

Tender Details

Tender No: SCL/PS/2018E0108301

Tender Date: 16/07/2018

Purchase Entity: Purchase& Stores

Tender Notice

E-Procurement Tender No. SCL/PS/2018E0108301 dated July 17, 2018, SEMI-CONDUCTOR LABORATORY [SCL] invites ONLINE offers in TWO part system through e-tender portal <https://eprocure.isro.gov.in> for Supply, Installation and Commissioning of 100 keV Electron Beam Lithography (EBL) Tool for 150mm & 200mm SEMI-standard wafer size. Tender Documents can be downloaded from July 18, 2018 -1701 hrs. to August 20, 2018 upto 1100 hrs. The vendors need to get enrolled in the e-tender portal to access tender and submit their offer online. Vendors need to have Digital Signature Certificate as detailed on our e-portal and corporate e-mail ID to register on the above portal. Only online tenders will be accepted. No Manual/Postal/courier/e-mail/fax tender will be entertained. Please note Tender fee shall not be applicable for tenders submitted on-line through this portal.

Vendors interested to participate in this e-Tender are required to register themselves as vendors, if not already registered, in our e-procurement portal <https://eprocure.isro.gov.in> by downloading plugins and help demos listed on the home page of the e-procurement link mentioned above to complete the vendor registration process. They can seek help from help desk +91 20 2531 5555/ Mobile No.91679 69601 (Email: support.isro@nextenders.com) also the home page of e-procurement portal may be accessed for any technical help for registration and subsequent process. Vendors may please note that without registering in our E-procurement portal they will not be able to quote for this tender.

Tender Attachments

Technical Write-up/Drawings

Attachment - I:

IDT0018130000000000isro05401.pdf

Attachment - II:

Attachment - III:

Attachment - IV:

Attachment - V:

Instructions to Tenderers (PT)

1. Interested tenderers may, at their option, login to <http://eprocure.isro.gov.in> and submit offers as per details in the tender notification.
2. This being two part Tender-Technical and Commercial parts separate, the bidder should not attach any document(s) containing pricing information alongwith Technical Part. The tenders containing price information in Technical Part will be treated as unsolicited offers and rejected. Prices should be indicated in the Price Bid format only .
3. Request for the extension of the due date will not be considered.
4. SCL reserves the right to accept or reject any/or all the tenders in part or full without assigning any reasons thereof. The bidder is at liberty to seek information related to bidding conditions, bidding process and/or rejection of its bid.
5. In this tender either the Indian Agent on behalf of the Principal/OEM or the Principal/OEM itself can bid, but both cannot bid simultaneously for the same item. Indian agents while quoting on behalf of their principals shall provide necessary latest authorization letter obtained from their Principals/Manufacturers in their bid.
6. If an agent submits bid on behalf of the Principal/OEM, the same agent shall not submit a bid on behalf of another Principal/OEM in the tender for the same item. If submitted, all offers submitted by the said agent shall be excluded from the procurement process.
7. Bids submitted other than EGPS mode shall not be considered..
8. SCL reserves the right to verify all claims made by the bidder.
9. SCL reserves the right to change any milestone date of the tendering activity / tender schedule.

10. Tender which is not submitted in terms of instructions mentioned herein is liable to be rejected.
11. If tender opening date happens to be a public holiday, tender will be opened on the next working day and interested bidders may depute their representatives to attend the Tender Opening, with proper authorization.
12. The purchaser shall be under no obligation to accept the lowest or any tender and reserves the right of acceptance of the whole or any part of the tender or portions of the quantity offered and the tenderers shall supply the same at the rates quoted.
13. It is expressly agreed that the acceptance of the Stores Contracted for is subject to final approval in writing by the Purchaser.
14. It is to be noted that the drawings, specifications, end-use, etc., given by the purchaser, are confidential and shall not be disclosed to any third party.
15. Prices are required to be quoted according to the units indicated in the Price bid. When quotations are given in terms of units other than those specified in the tender form, relationship between the two sets of units must be furnished.
16. The quote should indicate quantity wise unit rate separately which have to be Price bid. The Prices are to be mentioned both in figures as well as in words. The taxes, duties etc. are to be calculated and indicated in the column provided in online forms explicitly.
17. Bidders are expected to comply with commercial and other terms and conditions given in vendor specified terms of this tender. In case of any deviation, the reasons thereof should be clearly specified in the vendor specified terms column.
18. All available technical literature, catalogues and other data in support of the specifications and details of the items should be furnished along with the offer.
19. Specifications: Stores offered should strictly confirm to our specifications. Deviations, if any, should be clearly indicated by the tenderer in his bid. The tenderer should also indicate the Make/Type number of the stores offered and provide catalogues, technical literature and samples, wherever necessary, along with the quotations. Test Certificates, wherever necessary, should be forwarded along with supplies. Wherever options have been called for in our specifications, the tenderer should address all such options. Wherever specifically mentioned by us, the tenderer could suggest changes to specifications with appropriate response for the same.
20. The tenderer would provide, the name of his bankers as well as the latest Income-Tax clearance certificate duly countersigned by the Income-Tax Officer of the Circle concerned under the seal of his office, if required by the Purchaser during evaluation of tender.
21. Subletting and Assignment: The contractor/supplier cannot sublet, transfer or assign the order/Contract or any part thereof or interests therein or benefit or advantage thereof in any manner whatsoever, to any other party save with the previous written consent of the purchaser. Such consent

by the purchaser, however, shall not relieve or discharge the contractor/supplier from any obligation, duty or responsibility under the Purchase Order/ Contract.

22. The contractor/supplier shall indemnify the purchaser against Workmen Compensation Act.

23. The authority of the person submitting the tender, if called for, should be produced.

24. The bids shall be opened on 1st day of opening schedule as indicated in the Tender Notice in the presence of the bidders/their authorized representatives who may like to attend the tender opening against presentation of Authorization letter.

Due to any breakdown in server/link, bid opening will be continued on the following dates. The schedule of opening of Price bids shall be intimated separately to the technically qualified bidders only.

25. PROCEDURE FOR EVALUATION OF TENDERS:

Technical Evaluation Criteria:

Vendor meeting the eligibility criteria and basic technical specifications mentioned in SCL Tender shall be considered to be technically qualified.

