



An ISO 9001 Company

**Bharat Heavy Electricals Limited**  
(High Pressure Boiler Plant)  
Tiruchirapalli – 620014, TAMIL NADU, INDIA  
**MATERIALS MANAGEMENT / CAPITAL EQUIPMENT**

**Corrigendum 1**

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**NIT\_44536**

**Enquiry Number:**

**2601900006**

**Enquiry Date:**

**14.02.2019**

**Due date for submission of quotation:**

**18.03.2019**

You are requested to quote the Enquiry number, date and due date in all your correspondences. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

**Item Description:** Procurement of Integrated EDS and EBDS system for Carl Zeiss Scanning Electron Microscope , QTY.: 01 No.

**Details of Corrigendum**

***Changes in the technical specification (Part-B of Technical Specification) as per the annexure 1.***

**All other terms and conditions and specifications as published in the NIT\_44536 remains unaltered.**

**Confirmation of acceptance for BHEL commercial terms & conditions and Price Bid formats have been posted in BHEL Corporate web site [www.bhel.com](http://www.bhel.com) or from the Government tender website <https://eprocure.gov.in> (under Enquiry reference "2601900006")**

Tenders should reach us before 14:00 hours on the due date  
Tenders will be opened at 14:30 hours on the due date  
Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present

Yours faithfully,  
For BHARAT HEAVY ELECTRICALS LIMITED

  
**C. HEMALATHA**  
Senior Manager  
MM / Capital Equipment  
BHEL / Tiruchirappalli - 620 014

Following are the changes incorporated in the existing technical specification:

**Part B: Clause 5.0: 3rd Point:**

“The EBSD camera should be using latest C-MOS sensor with the resolution of 1K X 1K. It should be using rectangular phosphor exactly matching with the C-MOS sensor. The EBSD camera should have tapered nose design to prevent shadowing to other detectors of EVO18. The EBSD camera should have motorised insertion and retraction mechanism with position accuracy at least 0.1mm.”

**SHALL BE READ AS:**

“The EBSD camera should be using latest C-MOS sensor with minimum resolution of 600X400 pixels. It should be using rectangular/circular phosphor exactly matching with the C-MOS sensor. The EBSD camera should have motorised insertion and retraction mechanism with position accuracy at least 0.1mm.”

Note: The Revised Part B incorporating the above modification is attached with this annexure-1.



**PART B: TECHNICAL SPECIFICATIONS FOR 'INTEGRATED EDS AND EBSD SYSTEM FOR CARL ZEISS SCANNING ELECTRON MICROSCOPE'**

S. No.	PARTICULARS & BHEL SPECIFICATIONS	VENDOR's OFFER
<b>1.0</b>	<b>PURPOSE &amp; APPLICATION</b>	
	The integrated EDS+EBSD system should be state of art system designed to work with Carl Zeiss Scanning Electron Microscope (EVO 18). The supplier would be responsible for supply of all the necessary hardware and software to prove field integration of EDS +EBSD system with the SEM.	Bidder to confirm
<b>2.0</b>	<b>EDS System:</b>	
2.1	The EDS system should include latest hardware and software that comply with ISO 15632/2012 specifications.	Bidder to confirm & provide requisite details
2.2	The EDS system should include the LN2 free Silicon Drift Detector (SDD) having SDD area of at least 40mm <sup>2</sup> or more.	
2.3	The detectable element range should be from Beryllium (Be) onwards. The EDS detector movement should be motorized with manual as well as software control. The detector should be capable of handling a count rate of at least 500,000cps or higher.	
2.4	EDS detector Energy Resolution: $\leq 127\text{eV}$ at Mn- $\alpha$ , $\leq 65\text{eV}$ at F- $\alpha$ and $\leq 56\text{eV}$ at C- $\alpha$ .	
2.5	The EDS detector and related hardware should be extremely stable such that shift in peak position and Resolution is $<1\text{eV}$ over 1000 to 100,000cps. This specification should be clearly visible in the product brochure available on company website.	
2.6	The EDS system should be able to acquire the FESEM images with high resolution upto 8000 pixel wide. The X-ray mapping resolution should be atleast 4000 pixel wide.	
<b>3.0</b>	<b>EDS System software :</b>	
	The EDS system software should have 'Live Mapping display feature in real time mode'.	Bidder to confirm
	The EDS system software should allow user to use standards to enhance the accuracy of quantitative analysis. The EDS server and analysis software should be capable of performing data acquisition, storing and transfer, multitasking type based on latest operating system and comprising with 21 inch LED monitor (or better), CPU, Solid state drive external hard disc with capacity of 1TB Two numbers, MS office, etc. and necessary cables and connectors to link with existing EVO 18.	Bidder to confirm & provide requisite details

*(Signature)*  
**R. RAO**  
 Deputy  
 Welding Reson  
 Bharat Heavy Eng  
 Trichirappalli - 620 014.

