

CSIR- NATIONAL PHYSICAL LABORATORY

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From: Director, CSIR-NPL

Ref No. 14-VIII/SSK(27-GTE)2024PB/T-192

Dated : 30.01.2025

CORRIGENDUM

With reference to NPL's Global Tender ID: **2025_CSIR_785162_1**, for "Electron Beam Lithography (EBL) System". Consequent upon the outcome of PBC, **some changes have been made in the technical specification of captioned tender. Revised specifications are as follows: Final Specs after Pre-Bid Meeting**

FINAL DETAILED TECHNICAL SPECIFICATIONS

Annexure-1: Technical specification of "Electron Beam Lithography (EBL) system"

Scope of supply: Electron beam lithography (EBL) system should align and expose various layers on a ≤ 100 mm wafer with a minimum feature size of ≤ 10 nm and a writing field of ≥ 1000 μm .

1. Electron source:

- 1.1. Thermal field emission Schottky source is needed for long-term stability, low noise and a typical lifetime of 5000 hours or more.
- 1.2. Fully digital electron optics column, acceleration voltage ≥ 30 kV, routinely useable.
- 1.3. The e-beam current to the samples should be ≤ 100 pA to 10 nA or more.
- 1.4. Appropriate apertures should be provided to control the current.
- 1.5. Column pressure at the gun should be $\leq 5\text{E-}6$ Pa and should include adequate isolation and interlock features to avoid lasting gun damage.

2. Electron Optics system:

- 2.1. Beam position stability: ≤ 300 nm/hr at ambient with fluctuation of ± 0.5 °C.
- 2.2. Beam current stability $\leq 1\%$ over 4 hrs or larger time at ambient with fluctuation of ± 0.5 °C.
- 2.3. Beam spot size: ≤ 2 nm.

2.4. The beam blanking speed should be compatible with with the maximum writing speed of pattern generator the system,.

3. Lithography resolution:

3.1. The system should be capable of writing a minimum feature size of 10 nm or less.

3.2. The end system should be capable to expose grating patterns with a linewidth of ≤ 40 nm.

3.3. The system should have the largest writing field of 1000 μm or more.

3.4. Overlay accuracy should be $\leq 40\text{nm}$ (mean+3sigma).

3.5. Field stitching: ≤ 50 nm

4. Specimen stage and sample holder:

4.1. The movement of the stage should be controllable by external hardware or using the control software of the system, by scripting, and by pointing to the scanned images.

4.2. A 100×100 mm travel range laser interferometer controlled stage for X-Y positioning and 5 mm for Z direction.

4.3. The resolution for X and Y movement of the laser interferometric stage should be ≤ 1 nm.

4.4. The sample holder should be able to accommodate wafers of size 2", 3" and 4" as well as rectangular/square samples of size ≤ 10 mm \times 10 mm.

5. Main chamber and load lock:

5.1. Main chamber should be able to accommodate the above-mentioned specimen stage.

5.2. Main Chamber should be able to pump down to pressure $\leq 5\text{E-}3$ Pa

5.3. If the operation of the system requires a CCD camera in the main chamber, the same should be provided by the vendor.