Evaluation of Price Bids

The following elements shall be considered for evaluation of Priced Commercial offer:

a. Price quoted by the bidder in the price bid template for meeting the functionalities given in the Tender and Technical Specifications sheet. Bid shall be evaluated on overall cost basis. AMC charges and recommended spares & consumables charges sought in this tender shall not be taken into account for evaluation of price bid.

b. Compliance with the Payment Terms prescribed in this tender document. In the event, the bidder offers Payment Terms stringent than SCL prescribed Payment Terms, the bid of the bidder shall be loaded based on Base Rate of SBI prevailing on the date of opening of price bids.

c. In the event of the bidder requiring SCL to bear bank charges outside India (foreign bank charges), the bidders bid shall be loaded at the rate 0.5 percent of the value towards bank charges outside India.

26. The bid should contain the following information:-

a. Agency Commission: Bidders are required to provide the following information in respect of their authorised Indian Agent, if any, along with technical bid as the same is mandatory as is required for consideration of the bid. Name, Address, Telephone no. , fax no., email of the Indian Agent including the contact person. A letter from the Manufacturer/supplier in the current date certifying that the said Indian Agent is their authorised Indian Agent and also indicating the responsibilities/role of the Indian Agent under the proposed purchase. Remuneration/service charges payable to the Indian Agent under the proposed purchase. The amount of agency commission included in the price and payable to Indian Agent of the contractor shall be paid directly to the Indian Agents by the Purchasers in equivalent in Indian rupees on the basis of an invoice from him applying TT buying rate of exchange ruling on the date

of placement of the Purchase Order and which shall not be subject to any further exchange variations. The payment will be released to the Indian Agents within 30 days from the date of acceptance of the goods.

b. Recommended spares for satisfactory operation for a minimum period of one year.

c. Details of any technical service, if required for erection, assembly, commissioning and demonstration.

27. The FOB/FCA prices quoted should be inclusive of all taxes, levies, duties arising in the tenderer country.

28. The details of Import License if any, will be furnished in the Purchase Order.

29. Instruction/operation manual containing all assembly details including wiring diagrams should be sent wherever necessary in duplicate. All documents/correspondence should be in English Language only.

30. Part shipment is not allowed unless specifically agreed to by us.

31. RECOVERY OF SUM DUE:

Whenever any claim for the payment of, whether liquidated or not, money arising out of or under this Contract against the Contractor, the purchaser shall be entitled to recover such sum by appropriating in part or whole, the security deposited by the Contractor, if a security is taken against the Contract. In the event of the security being insufficient or if no security has been taken from the Contractor, then the balance or the total sum recoverable as the case may be, shall be deducted from any sum then due or which at any time thereafter may become due to the Contractor under this or any other Contract with the purchaser. Should this sum be not sufficient to cover the full amount recoverable, the Contractor shall pay to the purchaser on demand the remaining balance due. Similarly, if the purchaser has or makes any claim, whether liquidated or not, against the Contractor under any other Contract with the purchaser, the payment of all moneys payable under the Contract to the Contractor including the security deposit shall be withheld till such claims of the purchaser are finally adjudicated upon and paid by the Contractor.

32. PACKING:

a) The Contractor wherever applicable shall pack and crate all stores for sea /air/road shipment as applicable in a manner suitable for export to a tropical humid climate, in accordance with internationally accepted export practices and in such a manner so as to protect it from damage and deterioration in transit by road, rail, air or sea. The Contractor shall be held responsible for all damages due to improper packing.

b) The Contractor shall ensure that each box / unit of shipment is legible and properly marked for correct identification. The failure to comply with this requirement shall make the Contractor liable for additional expenses involved.

c) The Contractor shall notify the purchaser of the date of shipment from the port of embarkation as well as the expected date of arrival of such shipment at the designated port of arrival.

d) The Contractor shall give complete shipment information concerning the weight, size, content of each packages, etc.

e) Trans-shipment of equipment shall not be permitted except with the written permission of the purchaser.

f) Apart from the despatch documents negotiated through Bank, the following documents shall also be airmailed to the purchaser within 3 days from the date of shipment:

i) Air Way Bill (Two non-negotiable copies)

ii) Invoice (3 copies)

iii) Packing List (3 copies)

iv) Test Certificate (3 copies)

v) Certificate of Origin, wherever applicable.

The Contractor shall also ensure that one copy of the packing list is enclosed in each case. 33. SECURITY INTEREST:

On each item to be delivered under this Contract, including an item of work in progress in respect of which payments have been made in accordance with the terms of the Contract, purchaser shall have a security interest in such items which shall be deemed to be released only at the time when the applicable deliverable item is finally accepted and delivered to the purchaser in accordance with the terms of the Contract. Such security interest of the purchaser shall constitute a prior charge as against any other charge or interest created in respect of such items by any entity.

34. INDEMNITY:

The Contractor shall warrant and be deemed to have warranted that all Stores supplied against this Contract are free and clean of infringement of any patent, copyright or trade mark and shall at all times indemnify the purchaser against all claims which may be made in respect of stores for infringement of any right protected by Patent, Registration of design or Trade Mark and shall take all risk of accident or damage which may cause a failure of the supply from whatever cause arising and the entire responsibility for the sufficiency of all the means used by him for the fulfilment of the Contract.

35. COUNTER TERMS AND CONDITIONS OF SUPPLIERS:

Where counter terms and conditions/printed or cyclostyled conditions have been offered by the supplier, the same shall not be deemed to have been accepted by the purchaser unless specific written acceptance thereof is obtained.

36. CONTRACTORS DEFAULT LIABILITY:

The purchaser may upon written notice of default to the Contractor terminate the Contract in whole or in part in circumstances detailed hereunder:

a) If in the judgement of the Purchaser the Contractor fails to make delivery of Stores within the time specified in the Contract/agreement or within the period for which extension has been granted by the Purchaser to the Contractor.

b) If in the judgment of the Purchaser the Contractor fails to comply with any of the other provisions of this Contract.

