of dispatch of consignment. The balance 10% payment will be released after expiry of the applicable

Warranty period or on submission of Performance Bank Guarantee for an equivalent amount (10% of the Invoice value), having validity up to three months from the date of expiry of the applicable Warranty period.

**OR**

2) 50% by wire transfer on proof of dispatch of consignment and balance 50% after delivery and installation of equipment. PBG equal to 10% of invoice value to be submitted before release of the final 50% payment.

**ii) For Indigenous Equipment:** the payment in INR shall be made through NEFT/RTGS after successful installation and against submission of performance Bank Guarantee equal to 10% value of the equipment, valid for the period of warranty. Complete details such as the bank account number/IFSC/SWIFT/Bank Address, etc. should be provided along with the price bid.

- (i) **Opening of bids:** The firm shall be at liberty to authorize a representative to be present at the opening of the tender at the time and date which will be informed by E-mail. A proper letter of authority be produced before the meeting.
- (j) Any firm representing the actual supplier should submit authorized dealership certificate in original from the principal company.
- (k) **Banking charges:** All banking charges applicable outside India will be on suppliers account.
- (l) **Guarantee and replacement:** The Supplier shall guarantee that the Items/Equipment supplied shall comply fully with the specifications laid down, for material workmanship and performance. The Guarantee should be as mentioned in the specification.
- (m) The Centre reserves the right to accept or reject any quotation or part thereof without assigning any reasons.
- (n)
- (o) Sealed envelopes containing the quotation should be superscribed with " Quotation for Thermal Evaporator – F16"
- (p) Quotations received after the due date shall not be considered.
- (q) The Centre is exempt from paying Central Excise of Customs duty on purchase under the Govt. of India Notification No. 11/280/1993-TU-V dated 29 April 2016.

Yours sincerely

Sd/-  
Administrative Officer



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### ANNEXURE

ENQUIRY NO : CeNS/2016-17/PKS/F16

#### **SPECIFICATIONS OF THERMAL EVAPORATION SYSTEM WITH AUTOMATED PUMPING SYSTEM :-**

**Purpose of equipment:** Deposition of high purity thin films and multilayer with controlled deposition rate having  $\pm 3\%$  or better uniformity.

SI No	Specification	Detail description of an item
1	Chamber configuration	<ul style="list-style-type: none"> <li>(a) Chamber material shall be Stainless steel 304L (Internal finish: electro polished). Supplier has to provide chamber material test certificate.</li> <li>(b) Supplier has to provide 3D drawing of the chamber clearly indicating the location of all the attachments and extra blank feed through.</li> <li>(c) Chamber with preferable minimum dimension of 400 mm &amp; 400 mm height. 4 inch or higher wafer along with all above fitting/attachments.</li> <li>(d) There should be two doors in the chamber and one door should have sliding door mechanism.</li> <li>(e) The supplier has to integrate the thermal evaporator chamber with the glove box and the thermal evaporator should be compatible with 1 ppm O<sub>2</sub> and moisture level of glove box.</li> <li>(f) The proposed size should be appropriate to accommodate all the mountings, attachments, in-use and blank feed through etc.</li> <li>(g) Two sets of liners, made up of electro polished SS 304L with 2 mm thickness should be provided.</li> <li>(h) Periscope type view port should be located in the center of front door having Quarts window of 6" diameter size for direct viewing of process at sources and sample holder.</li> <li>(i) Each welded joint and entire empty chamber shall have less than <math>5 \times 10^{-8}</math> torr/s leak rate for Helium. Before starting the integration, supplier has to carry out MSLD test &amp; submit test report for clearance.</li> </ul>
2	Wafer/Substrate holders	<ul style="list-style-type: none"> <li>(a) Planetary holders with rotation facility holders for wafers should be provided.</li> <li>(b) A single, universal holder having capability to hold four quantity of wafers. Fixture and adaptors to be provided.</li> <li>(c) A holder capable to hold wafer Rotary system should have speed range from 0 to 20 rpm. Motors for planetary motions shall be outside the chamber and the coupling to inside the chamber shall be magnetic coupled.</li> </ul>
3.1	Basic System configuration	<ul style="list-style-type: none"> <li>(a) Structure: Single stand-alone unit frame enclosure with universal design, lockable type leveling jacks and lockable type castor wheels of appropriate capacity. The system design should be ergonomic and operator friendly. All the control elements should be Rack mounted.</li> <li>(b) System Interlocks: Manufacturer shall provide interlocks for system, human &amp; process safety like Doors, resistive power supply, Water, Vacuum level &amp; Resistive operation. The supplier should clearly bring out and include any other interlocks which are not covered here and which supplier feels essential for safe and secure system operation.</li> </ul>

