



**INDIAN INSTITUTE OF TECHNOLOGY BOMBAY  
MATERIALS MANAGEMENT DIVISION  
Powai, Mumbai 400076.**

**Corrigendum- I**

**Reference for PR No.1000016690 (RFx No.6100000678)**

**Technical Specifications : Field Emission Scanning Electron Microscope  
compatible with external pattern generation systems.**

1.	Resolution	1.0 nm or better @ 15KV and higher, & 2.0 nm or better @1KV. The resolution should be achieved without sample or stage biasing.
	Electron Gun	Schottky (Thermal-FE) Emitter.
2.	Magnification	15X to 10,00,000X or more continuously variable
3.	Acceleration Voltage	Lower limit :200V or less, Higher limit: 30KV or higher all the KV settings must be software controlled. Imaging at beam energies down to 50V or below without sample or stage biasing should be possible.
4.	Chamber	Large chamber with at least 6 additional ports.
5.	Stage	5-axes motorized stage should have facility to load single and multiple stub. Stage must allow tilting throughout working distance and controlled through computer as well as manually with joystick (equivalent). Movements: X=100 mm or more Y=100 mm or more Z=50 mm or more Tilt= (-10) – (+90)° R=360°
6.	Electron Optics	A. Possibility of imaging at low acceleration voltage (~ 1 kV) with high SNR (Gentle beam technology or equivalent). Possibility of stage biasing.  B. Suitable technology for high resolution imaging of magnetic materials with short (< 5 mm) working distance should be provided.  C. The lenses must be water cooled, and apertures must be motorized.  D. The system should have a focus wobbler with variable amplitude and adjustable stigmator with octopole configuration  E. High Speed electrostatic beam blanker with complete electronics for e-beam lithography, compatible with third party pattern generation systems (like Nabit/ELPHY etc.)
8.	Probe Current and external measurement	A. 5pA - 100nA or better with a current stability 0.2%/h or better.  B. It should be possible to measure the beam current either with the built-in specimen current monitor (Faraday cup) and an external pico-ammeter.



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		C. The system should have a “touch alarm” feature.
9.	Detectors	<p>A. Detection of SE-1: The system should have an "In-lens"/"Through the Lens"/In column detector or equivalent detector for high resolution imaging of surface topography in High Vacuum, using SE-1 electrons</p> <p>B. Detection of SE-2: The system should have an in-chamber detector for Secondary Electron Imaging (SEI) with SE-2 electrons</p> <p>C. Detection of BSE: The system should have "In Lens" AND chamber mounted Backscattered Electrons Detector</p>
10.	User Interface	<p>A. Keyboard, Mouse, Control Panel with multifunction for the control and adjustment of frequently used SEM parameters, like Focus, magnification, astigmatism correction, scan rotation etc.</p> <p>B. Manual Joystick control for stage axis.</p>
11.	Scanning & Display	1 No. 24” Monitors with suitable computer workstation for FESEM. Image frame store 10K x 8K or higher.
12.	Vacuum System	<p>A. Suitable vacuum system having ion pump, Turbo Pump &amp; Rotary/Diaphragm Pump</p> <p>B. Ventilation interlock to protect window-less detectors</p> <p>C. System should have a penning gauge for accurate vacuum measurement.</p> <p>D. Suitable heater and heat jackets for the baking of the column needs to be supplied by the manufacturer.</p>
13.	Essential Accessories (to be included in quoted cost)	<p>A. Suitable chiller</p> <p>B. A scroll-type (not reciprocating) compressor</p> <p>C. Chamber scope (IR-CCD &amp; color)</p> <p>D. Interface between SEM and EDS.</p> <p>E. 5 carbon tapes.</p> <p>F. 2 ultra-high-resolution gold-nanoparticles-on-carbon resolution-test specimen</p> <p>G. 2-inch Wafer Sample Holder</p> <p>H. Suitable UPS with 30 min backup.</p>
14	Warranty & support	3 years warranty + AMC/preventive maintenance for the complete system, including for accessories such as EXTIF and electrostatic beam blanker with its electronics.



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15.	Post warranty period support	Manufacturer/authorized distributor should offer maintenance support & guarantee of spare part supply for minimum 7 years after discontinuation of the model.
16	Spare part	Supplier should quote for three spare FEG emitters
17	Environment	The FESEM should have an integrated Mu-metal shielding to protect from stray magnetic fields.
18	Compatibility & Upgradation	The system should be upgradable to cryo, in-situ heating, tensile testing, EDS, electrical measurement and micromanipulation system at any point in future.
19	Service support & Installation	<ul style="list-style-type: none"><li>A. User list for similar FESEM systems supplied in India, together with reference letters from at least 2 such customers should be provided.</li><li>B. A list of at least 5 users using such FESEM system for electron beam lithography internationally, and/or within India, should also be provided.</li><li>C. The vendor should have service engineers stationed permanently in India, and be able to visit IITB (if required) in 48/72 hours.</li><li>D. Pre-installation site-inspection (at least 3 weeks prior to installation) by service engineers, to ensure smooth installation is required.</li><li>E. Installation and on-site demonstration of the FESEM capability meeting advertised specifications, as claimed (with images) in the technical bid.</li></ul>