Bid Templates

Technical Specification for EBL-1

Item Specifications

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Remarks
1	<p>1.00.OSCOPE OF WORK</p> <p>Vendor's scope of work shall cover supply, installation & commissioning and performance demonstration of floor mounted, fully automated Electron Beam Lithography (EBL) tool having beam energy of greater than or equal to 100 keV with necessary hardware and software. The tool shall be capable of handling & processing, 150 mm Silicon or GaAs wafers and 200 mm Silicon wafers as per Semi-Standards for semiconductor device fabrication and process development based CMOS, MEMS and MMIC technology. The scope of</p>			

	<p>work should include the following:</p> <p>-The major subsystem to be provided by the vendor shall include Plinth, Chamber, Airlock and Vacuum systems with automatic control, X-Y Stage and Control system, Electron optical column with beam formation control system, Beam deflection, alignment and compensation systems, pattern generator and pattern data handling system, Operator interface and beams control software using a workstation and distributed microprocessor sub-system controllers, Thermal control/cooling water baths and vacuum pumps.</p> <p>-Installation of the tool and Support equipment, including all utility</p>			
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	<p>connections.</p> <p>-Commissioning of the Tool and demonstration of its functionality as per the required specifications.</p> <p>-On-site training to concerned SCL personnel on Operations, Basic Maintenance & Troubleshooting of the tool.</p> <p>It is not the intent of this document to completely specify all details of design and construction. Nevertheless the systems shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing the operations in a safe and efficient manner as per industry codes.</p>			
2	<p>1.01.00ELIGIBILITY CRITERIA</p> <p>Only those parties are</p>			

	<p>eligible to participate in the tender who have experience in the manufacture and maintenance support of High Resolution Electron Beam Lithography System. The vendor must have a track record of at least 7 years in manufacture and supply of Electron Beam Lithography System and shall have supplied at least one similar system during the last five years. Vendor shall provide their client list/ List of installation for such tools successfully installed by them around the globe in last five years.</p>			
3	<p>1.02.00SCOPE OF SUPPLY</p> <p>1.02.01Vendor shall supply the tool, including support tools viz. Chiller units, Vacuum pumps, etc. as per the Technical Specifications (Refer clause 3.00.00).</p> <p>1.02.02 Vendor shall</p>			

	<p>supply all the auxiliary items like interconnect matching cables for electrical connections; interconnect fittings, vacuum line etc. for support tool installations; Foundation Pads/bolts, Clamps, etc. as may be required to complete the installation and commissioning of the tool.</p> <p>Any items not specifically mentioned in the specifications but required for safe and efficient operations of the system should deemed to be included in the scope of supply of the vendor unless explicitly indicated in the bid by the vendor.</p>			
4	<p>1.03.00SCOPE OF INSTALLATION AND COMMISSIONING</p> <p>1.03.01It will be the responsibility of the vendor to ensure proper installation and</p>			

	<p>commissioning of the tool at SCL. All interconnects for tool and subsystems shall be done by vendor. SCL will provide utilities to hook up to the tool.</p> <p>1.03.02 Vendor shall provide guidelines for preparation of installation site.</p> <p>1.03.03 Vendor shall also supply the installation drawings giving detailed information regarding the port size and type for the utility connections.</p> <p>1.03.04 Depending on delivery terms (ex. works or DAP/CIP) the vendor shall guide and instruct SCL by uncrating the tool, move the same to the respective area (s) and install the tool on foundations, etc. SCL will provide utilities hook-up up to the tool.</p> <p>1.03.05 Vendor shall</p>			
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	<p>Commission the systems with the required process gases (to be supplied by SCL) and demonstrate the functionality of the tool supplied, at SCL site.</p> <p>1.03.06 Vendor shall bring all necessary tools/instruments etc. that may be required for successful commissioning/ installation/ verification of the tool and sub tools of the tool. Pre-required items will be provided by SCL, as per vendors need.</p> <p>NOTE: All utility connections shall be from top of the tool.</p>			
5	<p>1.04.00 TRAINING</p> <p>1.04.01 During commissioning of the tool, vendor shall provide on-site hands-on training to the concerned SCL personnel (including classroom training) on Operations/Process,</p>			

	<p>application software, related applications, trouble-shooting and Preventive Maintenance of the tool supplied. The training should be extensive (at least for five days) enough so that quick diagnostics of problems and remedial actions is possible at SCL.</p>			
6	<p>2.00.00ACCEPTANCE PROCEDURE:</p> <p>2.01.00Vendor shall demonstrate, at site, the functionality as per the tool acceptance procedure specified at Annexure-A. Vendor should provide best known baseline process recipes for validating the process parameters mentioned in Annexure-A.</p> <p>SCL shall have the option for Pre-shipment inspection at vendor's premises. Final acceptance, however, will</p>			

	be done after installation and demonstration of the functionality of the tool, as per the acceptance procedure (Annexure-A).			
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Technical Specification for EBL-2

Item Specifications -I

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Remarks
1	<p>3.00.00TECHNICAL SPECIFICATIONS</p> <p>Following are the detailed technical specifications of the required system. Vendor has to provide complete information as required in various sections for proper evaluation of the system. The statements in the compliance sheet should be supported by relevant documents/brochures.</p>			
2	<p>3.01.00APPLICATION</p> <p>The electron Beam Lithography (EBL) tool is required for (Advance Lithography Process) Direct Writing on Photoresist coated Semi-standard 150 mm silicon or GaAs Wafers or 200 mm Silicon Wafers to fulfil the</p>			

	<p>process requirements of photolithography for CMOS, MEMS and Photonics devices. The EBL tool shall have capability of handling and processing of substrates of diverse materials like silicon, gallium arsenide, Glass and Quartz. The system should also have capability of Writing the sub-micrometre feature on chrome plated Quartz, and glass plates as specified in technical details for Mask Making of i-Line and DUV lithography Purpose.</p>			
3	<p>Basic System:</p> <p>Electron Beam Lithography system consists of the following major subsystems:</p> <p>(a) Plinth, Chamber, Airlock and Vacuum system with automatic control.</p> <p>(b) X-Y Stage and Control</p>			