5.4. The main chamber should have adequate safety interlocks/alarms.

5.5. Load lock option for automatic/manual substrate pickup holder into the process chamber.

5.6. System should be equipped with dry vacuum pumps for oil-free system vacuum.

5.7. Both load lock as well as main chamber should have proper suitable full-range vacuum gauges.

5.8. The control software of the system should have the provision of display of the vacuum levels of the system

6. Pattern generator and design software:

- 6.1. Should be able to write patterns with speed of ≥ 20 MHz. All base primitives should be available (e.g. circle, rectangle, triangle, polygon). System should also have provision of exposing the patterns using raster as well as vector scans.
- 6.2. The system should have mechanism for astigmatism and focus correction.
- 6.3. The user should be able to adjust the mark locate algorithm's contrast and brightness settings where the alignment algorithm fails to locate the mark.
- 6.4. The SEM dwell times should match pattern generator speed, i.e. dwell times of 50 ns or lower should be supported.
- 6.5. A workstation with a Windows software environment with the capability of interfacing with the system interlocks, and essential software, including proximity effect correction software, for patterning and features.
- 6.6. The design software should be capable of supporting design pre-processing offline. Floating network license or remote login for offline processing is preferable.
- 6.7. Second software license for offline process along with latest and compatible computer system should be provided.
- 6.8. The system should be capable of accepting DXF, GDSII and other common imaging formats pattern files. Vendor should clearly mention all the other pattern file types that the system is able to accept.

7. System safety and accessories:

- 7.1. Calibrations and corrections for deflection, focus, astigmatism and height variations.
- 7.2. Measurement and calibration of beam current, beam position, focus, field size and height must be provided.
- 7.3. The tool must come with a complement of interlocks to prevent common user errors. Any malfunction or error should display screen error message/signal.
- 7.4. The system should have sufficient interlocks for safety against malfunctioning of power, vacuum, compressed air and water supply.
- 7.5. Gun should have adequate interlocks and isolation valves for protection against gun trips.
- 7.6. Vendor should provide detailed vibration isolations, utility parameters for the best performance of the instrument.

8. Detectors:

8.1. Secondary electron detector should be provided.

9. Current measurement:

9.1. A picoammeter should be provided with a minimum resolution of the order of 10 fA and maximum detected current matching the SEM current.

9.2. All the sample holders/stage should have Faraday Cup with an integrated auto range picoammeter having an accuracy of better than 0.5%.

10. Installation, Training, spares and warranty

10.1 The end system should be capable to expose grating patterns with a linewidth of 40 nm or less with a gap of 40 nm or less and isolated line with minimum feature size of ≤ 10 nm.

10.2 The complete system must have a comprehensive warranty of 01 year (for the complete system) with support for spares and accessories continuously for up to 10 years from the date of Installation.

10.3 Standard accessories such as necessary tools, maintenance kit etc. should be provided.

10.4 System installation and commissioning at the CSIR-NPL New Delhi is to be done by the vendor/supplier and the full capability of the system has to be demonstrated as per the acceptance criteria .

10.5 A hands-on training course for the users, by experts/engineers, for using the instrument after the installation process is complete on a set of data for at least two users onsite for 5 working days. Maintenance-level training also to be provided.

10.6 A complete technical manual shall be supplied listing all the capabilities and operations of the instrument.

10.7 Vendor should recommend suitable resist and developer for best pattern fidelity, uniformity, and yield. Vendor should provide resist coated wafers for patterning of 10 nm features for installation, commissioning and training purpose.

10.8 Copies of customer feedback/installation reports for the quoted system from at least 3 different installations shall be submitted.

10.9 Site Survey and pre-installation requirements including the utilities (EM noise, acoustic and floor vibration measurements on-site & computer analysis of the impact on system performance; supply check) and utility parameters by supplier engineers.

10.10 Vendor has to provide the pre-installation requirement to the customer which should include the details of all the utilities being required for operation of the electron beam writing tool.

10.11 Provision for factory acceptance test of the complete system at the factory by the team of 2 persons of CSIR-National Physical Laboratory, New Delhi. The expenditure shall be borne by the CSIR-National Physical Laboratory.

10.12 Vendor should have service support in Indi with qualified Engineers with relevant experience of 2 years or more.

11. Acceptance criteria

11.1 Demonstration of beam current and stability as per the quoted system.

11.2 Demonstration of beam position stability as per the quoted system.

11.3 Demonstration of overlay accuracy as per the quoted system.

11.4 Demonstration of field stitching as per the quoted system.

11.5 Demonstration of isolated line of minimum feature size of less than 10 nm.

11.6 Demonstration of grating patterns with a linewidth of 40 nm or less with a gap of 40 nm or less.

12. General terms and conditions

12.1 Any item not specifically mentioned in the technical specification but essential for successful implementation of the system must be quoted.

