

INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

2A & 2B , Raja S.C. Mullick Road, Jadavpur, Kolkata-700032

NIT No. : IACS/SPS/SD/2018-19/84

Date: 09/01/2019

Sealed tender in two bids system (technical bid and price bid) is invited from bonafide, resourceful and eligible manufacturer/exclusive distributor/vendors for **High Resolution Electron Beam Lithography with Field Emission Scanning Electron Microscope**.

Part-I (Technical Bid) of the tender should contain technical specifications in detail as well as commercial terms and conditions. Part-II (Price Bid) should clearly indicate group-wise price, if needed, as mentioned in the technical bid. The Technical Bid and Price Bid are to be submitted in separately sealed envelopes, distinctly marked accordingly and both to be put inside another envelop, that should be sealed and superscribed with tender notice no. and due date. The bidders may submit bids duly signed in their own letterheads.

Completed tender bids should reach the office of the **Registrar, Indian Association for the Cultivation of Science (IACS), 2A & 2B Raja S. C. Mullick Road, Jadavpur, Kolkata-700032** on or before the scheduled date and time specified below:

Tender Notice No.	NIT No. IACS/SPS/SD/2018-19/84 Date: 09-01-19
Last date and time of submitting tender	January 31, 2019, 03:30 pm (IST)
Pre-bid meeting(date, time & place) to discuss technical specification	January 17, 2019, 04:00 pm, IACS
Date and time of opening tender (Technical Bids)	February 1, 2019, 04:00 pm
Place of opening tender	IACS
Date and time of opening of Price Bid	The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their email addresses. The rest of the bids will be rejected.
Contact	Email: sspsdd@iacs.res.in Tel.+91 33 2473 4971 [Ext 2141]

The technical bids will be opened first to judge/evaluate the technical specifications of the said instrument and thereafter the price bids of only technically qualified bidders will be opened.

Technical Bid Evaluation: The Technical Bids will be evaluated in the presence of the representatives of intending bidders who will be able to clarify technical aspects of their bids, if any, required by the Technical Evaluation Team.

Opening of price-bid: The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their email addresses. The rest of the bids will be rejected.

Please note that IACS will not provide any accommodation or reimburse any expenses to any of the bidders for attending opening of technical bid.

Quotations received incomplete or beyond the stipulated time will be summarily rejected.

Bidders should submit their past experience for supplying and successful installation of similar units to other research Institutes/Universities/other organizations in India and abroad. Please provide documentary

proofs of such successful installation and supportive documents that the instruments are running successfully.

1. TECHNICAL BID

The technical bid should contain technical specifications and should be kept in a separate sealed envelope duly superscribed as 'TECHNICAL BID' on the outer cover of the envelope as already detailed above. **It should be clearly mentioned on the envelope as "Technical Specification for High Resolution Electron Beam Lithography with Field Emission Scanning Electron Microscope."**

1	Resolution	1 nm or better @15 kV. 2 nm or better @ 1 kV. Should be verified at the time of installation.
2	Electron Gun	High Stability Schottky Field Emission Electron Source with Automated Filament cut-off safety device. Schottky Emitter should have stability better than 0.2%/hour.
3	Magnification	Image magnification: $\times 25$ to $\times 1,000,000$ Should be verified at the time of installation.
4	Accelerating Voltage	Lower limit: 20 Volts or lower Higher Limit: 30 kV or higher All the voltage settings must be operated /achieved through software only.
5	Chamber	Large chamber with at least 10 nos. accessory ports. Chamber should be equipped with an IR-CCD camera or any suitable device to view the sample & stage. Specimen exchange through Air lock/load lock mechanism can be quoted as an option.
6	Stage	5-axis motorized stage with motorized stage movements equivalent to or better X=100mm or more; Y=80mm or more; Z=40mm or more; Tilt=-3 to +70° or better; R=360° -continuous; Stage movement (XY) step size / resolution: <100 nm Manual Joystick as well as software control for stage-axis. The system must have the necessary safety features / alarm to avoid collision between sample stage & final pole piece during operation of the instruments.
7	Electron Optics, Aperture & Lens Corrections.	Beam Deceleration/ Beam Booster technology/ Gentle Beam technology or equivalent technology for high resolution imaging at low kV. All the recommended attachment (if any) must be offered in the offer itself, to work the above-mentioned options. Magnetic /Electrostatic objective lens assembly/ hybrid lens assembly or equivalent lens system for getting high resolution imaging of magnetic materials with shorter working distance. The lens system must be water cooled. The system must have motorized aperture. During cross-sectional imaging with stage tilt astigmatism, wobbling, aberration correction etc. should be controllable with proper adjustment of focusing. It is also desirable while tilting the sample from perpendicular position with respect to beam, the imaging parameters should not get changed for any predefined magnification.
8	Probe Current	Adjustable range from Minimum: 5pA or less Maximum: 100nA or higher Noise < 1% Drift < 0.2%/hour
9	Detectors	a) Chamber SEI detector.

