

## No.2

## Procurement of Electron Microscope (SEM and TEM)

404-02-12/2017-01

Question number	Reference in Tender documents	Question	Answer
1.	Technical Specifications 1.1	1.1 The brightness of the GUN asked with electron emitter source is a lock out for one supplier. Brightness of the gun is important but does not state what probe current can be delivered by the gun on the sample. Which practical probe current range are you aiming on the sample? And which spot size? Is 2,5nA in 1nm all right for your application? Do you accept the electron emitter brightness from $\geq 2 \times 10^8$ A/cm <sup>2</sup> sr at 200kV, to be open tender?	$8 \times 10^8$ A/cm <sup>2</sup> sr or better at 200 kV is mandatory.
2.	Technical Specifications 1.2	1.2 How the Resolution is defined? On which sample and which thickness?	As a professional microscope manufacturer, you must be aware of standard performance tests for resolution specification. These specifications can be found in all datasheets so we presume you are able to measure them using an industry accepted method.
3.	Technical Specifications 1.3	1.3 Information limit depends greatly also on gun brightness. Please confirm if while indicating 0.12 nm TEM information limit you refer to the minimal required gun brightness of $\geq 8 \times 10^8$ A/cm <sup>2</sup> sr? Or you take into account the higher brightness of $\geq 1.8 \times 10^9$ A/cm <sup>2</sup> sr, which is parameter subject to evaluation (and lockout for single supplier). You also do not require any point resolution which is the resolution without any loss of information at scherzer defocus used for 40 years. Therefore, we are asking which point resolution do you require? We suggest point resolution to be 0,23nm or better on a thin sample.	Information limit and STEM resolution are sufficient to define the performance of the transmission electron microscope. The point resolution of 0.23 nm is not acceptable.

4.	Technical Specifications 1.4	1.4 You are asking 25fps at 512x512 with a 4kx4k CMOS camera why? Most of the new cameras (at least 1 year old) are running already at 25fps at full 4k x4K resolution without binning. Do you give more point to quicker camera? moreover the specification given correspond to only one camera on the market.	The specifications are the minimum required. A faster camera will of course be acceptable. We are expecting from all bidders to offer an up-to-date camera, and we are expecting one with a recoding rate of 25fps at full 4k x4K resolution without binning.
5.	Technical Specifications 1.5	1.5 is the $\pm 30^\circ$ on the all the grid or just in the center? in order to be open tender we suggest $\pm 20^\circ$ $\pm 25^\circ$ but on the all grid.	Since our new TEM will be heavily used for diffraction work which often includes large specimen tilts, we requested at least $\pm 30^\circ$ tilt for both, alpha and beta tilt angles with a standard 3 mm grid inside the TEM. The proposed tilt angles of $\pm 20^\circ$ and $\pm 25^\circ$ are not acceptable.
6.	Technical Specifications 1.7	1.7 As you require several EDS detectors, you do not mention if you want one electronic per detector as it is proposed by suppliers nowadays. Or 1 electronic for all the detectors like it is done by one unique system delivered by one company since 10 years. We suggest: two EDS detectors with two separate electronics for professional quantitative analysis and 3D EDS work, in order to be open tender.  4 EDX detectors with one electronics is spec for one supplier excluding others.	TWO EDX detectors are mandatory. The number of electronics is not a defined specification.
7.	Technical Specifications 1.9	1.9 For the low background holder, it is not mention if it is a single tilt or double tilt holder? we suggest double tilt holder as you did not ask any double tilt holder for instance for crystallographic work.	We require a double tilt low background holder. It is essential for our crystallographic work.
8.	Technical Specifications 1.11	1.11 with the second spare gun you do not mention any lifetime warranty? Meaning that there is no security for the end user if broken after one year. We can propose 3 years' warranty on life time	This is not a tender requirement. However, since a Three-year warranty is mandatory, it applies to all elements of the entire equipment under this tender. Once the Three-year warranty expires, when the existing gun fails or gets broken, the second (spare) gun will be installed.
9.	Technical Specifications 2.1	2.1 20eV is a lock out for most of supplier we suggest 100eV to 30keV	Landing energy of 100 eV to 30 kV is acceptable.