12.2 Bidders should clearly specify after sales, the service/application support/AMC capabilities.

12.3 Provide all information related to pre-installation requirements (i.e. room, environment, air filters, temperature, area, etc.) for the system installation.

12.4 Original warranty certificate to be provided for all the procured items.

12.5 The electrical power input requirements of all the equipment and accessories should be as per Indian standards.

All other terms & conditions of said tender will remain the same. Revision in specifications, if any shall be intimated in due course.

Sr. Controller of Stores & Purchase

TSC Minutes

The PBC/TSC meeting was held on 28th January 2025 at the Director's conference room, Main building, to finalize the technical specifications of "Electron Beam Lithography System".

The meeting was attended by all the TSC members.

Based on the Pre-bid meeting and recommendation of I/O, following changes have been made in the specifications:

Original Specifications	Final Specifications
2.3 Beam spot size : ≤ 2 nm at maximum accelerated voltage.	2.3 Beam spot size: ≤ 2 nm.
6.1 Should be able to write patterns at least at 20 MHz. All base primitives should be available (e.g. circle, rectangle, triangle, polygon). System should also have provision of exposing the patterns using raster as well as vector scans.	6.1 Should be able to write patterns with speed of ≥ 20 MHz. All base primitives should be available (e.g. circle, rectangle, triangle, polygon). System should also have provision of exposing the patterns using raster as well as vector scans.
6.2 System should have astigmatism correction and autofocus facility.	6.2 The system should have mechanism for astigmatism and focus correction.
6.7 Second software license for offline process with a display along with hardware accessories and data storage should be provided.	6.7 Second software license for offline process along with latest and compatible computer system should be provided.
6.8 The system should be capable of accepting DXF, JPEG, GDSII and other common imaging formats pattern files. Vendor should clearly mention all the other pattern file types that the system is able to accept.	6.8 The system should be capable of accepting DXF, GDSII and other common imaging formats pattern files. Vendor should clearly mention all the other pattern file types that the system is able to accept.
7.1 Calibrations and dynamic online corrections for deflection, focus, astigmatism and height variations.	7.1 Calibrations and corrections for deflection, focus, astigmatism and height variations.
7.3 The tool must come with a complement of interlocks to prevent common user errors. Any malfunction should have an audible alarm system/flashing lights.	7.3 The tool must come with a complement of interlocks to prevent common user errors. Any malfunction or error should display screen error message/signal.
8.2 Back scattered electron detector should be provided.	Point 8.2 to be deleted.
9.2 All the sample holders should have Faraday Cup with an integrated auto range pico-ammeter having an accuracy of better than 0.5%.	9.2 All the sample holders/stage should have Faraday Cup with an integrated auto range pico-ammeter having an accuracy of better than 0.5%.
10.7 Vendor should recommend suitable resist for best pattern fidelity, uniformity, and yield. And provide compatible resists and developer for patterning of 10 nm features for installation, commissioning and training purpose.	10.7 Vendor should recommend suitable resist and developer for best pattern fidelity, uniformity, and yield. Vendor should provide resist coated wafers for patterning of 10 nm features for installation, commissioning and training purpose.
11.3 Demonstration of writing field as per the quoted system.	Point 11.3 to be deleted.
11.6 Demonstration of maximum writing speed as per the quoted system.	Point 11.6 to be deleted.