		b) In-Lens SEI detector/Upper secondary electron detector /In column detector or equivalent detector for high resolution imaging in High Vacuum. c) IR-CCD Camera.
10	User Interface	Keyboard, Mouse with multifunction for the control and adjustment of frequently used SEM parameters.
11	Display & Image frame store rate	2 no of 32" Monitors for FESEM. Image frame store rate must be 6k x 5k or better.
12	Vacuum System	Suitable vacuum system having Ion Pump, Turbo Pump & Rotary Pump.
13	Pico-ammeter	For beam current measurement down to pA with the possibility to adjust exposure doses.
14	Accessories	a) Factory fitted Electrostatic Beam Blanker. High Voltage Booster Input: TTL (5V) Output: 200 V to open electrode Power: 220V 50 Hz, Rise time: approx. 30ns. b) Chiller. c) Compressor. d) Interface between SEM and EBL e) Joystick/ Track ball or equivalent device for stage motor control f) Control panel g) Carbon tape. h) Compatible e-beam resist (at least 250 mL) and suitable developer for initial testing. i) Sample stubs j) Sample Holder for Cross-sectional view
15	Electron Beam Lithography system: (Must Mentioned the Brand Name Quoted)	The system must be able to reliably produce small patterns down to 50 nm or better line width, as well as between dots. Regular patterns 50 to 100 nm width must be achievable routinely depending on resist and processing. EBL attachment hardware: High Speed Beam control hardware: - PC-based pattern generator, customized PCI board - Two main XY deflection DACs with 16-bit resolution capable to run at 6 MHz or more pixel rate, - 6 MHz random pixel addressing (RPA) - Six field alignment and calibration DACs with 16-bit resolution for write field gain, shift and rotation - full main 16-bit main DAC range available for patterning. - One 12-bit ADC with 0,5 μs sample time for video signal conversion (mark registration and image acquisition) - Minimum pixel rate increment 100ns at all speeds EBL attachment Software Software package for Windows OS in 32bit architecture General - fully seamless software integration - no additional standard software e.g. for CAD design required for system operation - multi user environment in which each user log in with different user levels (all relevant system, design and exposure parameter files can be defined and stored user-specifically) - user can define his individual lithography software desktop and / or task-oriented parameter sets - script control for maximum flexibility and customization

		Design Layout - seamlessly integrated, fully hierarchical GDSII design editor and viewer allowing import of DXF, ASCII, CIF and GDSII layout files - up to 63 different layers must be available, all with the possibility to assign an individual layer property like name, colour, thickness ... (e.g. MESA, ETCH, METAL) - exposure dose must be assigned to each pattern element irrespective of which layer the pattern is designed in - provides seamless, fully integrated software algorithm, which can be applied to GDSII-file - (or critical parts thereof) in order to automatically subdivide design elements into Sub-patterns with corrected dose distribution (no 3rd party product), provides exposure - simulation module which allows for revelation of critical exposure areas - two full software licenses to be run on Lithography SEM and off-line PC included Exposure - exposure time calculation module - seamlessly integrated automated step and repeat exposure sequence using "drag and drop" function to prepare task/job list - exposure step size defined in nm or multiples of smallest 16-bit DAC step - separate definition of exposure parameters for area-, line- and dot-pattern elements Field Alignment and Calibration - fully automated or user assisted field to field alignment using marks of any shape by applying edge detection or cross correlation algorithms - field alignment and field calibration procedure must be independent of the maximum usable range of 16bit beam deflection DAC (65536 pixel) - theoretical pattern placement accuracy of 0.002% of field size by using dedicated gain control DAC Inspection and Metrology - seamlessly integrated digital image acquisition with up to 4000 x 4000 image points - seamlessly integrated manual or automated line width measurement PC with Flat Panel Display should be included, preinstalled and tested with Windows OS along with application software. EBL Starter Kit.
16	Warranty	Warranty for the entire system for 2 years from the date of successful installation and commissioning.
17	Availability of spares parts	The vendor must guaranty that all the spares parts for the offered FESEM and the related spare parts should be available for at least next 10 years.