	<p>System.</p> <p>(c) Electron optical column with beam formation control system.</p> <p>(d) Beam deflection, automatic calibration, pattern generator and pattern data handling. (Field Size 1 mm).</p> <p>(e) Graphical User interface and control software using a workstation.</p> <p>(f) Network connection for the remote access.</p> <p>The system must be capable of directly writing/defining, electronic, Photonic and mechanical devices consisting of nano-scale feature size components so as to meet the photolithography requirements of advance CMOS technology node.</p>			
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4	<p>High Resolution Lithography</p> <p>The system must be able to write Iso and Dense line features, Inter Digitized features like patterns (equal line and gap) having critical line widths 100 nm +/-10 nm on 200 mm silicon and 150 mm Silicon or GaAs wafers having Silicon oxides, Silicon Nitrides and III-V Compound Semiconductor epitaxial films, semi-conducting films, metal thin films, ceramic etc. and Cr masks. The system must support lithography of all kinds of shapes including triangles with any angle and circles etc. The system must support variety of resist materials as applicable in semiconductor industry and resist like (PMMA, SU-8 etc).</p>			

5	<p>Gray Scale Patterning</p> <p>The Machine should be able to make gray scale patterns over planar/non planar as well as substrates with curved surfaces. It must be possible to define structures in resist, coated over these substrates with desired slope and periodicity (normally of 300 lines per mm).</p>			
6	<p>Multi Layer Lithography:</p> <p>The machine must be capable of executing multilayer lithography with overlay accuracy +/- 20nm or better.</p>			
7	<p>High Aspect Ratio Structure Fabrication</p> <p>The Machine must be capable of patterning minimum 5micron critical dimensions on thick resist (around 10micron) and be able to produce high</p>			

	aspect ratio structures.			
8	<p>Electron Optical Column Specification</p> <p>The electron optical column shall consists of an electron source (TFE, Schottky emitter), condenser lenses, objective lens, fine focus lens and stigmator, electromagnetic alignment coils, blanking plate assembly, beam deflection system and an aperture array to select the final beam current and spot size.</p> <ul style="list-style-type: none"> •The design provides stable operation at 50 keV and 100 keV Acceleration voltage range must be 100 kV. •High brightness Thermal Field Emission electron gun with spot-size of 2 nm or better. •Beam energy: 50KeV and 			

	<p>100 KeV</p> <ul style="list-style-type: none"> •Cathode life time : 18 months (Typical) •Writing speed: up to 100MHz or better. •Automatic Beam selection : The Beam energy and the continuously variable current and spot size shall be fully automatically set and calibrated in a range from 50 pA to >150 nA up to 200 nA •Typical Measured Spot Size at 100KeV: 5 nm to 150 nm •Automatic Aperture changer: Shall have feature of Automatic selection and alignment of final aperture with different interchangeable apertures. •Backscattered electron detector control system 			
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	<ul style="list-style-type: none"> •Absorbed current detector control system and Specimen Current Monitor shall be provided. •Beam current uniformity: Typical +/-0.5% of value over the field •Beam current drift : max less than or equal to +/- 0.5% per hour (open loop) •Beam Parameters: Closed-loop correction mechanism and calibration using a software must be provided. •Minimum line widths of 10 nm or less at 100 keV. •Automatic set-up for electron gun run up, focusing, astigmatism correction and deflection calibrations. •SEM Mode Magnification: 200X to 200000X; facility to change or choose magnification through computer must be 			
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	<p>inbuilt.</p> <ul style="list-style-type: none"> •Coarse/ Fine Split: System shall have the ability to automatically expose fine/coarse lithography layers with different resolution and beam currents as separate passes. 			
9	<p>Specimen Chamber:</p> <ul style="list-style-type: none"> •Specimen chamber should be connected to low maintenance and oil-free UHV pumping system. 			
10	<p>Vacuum Systems:</p> <ul style="list-style-type: none"> • Suitable vacuum pumps shall be specified for continuous, uninterrupted and reliable operation of various functions of the system, viz., load lock chamber, main writing chamber, electron gun emission chamber, and other modules. • Vendor to provide sufficient length of 			

	<p>connecting lines to facilitate placement of pumps in the service area, wherever applicable.</p> <ul style="list-style-type: none"> • Air cooled dry pumps must be provided for roughing, backing and for achieving suitable and clean vacuum in sections of machine. • Suitable gauges, calibrated as per an official standard, must be provided for monitoring vacuum levels in different sections of the machine. • All the above pumps shall only be of reputed and standard makes (Edwards Make/ Leybold/Varian/Pfeiffer/ Brooks CTI Cryo). • Control and display: Automatic control and display with mimic facility for vacuum and other operations 			
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	<ul style="list-style-type: none"> • Should have provision to automatically reset to safe condition in case of vacuum leak or power failures. 			
11	<p>Stage and Holders:</p> <p>The X-Y stage shall have a travel range of 210 x 210 mm to enable exposure over the maximum allowable pattern area of supported substrates. The positioning is measured with a two-axes laser interferometer measurement system with a resolution of $\lambda / 4096$ (0.15 nm) (typically).</p> <p>Placement control shall use both mechanical positioning of the stage and continuous feedback of the residual stage error to the beam deflection system. This Beam Error Feedback (BEF) shall dynamically track the stage, whilst settling after stage moves and shall</p>			

	<p>compensate the stage position during writing with a resolution of 0.15 nm typically.</p> <ul style="list-style-type: none"> • Substrate Types: Capable of handling and Processing Semi Standard Silicon, GaAs substrates, Mask Plates etc. • Stage calibration provision shall be there. • Mechanical stage positioning error correction mechanism shall be provided • The system should be able to produce desired structures on curved surfaces with help of the stage movement in Z-direction in conjunction with the height mapping methodology or equivalent, which will be used to compensate for any anomalies on the planar surfaces as well. Z-axis movement should be 			
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	at least 10 mm.			
12	<p>Wafer / Substrate and Mask Holders / Handling</p> <ul style="list-style-type: none"> • Capable of holding 150 mm Silicon or GaAs substrate and 200 mm Silicon wafers (both top / bottom reference) • Airlock System: Automatic 2 –Position Cassette (Preferably) fully automated holder exchange enabling automatic sequencing of holders under job file control. • Substrate Height Sensor • Tools for pre-alignment of wafers should be provided • Substrate holder material shall be vacuum-compatible and low drift material • Mask Holder : Individual 5 inch X 5inch and 6 inch 			