Indentor's recommendation on requests/queries raised in Pre-bid Conference Meeting

Name of Indentor: Sunil Singh Kushvaha

Indent No.: PR2052312024

Tender No.: 14-VIII/SSK(27-GTE)24PB/T-192

Item Description: Electron Beam Lithography

Project No.: HCP-55

Estimated Cost (in INR): 965.00 Lakhs

No. of Budgetary Quotes: 02

(1) As per the recommendations of the 1st TSC meeting dated 7th January 2025, a pre-bid conference (PBC) meeting was held online on 21st January 2025 at the Director's conference room, Main building, CSIR-NPL. The following firms participated in the PBC meeting:

(i) EDGETECH SCIENTIFIC PVT. LTD. New Delhi-110018, India; OEM: Crestec Corporation, Japan (Mr. Abhyudey Sharma and Mr. Masahiro Shibata)

(ii) Raith India Pvt. Ltd. Bangalore – 560054, India; OEM: Raith GmbH, 44263 Dortmund, Germany (Mr. Masum Khan)

2. Participating bidders raised the following queries:

Name of the Firm	Queries Raised	Remarks, if any
<p>EDGETECH SCIENTIFIC PVT. LTD. New Delhi-110018, India; OEM: Crestec Corporation, Japan</p>	<p>S.No 1.2 – Tender's specs - Fully digital electron optics column, acceleration voltage ≥ 30 kV, routinely useable. Our request: Fully digital electron optics column, acceleration voltage of 5-50 kV, routinely useable.</p> <p>S.No 2.1 Tender's specs – Beam position stability: ≤ 300 nm/hr at ambient with fluctuation of ± 0.5 °C. Our Request: Stability : $< +/- 30$nm/5hrs with fluctuation of $+/- 1$ degree C.</p> <p>S.No. 5.3 Tender's specs -If the operation of the system requires a CCD camera in the main chamber, the same should be provided by the vendor. Our Request: We request you to kindly remove this point.</p> <p>S.No. 6.1 Tender's specs -Should be able to write patterns at least at 20 MHz. All base primitives should be available (e.g. circle, rectangle, triangle, polygon). System should also have provision of exposing the patterns using raster as well as vector scans. Our Request: Should be able to write patterns at least at 100 MHz. All base primitives should be available (e.g. circle, rectangle, triangle, polygon). System should also have provision of exposing the patterns using raster as well as vector scans.</p> <p>S.No. 6.7 Tender's specs -Second software license for offline process with a display along with hardware accessories and data storage should be provided. Our Request: Additional software license is not a problem but you have requested display and hardware accessory, does this mean that you require a second PC for offline use? Typically additional software can be installed on any available PC. Does this mean that you require a second PC for offline use, please confirm?</p> <p>S.No. 6.8 Tender's specs -The system should be capable of accepting DXF, JPEG, GDSII and other common imaging formats pattern files. Vendor should clearly mention all the other pattern file types that the system is able to accept. Our Request: Remove JPEG</p> <p>S.No. 8.2 Tender's specs -Back scattered electron detector should be provided.</p>	