18	Installation and commissioning	The installation and commissioning of the entire system including EBL must be done by factory trained engineer at free of cost.
19	Training on the complete system	After successful installation and commissioning of the system, the required operational training on the entire system including EBL must be provided on site to the deputed personnel at no additional cost. In addition, vendor must provide a trained operator (with no additional cost) for 1 year from the date of successful installation.
20	Installation	Please note the party should have at least 10 nos. of EBL with SEM installations across the country in last 10 years. All the major points mentioned in the specifications (like resolution, kV range, Lens system etc.) should be clearly mentioned in the brochure, so that that can be cross checked with the technical bid.
21	Payment terms	Payment terms: 90% of the entire amount through LC on shipment and balance 10% after installation through TT.

Warranty: Minimum 2 years while 3 years extendable warranty is preferred.

Servicing facility within India is a must while service engineer stationed at Kolkata will be preferred.

A list of other places where the instrument has been installed should also be provided.

A compliance table (see below) must be prepared and submitted along with the technical bid.

Sr. No	Tender specification	Your offered instrument specification	Extent of compliance

Tender will not be accepted if the technical compliance chart is NOT provided following the above format.

2. PRICE BID

The financial bid indicating (item-wise) price for the item(s) mentioned in the technical bid should be kept in a separate sealed envelope duly super scribed as 'PRICE BID' on the outer cover of the envelop as already detailed above. Price bids of only technically qualified bidders will be opened, and they will be intimated the date and time of the opening of price bid at their e-mail ids. Rest of the bidders will stand rejected.

PRICE: Price to be quoted on CIF Kolkata and also FOB basis.

3. BID SECURITY:

An Account payee Demand Draft of any of the Commercial Banks for Rs. 4,00,000 (Rupees 4 Lakh only) drawn in favour of "Indian Association for the Cultivation of Science (State Bank of India, Jadavpur University Branch, A/C No. 11079699211, IFSC: SBIN000093, MICR Code: 700002048)" is to be furnished by the bidders along with Technical Bid, except Micro and Small Enterprises (MSEs) as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprises (MSME) or are registered with the Central Purchase Organisation or the concerned Ministry or Department.

Alternatively, the bidder shall have the option to furnish EMD in the form of Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee from any of the Commercial Banks. The Bid-Security should have at least 90 (ninety) days validity period beyond the final bid validity period.

In case of non-award of the work the Bid Security money would be returned to the unsuccessful Bidders.

4. PERFORMANCE SECURITY:

An Account Payee Demand Draft on any commercial bank of India or Bank Guarantee (BG) of any Commercial Bank preferably located at Kolkata of 10% of the order value in the name of “Indian Association for the Cultivation of Science” is to be furnished by the successful bidder as Performance security. Performance security money should remain valid for a period of 60 days beyond the date of completion of all contractual obligations of the supplier including warranty obligations. Bid security money or EMD will be refunded to successful bidder on receipt of the Performance security money.

5. TERMS OF PAYMENT:

Payment will be made through irrevocable Letter of Credit in two instalments. 90% of the money will be released on submission of shipping of documents. Remaining 10% will be released after successful installation of the instrument.

6. GENERAL INSTRUCTIONS:

1. Validity of tender: Tender submitted should remain valid for at least six months from the date of opening the tender. Validity beyond six months from the date of opening of the tender shall be lapsed by mutual consent.
2. The tender should accompany a compliance chart.
3. Incomplete and conditional tenders as well as tenders received after the due date will be summarily rejected without assigning any reasons thereof.
4. At any time prior to the bid due date, IACS may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder during pre-bid meeting, modify the bidding documents. The amendment(s) will be notified on the institute website. Prospective bidders are advised to occasionally to visit the website (www.iacs.res.in/tender) for any amendment.
5. Installation/Demonstration/Application training at site: Installation & user training at IACS, free of cost by the supplier.
6. Service facility: In India, preferably Kolkata, supplier should mention their details of service setup and man powers who are responsible for after sales support. Response time should be within 24 hrs.
7. The model number, make and a printed literature of the product should be submitted positively.
8. Proposed delivery schedule should be mentioned clearly.
9. Manufacturers / exclusive distributors / vendors should have history of supplying this type of instruments to this or other scientific organizations. Availability of a list in this regard would be preferred.
10. Authorized dealership certificate should be provided in case of principal manufacturing company is not quoting directly.
11. Guarantee certificate, users manuals etc. are to be handed over to the user after successful commissioning of the system.
12. In the event of date being declared a closed holiday for purchaser's office, the due date for submission of bids and opening of the technical bids will be the following working day at the appointed time.
13. In case of any dispute, the decision of IACS authority shall be final and binding on the bidders.
14. In case of any litigation the matter will be dealt within the jurisdiction of the High Court of Calcutta only
15. For any clarification regarding technical specifications, information etc., please send your queries to (sspsdd@iacs.res.in).
16. The authority of IACS reserves the right to reject any or all of the tenders received without assigning any reason thereof.

Acting Registrar