	<p>X 6 inch and 7 inch X 7inch square mask holders</p> <ul style="list-style-type: none"> • Current Measurement : All the sample holders should have Faraday cup with an integrated auto range pico ammeter having an accuracy of better than 0.5 percent • Wafer Pre-alignment: Suitable provision should exist to align wafer cut to X or Y axis with an accuracy of better than 0.1 deg or less at the time of loading. 			
13	<p>Lithography System / Pattern Generator:</p> <ul style="list-style-type: none"> • Vector Scan using a spot beam with Gaussian distribution or vendor may offer any other suitable techniques which can meet required tendered specifications (Vendor has to provide the details of techniques used). It must also have required 			

	<p>controls and must be able to provide drift free long exposures (running even in 60 – 70 hours).</p> <ul style="list-style-type: none"> • Fully dedicated lithography system and PG to latest standards • Able to carry out writing by finely changing the pattern size and the pitch between the patterns. • Pattern shapes supported: All kinds of shapes and angles including circles. • Dosage setting: Numbers of stepping frequencies • Alignment: Automatic global alignment software to be provided. Software should also automatically correct errors in position, rotation, run out errors, and facilitate/correct mix-and-match operations to be performed with features realized with 			
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	<p>lithography</p> <ul style="list-style-type: none"> • Field size: Continuously selectable greater than or equal to 500micron, Field-size of 1mm as option. • Stitching accuracy: The field stitching should be < +/-15nm, worst values not to exceed +/-25nm, both for X and Y axes. • In field distortion +/- 12nm, maximum for any field • Overlay accuracy: Better than +/-20nm • Beam positioning resolution Typically: 0.16nm • Line width: Minimum line width must be less than 8nm 			
14	<p>Markers, alignment and calibration</p> <ul style="list-style-type: none"> • System Calibration: Automatic System 			

	<p>Calibration for beam currents between 50 pA and 150nA, typically higher.</p> <ul style="list-style-type: none"> • Calibration Markers: An array of suitable size markers shall be provided on a substrate are mounted on each holder and shall be used for deflection calibration, beam formation and drift compensation and astigmatism calibration and drift compensation. • Direct Writing (overlay writing) : Overlapping with detection of the marks on the wafer • Calibration and dynamic online corrections for deflection, focus, astigmatism and height variations. • Marker detection speed shall be typically less than 1 sec/marker for beam currents of 1nA- 100nA, 			
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	<p>less than 1.8 sec for 100pA – 1nA.</p> <ul style="list-style-type: none"> • Marker detection reproducibility typically less than 3 nm, 1sigma for beam current down to 50 pA • Automatic Height correction: Automatic height correction to correct focus and field size. • Registration and Alignment: Markers for beam formation, deflection, drift, global alignment must be provided. Specific software for alignments (global, distortions, corrections for drift, position, rotation, off axis focus, stigmatism, etc.) must be provided. The system should have the facility for local and chip level alignment by registration of defined 			
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	<p>markers.</p> <ul style="list-style-type: none"> • Measurement and calibration of beam current, beam position, focus, field size and height must be provided • Calibration for other alignment, stage movements, etc., may be stipulated and provided. • External calibration standards, if any, should be specified and provided with certificates of traceability. • EM Field correction: The module for EM field measurement should be supplied and installed by the vendor. 			
15	<p>System control and Image acquisition Hardware/Software:</p> <ul style="list-style-type: none"> • System control should be through appropriately designed ergonomic keyboard with joysticks or 			

	<p>knobs.</p> <ul style="list-style-type: none"> • Appropriate software for system control and image acquisition, manipulation and storage. • Software should be user configurable • Upgrades/ Updates should be available free of cost or for a minimal fee • Pattern processing software package with latest configuration, to be used for designing, troubleshooting, compiling (into machine format) and plotting of data. The pattern processing software must be portable along with the data to a processing station with similar or better configuration. Licensed version of all the software must be provided. • The pattern processing software shall support: 			
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	<p>a) both interactive and batch processing modes</p> <p>b) unlimited number of shapes</p> <p>c) The pattern processing software must be compatible with the machine format in Pre-machine fracturing approach and patter generator resolution.</p> <p>d) It should have help function for all the instructions / commands of the pattern processing station</p> <p>e) Determination of number of shapes, number of grids exposed, size of the pattern, critical dimension, area covered and percentage area exposed</p> <p>f) Proximity effect correction</p> <p>g) Conversion of the input data to output data. Able</p>			
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	<p>to input (read) as well as export in traditional .dxf as well as GDS-II format files. Image display of the input and output data.</p> <ul style="list-style-type: none"> • The software and drivers must be compatible with Windows operating system or comparable operating system • Separate computer/workstation, suitable for pattern generation, etc., must be provided and interfaced with the main system computer. • Visual display of the exposure process and system parameters must be available with the system • User-settable machine parameters for control of the system, through software files/shells. • Provision for run time 			
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	<p>interpretation of pre-defined job files and logging of instructions executed for unattended operations.</p> <ul style="list-style-type: none"> • Programming: Capacity to store multiple programs/recipes, with multiple levels of password protection. Automatic data logging of all process parameters on a continuous basis for better process control and failure analysis should be provided. • Self-test and diagnostics facility with an optional remote diagnostics to be included in the system. 			
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Technical Specification for EBL-3

Item Specifications -II

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Remarks
1	<p>5.00.00 WARRANTY</p> <p>Vendor to provide a comprehensive part and labor warranty for a period of 24 months after acceptance of the system at SCL. Vendor to guarantee 90percent uptime for the tool based on 24 hours working, 7 days a week. Vendor to give two Preventive Maintenance Visits in the Warranty Period of the tool. Vendor to provide all consumables and spares which will be required during preventive maintenance during the period of warranty.</p>			
2	<p>6.00.00 POST WARRANTY SYSTEM SUPPORT:</p>			

	Spares and maintenance support required for 10 years after the expiry of warranty period. Vendor to quote for Post-warranty 'labor-only' AMC charges per year for a period of 5 years.			
3	<p>7.00.00 RECOMMENDED SPARES AND CONSUMABLES:</p> <p>Vendor to provide separately the list of recommended spares and consumables which will be required to maintain above stated tool uptime. This list would be for reference only and shall NOT include any price information. Even the quote for main tool shall also NOT include any price information for the spares and consumable.</p>			
4	<p>8.00.00 SAFETY:</p> <ul style="list-style-type: none"> • Appropriate safety mechanism in terms of 			

	<p>alarms and EMO should be provided for operator safety. Vendor to provide the details.</p> <ul style="list-style-type: none"> • The system should be design to be compliant with CE standards or other Industrial safety standard. • Fitted with all necessary safety interlocks (Hardware and software) for safe operation. 			
5	<p>9.00.00 TECHNICAL DOCUMENTATION</p> <p>Vendor to supply two sets of technical documentation (in English language) containing, but not limited to, the following:</p> <ol style="list-style-type: none"> 1. System user manuals (two sets of clean room and two sets for grey rooms). 2. System Hardware / Software manuals. 			