		<p>(c) Operations: System operation shall be semi-automatic with full function manual over ride.</p> <p>(d) Computer and PLC HMI based control of all hardware modules with interlocks. The control should be programmable and automatic with full function manual over ride for process diagnostics and maintenance purpose. Note: All the components should have proper contactors, OLR, fuses and fuse terminal of reputed make only.</p> <p>(e) System Status display: Display for all the system parameters during setting as well as process cycle like vacuum, power, temperature, rotations etc.</p> <p>(f) Deposition Film Thickness Controller: Fully programmable for automatic sequential deposition of multilayers, with digital display for deposition rate &amp; thickness.</p> <p>(g) Deposition Film Thickness Monitor: QCM monitor and necessary accessories should be provided.</p> <p>(h) Mains Power Supply: Operable on 1 Ø, 220-240 V, 50 Hz/3 Ø, 415-440V, 50 Hz Exact electric load for full system operation shall be provided by the supplier.</p>
3.2	Vacuum Pumping System	<p>(a) Vacuum pumps shall be of Edward /Pfeiffer/Varian/ make.</p> <p>(b) Required mist filter shall be inclusive as a part of offer. Required capacity of air/ water.</p> <p>(c) Cooled 350 lps or higher Turbo molecular pump with suitable 15 mtrcube.</p> <p>(d) Dry pump for backing/roughing to the vacuum range of <math>1 \times 10^{-3}</math>. Air cooling of the pumps shall be preferred.</p> <p>(e) Vacuum system shall be able to achieve better than <math>1 \times 10^{-7}</math> torr</p> <p>(f) One Penning gauge and Two Pirani gauges should be provided.</p>
4.1	Resistive Sources	<p>2500VA transformer</p> <p>(a) Scalable output voltage up to 10V provides a wide voltage range without the need to change high current cables at the transformer.</p> <p>(b) Capable of holding boats, filaments, wire baskets, crucible style boats and crucible holders.</p> <p>(c) a current regulator with display of evaporation current should be provided. It shall be SCR/IGBT based power controller.</p>
4.2	Evaporation sources	<p>(a) 03 nos. of source shall be accommodating in the system.</p> <p>(b) Thermal heating source capable of evaporating metal by heating upto 2000°C.</p> <p>(c) Evaporation source holder suitable for using resistive coil, basket or boat as an evaporation source with cover &amp; shutter.</p> <p>(d) Ion cleaning: It comprises of an H.T. Transformers of 3.5 KV 50m A (5KV open circuit) and with H.T. cables connected to feed through in the base plate. The supply is controlled from the standard HT/LT switch fixed in the front panel.</p>
4.3	Rotating Substrate Stage	<p>(a) Tapped sample holder designed to mount 4" size substrate also a spare substrate holder of 4" x 4" x 5" with roller mechanism.</p> <p>(b) Customized sample holders available upon request.</p> <p>(c) Source to substrate distance varies with configuration</p> <p>(d) 0-50 RPM continuous rotation capability Thickness Uniformity</p> <p>(e) <math>\pm 3\%</math> thickness uniformity across the substrate using Al with 1500Å thickness layer.</p> <p>(f) Formula used to calculate uniformity <math>0.5 * (\max - \min) / \text{avg}</math>.</p> <p><b>Option for substrate in the form of web mounted on roller for deposition during a roll to roll process must be provided.</b></p>

4.4	<p>Acceptance criteria:</p> <p>Utilities available:</p>	<p>(a) System should be fully integrated and performance tested in a factory film thickness uniformity of <math>\pm 5\%</math> across 100mm square substrate (edge exclusion: <math>&lt; 5\text{mm}</math>) on 2000Å thickness using Ag material.</p> <p>(b) Co-deposition of <math>\text{CH}_3\text{NH}_3\text{PbI}_3</math> perovskite film on 100mm square FTO glass substrate from <math>\text{CH}_3\text{NH}_3\text{I}</math> and <math>\text{PbI}_2</math> powder</p> <p>Power supply: AC 415 V <math>\pm 10\%</math> (3 Phase, 4 wire system), 50Hz  AC230 V <math>\pm 10\%</math> (Single Phase, 2 wire system), 50Hz  Compress dry air : up to 9 bar  Nitrogen: 99.999% purity @ 5 bar</p>
5	General specifications(Pre and post installation details and warranties)	<p>(a) A 3D drawing should be provided with the technical specifications.</p> <p>(b) Supplier should have install at least 5 thermal evaporator integrated with glove box and at least one purchase order copy has to be attached.</p> <p>(c) Supplier should provide minimum <b>5 years</b> warranty for the system. The standard warranty should be effective from the date of installation and site acceptance at site.</p> <p>(d) Supplier should provide pre installation documents clearly indicating requirements and site preparation for the purpose of system installation along with the offer.</p> <p>(e) The complete system and all them modules /parts including third party OEM items shall be from reputed manufacturer /supplier and have a proven heritage. Necessary details shall be submitted in support of this. Prototype or developmental/ refurbished system shall not be acceptable.</p> <p>(f) A detailed list of existing customers (minimum 5) with offered model &amp; configuration, references, and contact details should be submitted along with the quotation.</p> <p>(g) A complete training on equipment usage must be provided after installation of equipment.</p> <p>(h) The quoted system shall be fully compatible to class clean room</p> <p>(i) Consumables such as Resistive tungsten Coils • Minor/major maintenance kit • O ring kit• Feed through/ clamps• Essential bellows with Clamps, reducers, tee, Laminar Filter etc.must be provided.</p>