10.	Technical Specifications 2.3	2.3 Electrostatic final lens is limiting factor for other suppliers. We suggest to omit electrostatic to be compliant with open tender.	It is not acceptable for us.
11.	Technical Specifications 2.7	2.7 65nA is a limiting factor for some supplier we suggest $\geq 50\text{nA}$	Higher beam currents are essential for faster milling thus reducing milling time. The proposed spec of $\geq 50\text{ nA}$ is not acceptable to us.
12.	Technical Specifications 2.5	2.5 segmented backscattered detectors is dedicated to one supplier, can we propose a retractable backscattered electron detector with also very good resolution and signal to noise ratio. These features determine the quality of a detector not the shape.	Segmentation is important to us for imaging flexibility.
13.	Technical Specifications 2.6	2.6 These holders are all very specific to one supplier can you explain the applications and use in order to propose an equivalent solution?	These are all very standard holders and can be offered by any manufacturer. We need this range of sample holders to cover the anticipated range of applications.
14.	Technical Specifications 2.16	2.16 The digital resolution 6144 x 4096 is the exact resolution for one supplier. We suggest 5000x4000 pixel resolutions to be open tender.	We don't see the point of accepting lower digital resolution.
15.	Technical Specifications 2.17	2.17 It should be possible to false color images in the live image so grey area matching is fast. We do not understand that point, can you be more accurate and state what application is targeted?	We would just like a method for coloration of our SEM images for clear segmentation of different phases.
16.	Technical Specifications 2.22	2.22 You are asking for old patent dedicated for only one company and excluding others (Based on the algorithms developed by Paul Kotula at Sandia National Labs, defined in US Patents 6,684,413 and 6,675,106 and exclusively licensed to Thermo Fisher Scientific). There is other new solution on the market that can be of the great benefit for you. For an open tender, we suggest to remove request.	We accept to remove the requirement.

17.	Technical criteria 3.1	<p>3.1 Flexible goniometer for full rotation. If the goniometer is able to continuously tilt from -90 to +90 degrees,</p> <p>At +90° or -90 degrees the beam cannot go through the grid which is too thick, this is a lock out specification only for one supplier. Therefore, we propose to change the range to +/80°, to be open tender.</p>	We don't see the point of accepting suggestion for +/- 80° rotation if +/- 90° rotation can be delivered, because it would significantly benefit to avoid the missing wedge effect in high precision 3D tomography reconstruction.
18.	Technical criteria 3.2	<p>3.2 The system has 4 EDX detectors symmetrically positioned around the sample for optimized 3D EOX tomography</p> <p>The 4 EOS detector (Patent n°US 2010/0148064 and US 2012/0074333) is a lock out specifications for one supplier. To be open tender we suggest the following text: The system has 2 EDS detectors suitably positioned around the sample for optimized 3D EDS tomography with a solid angle ~ 0.9 sr with one electronic for each detector.</p>	The number of electronics is not a defined specification. If all other specifications in our tender are met or/and exceeded we would be happy to consider a system with TWO EDX detectors (TWO EDX detector system should be considered mandatory). However, the FOUR EDX detector setup is preferred and will be awarded additional points because this is beneficial due to symmetrical arrangement reducing tilt dependency, especially in the case of diffraction work at large tilt angles in tandem with EDX analysis.
19.	Technical criteria 3.3	<p>3.3 The Electron emitter has a brightness of <math>\geq 1.8 \times 10^9</math> A/cm<sup>2</sup> sr for faster analysis</p> <p>The Brightness is a lock out for one supplier. To meet the requirements of open tender we suggest to accept the text: The Electron emitter has a brightness of <math>\geq 2 \times 10^8</math> A/cm<sup>2</sup>•sr for faster analysis.</p>	Again, for our intended application of 3D analysis, a high brightness beam is hugely beneficial as this will speed up the data collection. As such, we are awarding additional points for giving a solution superior for the intended application.
20.	Technical criteria 3.4	<p>3.4 The beam current <math>\geq 400</math> nA for fast EOX analysis</p> <p>This is lock out for one supplier. To be open tender we suggest: The beam current to be <math>\geq 40</math> nA for fast EDS analysis</p>	As far as we are aware, numerous companies are capable to offer FEG columns yielding more than 400 nA of beam current. We require this high beam current in order to ensure fast data collection. It would be inappropriate to accept better than 40 nA if we can get better than 400 nA.
21.	Technical criteria 3.6	<p>3.6 The nanomanipulator should be manufactured by the SEM supplier enabling superior integration for more automated TEM sample lift out.</p> <p>This request is excluding all the other suppliers from the tender except one.</p> <p>Do you accept tender text as follows, so that the tender can be open as requested: The Nano manipulator should be from world known company and should allow quick, easy and high quality TEM sample lift out.</p>	We are willing to accept any manipulator meeting the specifications as defined in section 2.14. However, because automated TEM sample preparation is an integral part of our application and we believe having the same manufacturer and a single software interface for both the microscope and the manipulator operation is advantageous, we are awarding additional points.



22.	Section VI. 1. Related Services and Completion Schedule	1-Considering the time for manufacturing such high quality scientific equipment plus the delivery time, the 90 days delivery time, (realization between May and August) which was asked on tender (deadline for the tender is 24.april 2017 ) ) may show us, that the deal has been done already in advance before the tender and the equipment will be delivered either from stock or demo or has been ordered well in advance?  Do you accept normal delivery time for such new sophisticated scientific equipment, which is normally 5 months for FIB and 7month for the TEM in order not to exclude other suppliers?	Regarding the delivery times, we extend them to "5 months for FIB and 7 month for the TEM".
23.		2- would you be so kind to send us the contact of EIB, to whom we can place the claim for the technical specification?	<a href="http://www.eib.org/index.htm">http://www.eib.org/index.htm</a>

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