	<p>Our Request: We request you to kindly remove this point.</p> <p>S.No.9.2 Tender's specs -All the sample holders should have Faraday Cup with an integrated auto range pico-ammeter having an accuracy of better than 0.5%.</p> <p>Our Request: Change "sample holder" to sample stage</p> <p>S.No.10.7 Tender's specs -Vendor should recommend suitable resist for best pattern fidelity, uniformity, and yield. And provide compatible resists and developer for patterning of 10 nm features for installation, commissioning and training purpose.</p> <p>Our Request: to provide spin coated wafers and developer to be provided by NPL.</p> <p>Tender's specs -Also, we would like to clarify regarding the PBG as in tender document on page 9 it is mentioned as 5% of contract value and on page 25 it is stated as 3% of contract value. Please clarify which is correct.</p>	
<p>Raith India Pvt. Ltd. Bangalore – 560054, India; OEM: Raith GmbH, 44263 Dortmund, Germany</p>	<p>S.No.2.3 Tender's specs -Beam spot size : ≤ 2 nm at maximum accelerated voltage.</p> <p>Our Request: Remove: at maximum accelerated voltage.</p> <p>S.No.6.2 Tender's specs -System should have astigmatism correction and autofocus facility.</p> <p>Our Request: We have height sensing system, no autofocus.</p> <p>S.No.6.8 Tender's specs -The system should be capable of accepting DXF, JPEG, GDSII and other common imaging formats pattern files. Vendor should clearly mention all the other pattern file types that the system is able to accept.</p> <p>Our Request: JPEG is not a vector format (to be removed)</p> <p>Compatible with BMP or TIFF formats.</p> <p>S.No.7.1 Tender's specs -Calibrations and dynamic online corrections for deflection, focus, astigmatism and height variations.</p> <p>Our Request: Remove: dynamic online corrections for deflection, focus, astigmatism</p> <p>S.No.7.3 Tender's specs -The tool must come with a complement of interlocks to prevent common user errors. Any malfunction should have an audible alarms system/flashing lights.</p> <p>Our Request: Remove: The tool must come with a complement of interlocks to prevent common user errors. Any malfunction should have an audible alarm system/flashing lights.</p> <p>Replace: Tool must come with user error intimation</p> <p>S.No.10.7 Tender's specs -Vendor should recommend suitable resist for best pattern fidelity, uniformity, and yield. And provide compatible resists and developer for patterning of 10 nm features for installation, commissioning and training purpose.</p> <p>Our Request: Raith training is provided on coated samples (no resist bottles will be supplied)</p> <p>S.No.8.2 Tender's specs -Back scattered electron detector should be provided.</p> <p>Our Request: Much needed specification, no changes needed.</p> <p>S.No.1.2 Tender's specs -Fully digital electron optics column, beam energy ≥ 30 keV, routinely useable.</p> <p>Our Request: No changes needed: Scope of supply can be met with 30 keV tool. Electron beam lithography (EBL) system should align and expose various layers on a ≥ 100 mm wafer with a minimum feature size of ≤ 10 nm and a writing field of ≥ 1000 μm.</p> <p>S.No.11.3Tender's specs- Demonstration of writing field as per the quoted system.</p> <p>Our Request: No standard test to show this</p> <p>S.No.11.6 Tender's specs- Demonstration of maximum writing speed as per the quoted system.Our Request: No standard test to show this</p>	

Indentor's recommendation

The comments, as received from bidders during PBC, and our response is as follows:

Tender Specification and its number	Comment of participating firm/OEM in PBC	Response of Indentor (Accepted/ Not accepted)	Revised specification (If any)	Justification for non-acceptance
1.2 Fully digital electron optics column, acceleration voltage ≥ 30 kV, routinely useable.	Fully digital electron optics column, acceleration voltage of 5-50 kV, routinely useable. (EDGETECH SCIENTIFIC PVT. LTD. New Delhi-110018, India; OEM: Crestec Corporation, Japan)	Not Accepted		Acceleration voltage requirements specified in the tender are generic, and these are also offered by other participating firms/OEMs in PBC as well. During PBC, TSC in the view that the modification/deletion can be only done if firm/OEM is not meeting with the technical specification. Here, firm/OEM specification are considered and found fulfilling the requirements.
2.1 Beam position stability: ≤ 300 nm/hr at ambient with fluctuation of ± 0.5 °C.	Stability : $< +/- 30$ nm/5hrs with fluctuation of $+/- 1$ degree C (EDGETECH SCIENTIFIC PVT. LTD. New Delhi-110018, India; OEM: Crestec Corporation, Japan)	Not Accepted		During PBC, TSC in the view that the modification/deletion can be only done if firm/OEM is not meeting with the technical specification. Here, firm/OEM specification are considered and found fulfilling the requirements.
5.3 If the operation of the system requires a CCD camera in the main chamber, the same should be provided by the vendor.	We request you to kindly remove this point. (EDGETECH SCIENTIFIC PVT. LTD. New Delhi-110018, India; OEM: Crestec Corporation, Japan)	Noted and discussed		The query was addressed to the satisfaction of the firm during PBC as the different system has different provisions for viewing and monitoring samples and positions.
6.1 Should be able to write patterns at least at 20 MHz. All base primitives should be available (e.g. circle, rectangle, triangle, polygon). System should also have provision of exposing the patterns using raster as well as vector scans.-	Should be able to write patterns at least at 100 MHz. All base primitives should be available (e.g. circle, rectangle, triangle, polygon). System should also have provision of exposing the patterns using raster as well as vector scans. (EDGETECH SCIENTIFIC PVT. LTD. New Delhi-110018, India; OEM: Crestec Corporation, Japan)	Partially Accepted	Should be able to write patterns with speed of ≥ 20 MHz. All base primitives should be available (e.g. circle, rectangle, triangle, polygon). System should also have provision of exposing the patterns using raster as well as vector scans.	The firm/OEM specification is considered and found fulfilling the requirements.
6.7 Second software license for offline process with a display along with hardware accessories and data storage should be	Additional software license is not a problem but you have requested display and hardware accessory, does this mean that you require a second PC for offline use? Typically additional software can be installed on any available PC. Does this mean that you require a second	YES	Second software license for offline process along with latest and compatible computer system should be provided.	