	<p>3. Maintenance /Diagnostic / Trouble shooting manuals including schematics, Circuit diagram (Electrical & Plumbing) along with Parts for all spares.</p> <p>4. OEM system/subsystem/accessories manuals</p> <p>5. Vendor to recommend/ specify type of pump, accessories and type of oils/grease to be used along with pump operation & maintenance manual to minimize pump down time.</p> <p>6. Vendor shall supply all additional information such as application development notes, paper published/process information etc. related to the system</p>			
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Acceptance Procedure Annexure-A

Item Specifications -III

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Remarks
1	Acceptance Procedure Tool will be accepted on the basis of following process parameters / test procedures to be at SCL. Tests to be performed on field-size ordered and on mask-plates or Si wafers. Wafers will be supplied and processed by SCL.			
2	1. In field Resolution demonstration: a. Demonstration of Typical Line width of less than or equal to 80 nm for a Field size of 100 micron and Beam Energy of 100 keV b. Demonstration of Typical Line width of less than or equal to 12 / 15			

	nm for a Field size of 500 / 1000 micron and Beam Energy of 100 keV			
3	<p>2. Stitching Accuracy (Max/Min)</p> <p>a. Demonstration of Typical Stitching accuracy of +/-15 nm for a Field Size of 250 micron for a Beam Energy of 100 keV</p> <p>b. Demonstration of Typical Stitching accuracy of +/-20 /+/-30 nm for a Field Size of 500 /1000 micron for a Beam Energy of 100 keV</p> <p>c. Demonstration of Typical Stitching accuracy of +/-20 /+/-40 nm for a Field Size of 500 /1000 micron for a Beam Energy of 50 keV</p>			
4	<p>3. Overlay Accuracy (Max/Min) in Direct Writing</p> <p>a. Demonstration of Typical Stitching of +/-15 nm for a Field Size of 250</p>			

	<p>micron for a Beam Energy of 100 keV</p> <p>b. Demonstration of Typical Stitching of +/- 20/+/-30 nm for a Field Size of 500/1000 micron for a Beam Energy of 100 keV</p> <p>c. Demonstration of Typical Stitching of +/- 20/+/-40 nm for a Field Size of 500/1000 micron for a Beam Energy of 50 keV</p>			
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UTILITY REQUIREMENTS FOR TOOL Annexure B

Item Specifications -IV

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Remarks
1	<p>UTILITY REQUIREMENTS FOR TOOL</p> <p>1 Environmental Conditions</p> <ul style="list-style-type: none"> - Clean Room Class - Temp. - RH <p>Vendor to specify</p> <p>Vendor to strike off whatever is not applicable and specify any other utility requirements.</p>			
2	<p>2 UHP Water.</p> <p>(Please specify Hot Water reqmt., if any)</p> <p>Vendor to specify</p>			
3	<p>3 BULK Gases</p>			

	<ul style="list-style-type: none"> - Process Nitrogen - General Nitrogen - Oxygen - Hydrogen - Argon - Helium <p>Vendor to specify</p>			
4	<p>4 Specialty Process Gases</p> <p>(Pl. specify reqmt for all the process gases)</p> <p>Vendor to specify</p>			
5	<p>5 Process Cooling Water</p> <p>Vendor to specify</p>			
6	<p>6 Compressed Dry Air</p> <p>Vendor to specify</p>			
7	<p>7 Process Vacuum</p> <p>Vendor to specify</p>			
8	<p>8 Exhaust</p> <ul style="list-style-type: none"> - Acid Exhaust 			

	<ul style="list-style-type: none"> - Solvent Exhaust - General Exhaust <p>Vendor to specify</p>			
9	<p>9 Drains for</p> <ul style="list-style-type: none"> - Acid/ Alkalies - Organic Solvent - CMP etc <p>Vendor to mention composition of effluent , if discharged from the Tool</p>			
10	<p>10 City Water</p> <p>Vendor to specify</p>			
11	<p>11 Special Flooring/ Foundation reqmts, if any (Anti Vibration pads etc.)</p> <p>Vendor to specify</p>			
12	<p>12 Vacuum Wands/ N2 guns.</p> <p>Vendor to specify</p>			
13	<p>13 Dimensions/Foot-Print & Weight.</p>			

	<ul style="list-style-type: none"> - Tool Foot-Print. - Tool weight - Support Tools. <p>Vendor to specify</p>			
14	<p>14 Electrical Supply (50 Hz)</p> <ul style="list-style-type: none"> - Normal Supply. - UPS - Emergency back-up <p>Vendor to specify load, voltage and phase</p> <p>NOTE: Power Mode Available at SCL: 230V +/- 10percent, 1 PHASE, 50Hz +/- 5 percent</p> <p>OR 415V +/- 10 percent/3 PHASE, 50 Hz +/- 5 percent</p>			

Vendor Specified Terms

Description	Vendor Terms
<p>1.Delivery Term:</p> <p>For imported stores, prices shall be quoted on FOB/FCA nearest International/Gateway airport basis.</p> <p>For indigenous stores, prices shall be quoted on F.O.R destination basis i.e. SCL, S.A.S. Nagar, Mohali, Punjab, exclusive of GST and taxes as may be applicable.</p>	
<p>2.For indigenous materials, Purchaser is entitled to concessional CGST of 2.5 % and IGST of 5 % as per Ministry of Finance, Department of Revenue, Notification Nos. 45/ 2017 Central Tax (Rate) and 47/2017 Integrated Tax (Rate) both dated 14th November, 2017 respectively and would accordingly issue Exemption Certificate in favour of the contractor quoting in Indian Rupees. The bidder should take note of the same while quoting the prices in Indian Rupees.</p>	
<p>3.For imported materials, Purchaser is entitled to issue Customs duty exemption certificate (CDEC) to the contractor under customs notification no.51/96 dated 23.07.1996 and subsequent amendments to enable the contractor to avail off the benefit of concessional rate of customs duty under this notification. CVD under this notification is nil. In addition to the above CDEC, any documentary support requested by the contractor from the purchaser for customs clearance of goods against the above CDEC shall be provided by the purchaser.</p> <p>(Purchaser will provide Customs Duty Exemption Certificate in case of</p>	