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<b>4.0</b>	<b>The EDS system software should have following features:</b>	
	Navigator based design for ease of use.	Bidder to confirm & provide requisite details
	Auto Identification without any forbidden element list.	
	Auto Background removing technique, Pulse pile up processing	
	Qualitative and Quantitative techniques with latest XPP absorption corrections	
	Line Scanning, Phase Mapping	
	Multi-element mapping with spectral imaging. Should be able to fetch EDS spectra stored with the mapped image	
	Image co-related elemental analysis	
	Beam Measurements.	
<b>5.0</b>	<b>EBSD System:</b>	
	The EBSD system should be integrated with EDS system on the same software/ computer platform.	Bidder to confirm
	The EBSD system should include Hardware consisting of EBSD camera/detector, control electronics and software for acquisition and indexing of electron backscatter diffraction patterns and phase mapping with SEM beam and stage control. Interface, pre-tilt sample holders, Calibration samples, Operation manuals should be included.	Bidder to confirm & provide requisite details
	The EBSD camera should be using latest C-MOS sensor with minimum resolution of 600X400 pixels. It should be using rectangular/circular phosphor exactly matching with the C-MOS sensor. The EBSD camera should have motorised insertion and retraction mechanism with position accuracy at least 0.1mm.	Bidder to confirm & provide requisite details
	The real time indexing speed should be at least 400 patterns per seconds. The hit rate should be at least 98% or better. The EBSD system Angular resolution should be < 0.05 deg.	Bidder to confirm & provide requisite details
<b>5.0</b>	<b>EBSD system software</b>	
	Latest Data Acquisition Software working on WINDOWS 64 bit platform,	Bidder to confirm & provide requisite details
	System software with latest indexing algorithms and Phase Identification Software	
	Auto tilt correction	
	Phase Reflector File Creation Software	

  
**R. RAVIBHARATH**  
 Deputy Manager  
 Welding & Metallurgy Institute  
 Bharat Heavy Electricals Limited  
 Chennai - 600 014.



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S. No.	PARTICULARS & BHEL SPECIFICATIONS	VENDOR's OFFER
	Pole Figure Software – texture analysis	
	Mapping Software – post processing for grain size, Grain Boundary Characteristics, etc	
	ODF Software – texture analysis	
	ICSD Data Base	
	One additional off line license	
<b>6.0</b>	<b>ESSENTIAL ACCESSORIES</b>	
	Suitable table for EBSD and EDS support PC	Bidder to confirm
	Up-gradation: The supplier shall supply any software for EDS and EBSD operation whenever they are upgraded free of cost for a period of five years.	Bidder to confirm
	Calibration standards: Necessary multi element calibration standards for both EDS and EBSD	Bidder to provide details
<b>7.0</b>	<b>OPTIONAL ACCESSORIES: Quote for following item are not mandatory</b>	
	Table top precision abrasive cutting Machine with Specimen holder vice type with max. opening 60 mm, Vice type small/long specimens with double parallel vice and 100 numbers abrasive wheels.	Bidder to provide details
<b>8.0</b>	<b>Dispatch Clearance</b>	
	The Equipment (supplied as per the PO scope of supply) shall be thoroughly tested by the OEM/Supplier for its performance, before effecting dispatch and associated internal test report should be submitted to BHEL for dispatch clearance.	Bidder to confirm
<b>9.0</b>	<b>DOCUMENTATION</b>	
	Operating manuals of EDS and EBSD in English language should be supplied along with the equipment and all the add-on systems Hard Copies: 3 sets ; In CD form: 1 Set	Bidder to confirm
<b>10.0</b>	<b>INSTALLATION AND COMMISSIONING</b>	
	The manufacturer / vendor shall be responsible for the installation of EDS and EBSD in association with M/s Carl Zeiss, as the main equipment is under their warranty.	Bidder to confirm
	The supplier shall impart training to BHEL's operator and maintenance crew in operation and maintenance during commissioning of the equipment at BHEL works, for 5 working days.	Bidder to confirm

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<b>11.0</b>	<b>WARRANTY:</b>	
	Warranty shall be 12 months from the date of E&C.	Bidder to confirm
	Service response time, turn-around time & up-time of the equipment should be clearly specified. Service response time must be less than 72 hours	
	Additional two years AMC (without any additional cost) should be provided after the expiry of one year warranty period.	Bidder to provide details
<b>12.0</b>	<b>GENERAL POINTS (Details to be provided for the following clauses compulsorily with the TECHNICAL BID /OFFER</b>	
	Equipment Model Number and other related details	Bidder to provide details
	Total connected Load (in kVA)	Bidder to provide details
	Total weight of the equipment & Accessories	Bidder to provide details
	General Arrangement drawings	Bidder to provide details
	Sea worthy & rigid packing for all items of complete equipment, all accessories and other supplied items to avoid any damage / loss in transit. When equipment dispatch in container, all small loose items shall be suitably packed in boxes	Bidder to confirm
	(a) A single order will be processed for the entire configuration. (b) The firm has to guarantee support for both system and spares for a minimum period of 10 years. (c) Provision for on-line remote diagnose is of faults. (d) Free training on different applications to selected users. (e) Compliance of all listed specifications/terms and conditions sheet should be indicated by the vendors in tabular form. (f) Break up of price for optional items should be shown separately in the price bid.	Bidder to confirm & provide requisite details



**R. RAVIBHARATH**  
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