provided.	PC for offline use, please confirm? (EDGETECH SCIENTIFIC PVT. LTD. New Delhi-110018, India; OEM: Crestec Corporation, Japan)			
6.8 The system should be capable of accepting DXF, JPEG, GDSII and other common imaging formats pattern files. Vendor should clearly mention all the other pattern file types that the system is able to accept.	Remove JPEG. (EDGETECH SCIENTIFIC PVT. LTD. New Delhi-110018, India; OEM: Crestec Corporation, Japan)	Accepted	The system should be capable of accepting DXF, GDSII and other common imaging formats pattern files. Vendor should clearly mention all the other pattern file types that the system is able to accept.	
8.2 Back scattered electron detector should be provided.	We request you to kindly remove this point. (EDGETECH SCIENTIFIC PVT. LTD. New Delhi-110018, India; OEM: Crestec Corporation, Japan)	Accepted	Point 8.2 in the tender document may be deleted.	
9.2 All the sample holders should have Faraday Cup with an integrated auto range pico-ammeter having an accuracy of better than 0.5%.	Change "sample holder" to sample stage. (EDGETECH SCIENTIFIC PVT. LTD. New Delhi-110018, India; OEM: Crestec Corporation, Japan)	Accepted	All the sample holders/stage should have Faraday Cup with an integrated auto range pico-ammeter having an accuracy of better than 0.5%.	
10.7 Vendor should recommend suitable resist for best pattern fidelity, uniformity, and yield. And provide compatible resists and developer for patterning of 10 nm features for installation, commissioning and training purpose.	Vendor should recommend suitable resist for best pattern fidelity, uniformity, and yield. And to provide spin coated wafers and developer will be provided by NPL for patterning of 10 nm features for installation, commissioning and training purpose. (EDGETECH SCIENTIFIC PVT. LTD. New Delhi-110018, India; OEM: Crestec Corporation, Japan)	Accepted	Vendor should recommend suitable resist and developer for best pattern fidelity, uniformity, and yield. Vendor should provide resist coated wafers for patterning of 10 nm features for installation, commissioning and training purpose.	
2.3 Beam spot size : ≤ 2 nm at maximum accelerated voltage.	Remove: at maximum accelerated voltage. (Raith India Pvt. Ltd. Bangalore – 560054, India; OEM: Raith GmbH, 44263 Dortmund, Germany)	Accepted	Beam spot size: ≤ 2 nm.	
6.2 System should have astigmatism correction and autofocus facility.	We have height sensing system, no autofocus. (Raith India Pvt. Ltd. Bangalore – 560054, India; OEM: Raith GmbH, 44263 Dortmund, Germany)	Accepted	The system should have mechanism for astigmatism and focus correction.	
6.8 The system should be capable of accepting DXF, JPEG, GDSII and other common imaging formats pattern files. Vendor should clearly mention all the other pattern file types that the system is able to accept.	JPEG is not a vector format (to be removed). Compatible with BMP or TIFF formats. (Raith India Pvt. Ltd. Bangalore – 560054, India; OEM: Raith GmbH, 44263 Dortmund, Germany)	Accepted	The system should be capable of accepting DXF, GDSII and other common imaging formats pattern files. Vendor should clearly mention all the other pattern file types that the system is able to accept.	
7.1 Calibrations and dynamic online corrections for deflection, focus,	Remove: dynamic online corrections for deflection, focus, astigmatism. (Raith India Pvt. Ltd. Bangalore – 560054,	Accepted	Calibrations and corrections for deflection, focus, astigmatism and height variations.	