<p>Import Orders/ imported supplies/ High Sea Sales).</p>	
<p>4. Contractor shall confirm that whether they have submitted offer for new system.</p>	
<p>5. IMPORTANT: This being two part Tender-Technical and Commercial parts separate, the bidder should not attach any document(s) containing pricing information alongwith Technical Part. The Contractor will provide Un-Priced Commercial offer in envelope 1 (Technical Part) as an attachment.</p> <p>The tenders containing price information in Technical Part will be treated as unsolicited offers and rejected. Contractor to confirm that Price bid is not attached in Envelope 1 i.e. Technical Part</p> <p>Priced Commercial offer, if any, should be attached in Envelope-2 (Price Bid) under Supporting Documents from Vendor (Commercial), as an attachment</p>	
<p>6. Delivery Period:</p> <p>The contractor should specify their best delivery period inclusive of all Govt. formalities of the exporting country.</p>	
<p>7. Security Deposit (SD):</p> <p>On acceptance of the tender, the Contractor shall submit security deposit for ten percent (10 percent) value of the Purchase Order (PO) within 15 days from the date of PO towards successful execution of the PO. Security Deposit shall be submitted through Demand Draft / Bankers Cheque/ fixed deposit receipt or Bank Guarantee from any of the Scheduled Banks executed on non-judicial stamp paper of appropriate value, and shall be valid for a period of sixty (60) days</p>	

<p>beyond the date for completion of the Purchase Order.</p> <p>(This will be returned by SCL immediately on execution of the PO satisfactorily as per order terms. If not, the amount will be forfeited).</p>	
<p>8.TERMS OF PAYMENT IN CASE OF OVERSEAS SUPPLIER[S]:</p> <p>Being a Department of the Government of India, the normal terms of payment are by Sight Draft. The payment shall be remitted as under:</p> <p>90% of the value of the materials supplied shall be paid within 30 days of the receipt of the materials at purchaser site and the balance 10% amount shall be payable on successful installation, commissioning and acceptance of the entire project at Purchasers site against a Performance Bank.</p> <p>All bank charges outside India related to the payment shall be borne by the Contractor and all bank charges in India shall be borne by the purchaser.</p> <p>In the event of the Contractor not being able to provide the Performance Bank Guarantee the payment of balance 10% amount shall be made after the expiry of the warranty period.</p> <p>Indian agent remuneration/service charge shall be payable by the Purchaser directly to the Indian agent in Indian Rupees based on T.T buying rate of exchange prevailing on the date of placement of purchase order within 30 days of acceptance of equipment at purchaser site.</p> <p>The Sight Draft will be operative on presentation of the under mentioned documents :</p>	

<p>a) Original Airway Bill</p> <p>b) Commercially certified invoices describing the stores delivered, quantity, unit rate and their total value, in triplicate. The invoice should indicate the discounts, if any, and Agency Commission separately.</p> <p>c) Packing List showing individual dimensions and weight of packages.</p> <p>d) Country of Origin Certificate in duplicate, wherever applicable.</p> <p>e) Test Certificate, if applicable.</p> <p>f) Declaration by the Seller that the contents in each case are not less than those entered in the invoices and the quality of the Stores are guaranteed as per the specifications asked for by the Purchaser, if applicable.</p> <p>g) Warrantee and guarantee Certificate/s as applicable.</p> <p>While the purchasers bank charges shall be borne by the purchaser, the contractor shall bear the bank charges payable to his banker including the charges towards advising/amendments/commissions etc.</p>	
<p>9.TERMS OF PAYMENT IN CASE OF INDIGENOUS SUPPLIER[S]:</p> <p>The payment shall be remitted as under:</p> <p>90% of the value of the materials supplied shall be paid within 30 days of the receipt of the materials at purchaser site and the balance 10% amount shall be payable on successful installation, commissioning and acceptance of the entire project at Purchasers site against a Performance Bank Guarantee .</p> <p>In the event of the Contractor not being able to provide the</p>	

<p>Performance Bank Guarantee the payment of balance 10% amount shall be made after the expiry of the warranty period.</p> <p>While the purchaser bank charges shall be borne by the purchaser, the contractor shall bear the bank charges payable to his banker including the charges towards advising/amendments/ commissions etc.</p>	
<p>10. Performance Bank Guarantee (PBG):</p> <p>The Contractor shall furnish a Bank Guarantee (as per format given by purchaser) from any nationalized/scheduled bank for an amount equivalent to 10% of the value of the Contract and shall be valid for a period of 60 days beyond the expiry date of warranty period. On the performance and completion of the Contract in all respects, the Bank Guarantee will be returned to the Contractor without any interest.</p>	
<p>11. Warranty :</p> <p>The Contractor shall provide for the tendered equipment comprehensive warranty for parts as well as labour for a period of 24 months after acceptance of the system at Purchasers site at no extra charges against any manufacturing defect/faulty workmanship.</p> <p>In case any defect arises during warranty period, the Contractor should replace/rectify the same at its own cost at site/works.</p> <p>The Contractor to guarantee 90% uptime for the system based on 24 hours working, 7 days a week. The Contractor will provide two Preventive Maintenance (PM) Visits in the warranty period of the tool.</p> <p>Contractor will also provide all consumables, spares and PM kit which will be required during preventive maintenance during the warranty period at no extra cost.</p>	