astigmatism and height variations.	India; OEM: Raith GmbH, 44263 Dortmund, Germany)			
7.3 The tool must come with a complement of interlocks to prevent common user errors. Any malfunction should have an audible alarm system/flashing lights.	Remove: The tool must come with a complement of interlocks to prevent common user errors. Any malfunction should have an audible alarm system/flashing lights. Replace: Tool must come with user error intimation (Raith India Pvt. Ltd. Bangalore – 560054, India; OEM: Raith GmbH, 44263 Dortmund, Germany)	Accepted	c	
10.7 Vendor should recommend suitable resist for best pattern fidelity, uniformity, and yield. And provide compatible resists and developer for patterning of 10 nm features for installation, commissioning and training purpose.	Raith training is provided on coated samples (no resist bottles will be supplied) (Raith India Pvt. Ltd. Bangalore – 560054, India; OEM: Raith GmbH, 44263 Dortmund, Germany)	Accepted	Vendor should recommend suitable resist and developer for best pattern fidelity, uniformity, and yield. Vendor should provide resist coated wafers for patterning of 10 nm features for installation, commissioning and training purpose.	
8.2 Back scattered electron detector should be provided.	Much needed specification, no changes needed. (Raith India Pvt. Ltd. Bangalore – 560054, India; OEM: Raith GmbH, 44263 Dortmund, Germany)	Not Accepted	Point 8.2 in the tender document may be deleted.	Other OEM/firm requested for deletion during PBC. To make it more generic, TSC suggested removing point 8.2 in the tender document.
1.2 Fully digital electron optics column, beam energy ≥ 30 keV, routinely useable.	No changes needed: Scope of supply can be met with 30 keV tool. (Raith India Pvt. Ltd. Bangalore – 560054, India; OEM: Raith GmbH, 44263 Dortmund, Germany)	Noted and considered		During PBC, TSC in the view that the modification/deletion can be only done if firm/OEM is not meeting with the technical specification. Here, firm/OEM is meeting the given specification.
11.2 Demonstration of writing field as per the quoted system.	No standard test to show this (Raith India Pvt. Ltd. Bangalore – 560054, India; OEM: Raith GmbH, 44263 Dortmund, Germany)	Accepted	Point 11.2 in the tender document may be deleted.	
11.4 Demonstration of maximum writing speed as per the quoted system.	No standard test to show this (Raith India Pvt. Ltd. Bangalore – 560054, India; OEM: Raith GmbH, 44263 Dortmund, Germany)	Accepted	Point 11.4 in the tender document may be deleted.	
Query related to PBG	Also, we would like to clarify regarding the PBG as in tender document on page 9 it is mentioned as 5% of contract value and on page 25 it is stated as 3% of contract value. Please clarify which is correct. (EDGETECH SCIENTIFIC PVT. LTD. New Delhi-110018, India; OEM: Crestec Corporation, Japan)	Noted and discussed	PBG is 5 % of contract value.	