<p>12. Post Warranty System Support:</p> <p>Contractor will ensure Spares and maintenance support required for 10 years after the expiry of warranty period.</p> <p>Contractor shall provide quote for Post-warranty (labour-only) AMC charges per year for a period of 5 years. This AMC charges may be quoted in Envelope -2 (Price Bid) under Supporting Documents from Vendor (Commercial), as an attachment. These charges shall be for reference purpose and shall not be considered during evaluation of the tendered stores.</p>	
<p>13. Recommended Spares and Consumables:</p> <p>The Contractor to provide separate itemized Quote (optional, for reference) for recommended essential spares and consumables will be required for meeting the essential above stated tool uptime. This itemized quote would be for reference only and shall not include in price information.</p> <p>Price of these recommended spares and consumables may also be quoted in Envelope-2(Price Bid) under Supporting Documents from Vendor(Commercial), as an attachment. These charges shall not be considered during evaluation of the tendered stores.</p>	
<p>14. Warranty Replacements:</p> <p>a) If in the opinion of the purchaser it becomes necessary to replace or repair any defective equipment during the warranty period, such replacement or repair shall be made by the Contractor free of all costs to the Purchaser provided the notice informing the Contractor of the defect is given by the Purchaser within a period of 26 months from the</p>	

<p>date of acceptance thereof.</p> <p>b) All replacement parts during the warranty period shall be supplied by the Contractor, free-of-cost on DDP (Delivery Duty paid) basis with freight and insurance upto Purchaser site at S.A.S. Nagar, Punjab and customs duty applicable in India to the Contractor account including compliance with the customs procedure in India. The indigenous replacement parts, if any, shall be supplied by the Contractor free of cost on F.O.R. Purchaser site at SAS Nagar, Punjab basis.</p> <p>All defective parts including the imported parts shall be returned by Purchaser to the Contractor, if requested, on Freight to pay basis.</p>	
<p>15.REPLACEMENT :</p> <p>If the stores or any portion thereof is damaged or lost during transit, the Purchaser shall give notice to the Contractor setting forth particulars of such stores damaged or lost during transit. The replacement of such stores shall be effected by the Contractor within a reasonable time to avoid unnecessary delay in the intended usage of the Stores. In case the purchaser agrees, the price towards replacement items shall be paid by the purchaser on the basis of original price quoted in the tender or as reasonably worked out from the tender.</p>	
<p>16.Validity of Offer:</p> <p>The tender must be valid for a minimum period of 120 days from the date of opening of Technical bid and 90 days after opening of Price bid.</p>	
<p>17.Liquidated Damages (LD):</p> <p>If the Contractor fails to deliver the stores within the time specified in</p>	

<p>the contract or any extension thereof, the purchaser shall recover from the Contractor as liquidated damages a sum of one-half of one percent (0.5 percent) of the Contract price of the undelivered stores for each calendar week of delay. The total liquidated damages shall not exceed ten percent (10 percent) of the Contract price.</p>	
<p>18.Mode of Despatch:</p> <p>In case of foreign orders, stores should be dispatched to IGI Airport, New Delhi through freight forwarder nominated by the purchaser whose details shall be indicated in the purchase order.</p>	
<p>19.EXTENSION OF TIME :</p> <p>If the completion of supply of stores is delayed due to reason of force majeure such as acts of god, acts of public enemy, acts of Government, fires, floods, epidemics, quarantine restriction, strikes, freight embargoes, etc., the Contractor shall give notice within 15 days to the purchaser in writing of his claim for an extension of time. The purchaser on receipt of such notice after verification, if necessary, may agree to extend the Contract delivery date as may be reasonable but without prejudice to other terms and conditions of the Contract.</p>	
<p>20.INSTALLATION AND COMMISSIONING :</p> <p>Installation, commissioning and demonstration of performance of the tendered stores as per Purchaser tendered specifications shall be carried out by the Contractor at Purchaser site at S.A.S. Nagar, Punjab, India.</p> <p>The Contractor shall provide in advance guidelines for preparation of the installation site and list of items to be supplied by Purchaser during</p>	

<p>installation.</p> <p>On receipt of intimation from the Purchaser, the Contractor shall depute its engineer(s) to Purchaser site within two weeks to carry out installation and commissioning and will demonstrate the functionality of the tendered equipment to Purchaser specifications as per mutually agreed acceptance procedure. The Contractor shall be responsible for any loss/damages sustained due to delay on the part of the Contractor to send its engineer for installation and commissioning.</p> <p>Failure to commission the tendered equipment successfully shall entitle Purchaser to full refund of the payment made and the interest thereon. Decision regarding successful installation and commissioning shall rest solely with the Purchaser.</p>	
<p>21. Insurance of Stores:</p> <p>Insurance wherever necessary, will be arranged by the Purchaser. The necessity or otherwise of insurance will be as indicated in the Purchase Order/Contract.</p>	
<p>22. Packing & Forwarding:</p> <p>The Contractor shall pack and crate all stores for air/sea/road shipment as applicable in a manner suitable for export to a tropical humid climate, in accordance with internationally accepted export practices and in such a manner so as to protect it from damage and deterioration in transit by road, rail, air or sea. The Contractors shall be responsible for all damages due to improper packing.</p>	
<p>23. Arbitration:</p> <p>If at any time any question, dispute or difference whatsoever shall</p>	

<p>arise between the purchaser and the Contractor upon or in connection with this Contract, either party may forthwith give to the other notice in writing of the existence of such question, dispute or difference and the same shall be referred to the adjudication of two arbitrators, one to be nominated by purchaser, other by a Contractor and in the event of any difference of opinion, the arbitrators will refer the matter to the umpire. The arbitration shall be conducted in accordance with the rules and procedure for arbitration of the International Chamber of Commerce at Paris. The expenses of the arbitrators and umpire shall be paid as may be determined by them. However, the venue of such arbitration should be in India. In case of dispute arises with domestic/Indian suppliers, the applicable Arbitration procedure shall be as per Indian Arbitration & Conciliation Act, 1996.</p>	
<p>24.Applicable Law: The Contract shall be interpreted, construed and governed by the laws of India.</p>	
<p>25.Any Other Term</p>	

Supporting Documents from Vendor

Attachment - I:

Attachment - II:

Price Bid Form

Item Description	Slab Range	Qty	UOM	Currency	Unit Price	Total Price
Supply, Installation and Commissioning of 100KeV Electron Beam Lithography (EBL) tool for 150 mm and 200 mm SEMI-standard wafer size SCL Material Code 210511709	-	1	No.	-	-	-

Break-up of other taxes and other costs should be specified in respective narration columns.

Sum of these Break-up values should be specified in respective value columns.

Supporting Documents from Vendor (Commercial)

Document attachment with price bid

Attachment - I:

Attachment - II: