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Enquiry Letter for Quotation of Bio-Tribometer

**Enq. No.: DST/MET/2017476/BIOT**

**Enquiry Dated: Apr. 04, 2018**

**Closing Date: May 04, 2018**

Sealed quotations (in two separate envelopes namely “TECHNICAL ONLY” and second “FINANCIAL” bid) are required for **Bio-Tribometer (Automated)**. The specifications for the equipment are in the addendum. The closing date for the above item is May 04, 2018. The prospective suppliers are required to send quotation in two parts in sealed envelopes, as “**Technical Bid**” and “**Financial Bid**”. The two separate and sealed envelopes should be clearly marked appropriately as “Technical Bid” and “Financial Bid”.

(i) The **Technical Bid** should contain detailed technical specification of the product being offered (with model number and make/brand) and should not mention any price. This should also mention the guarantee and must include complete spare parts that are required for functioning of the unit without requiring any additional accessory.

(ii) The **Financial Bid** should include the detailed price quotation clearly including the cost of the equipment (with model number and make/brand name), taxes, service charges if any, shipping and handling charges.

**\*Prebid meeting is scheduled on Apr. 30 at 11 am in Lab. For Biomaterials (IIT Kanpur)**

Terms and Conditions:

1. Maximum educational discount, if any should be offered
2. Quotation should be valid for at least for 90 days
3. Prices should be on CIF and FOB separately (if imported)
4. Prices should include the installation and training cost
5. Warranty should be for at least two years after installation. Next three year AMC (Annual Maintenance Contract) should also be included without any additional cost (i.e. total of 5 years of complete coverage is required).
6. Normal payment terms for the Institute will be applicable (70%-30% or 90%-10% on delivery of the remaining after satisfactory installation/ inspection).
7. Quotation should carry proper agency certificate, proprietary certificate, etc.
8. A list of similar equipment supplied to CTFIs (Centrally Technically Funded Institutes) or globally. Please include purchase-order and/or successful installation certificate. **Service feedback from the customer is required.**
9. An undertaking that the vendor will supply all the spares and services for the equipment for at least 5 years from the date of commissioning.
10. Vendor must be ISO9000 certified.
11. Delivery must be within 12-16 weeks after purchase/confirmation.
12. Installation and training to complete within 2-3 weeks of delivery.
13. Please note that GST of only 5% is applicable to IIT Kanpur.

Kindly send the Technical and Financial bids in sealed envelopes latest by May 04, 2018 (or e-portal) by 5pm, to:

**Dr. Kantesh Balani**  
**Faculty Building, Room 412,**  
**Dept. of Materials Science and Engineering**  
**IIT Kanpur, U.P. 208016, India.**  
**e-mail: [kbalani@iitk.ac.in](mailto:kbalani@iitk.ac.in)**  
**Ph: +91-512-259-6194**

### Technical Specifications for Bio-Tribometer (Automated)

Parameter	Specifications*
<b>BIO-TRIBOMETER SYSTEM</b>	
Multiple Test stations	4-12 in number (automated) <b>please specify</b>
Load Range	0-400 N → <b>Required</b> 400-1000 N → <b>Optional</b> Component
Balls/ Pin Type	Flat pin AND spherical-ball tips of 3, 6 and 10 mm ( <b>Required</b> ) At least following are 'require': (i) 100 quantity of 6-mm diameter zirconia balls (ii) 50 quantity of 6-mm diameter alumina balls (iii) 150 quantity of 6-mm stainless steel (SS 316 or 316L) balls (iv) 50 quantity of 3-mm diameter zirconia pin (25 mm height)  <u>At least 600 balls &amp; 150 pins must be supplied (REQUIRED).</u>  <u>Desirable:</u> (v) Other pins/ balls of 3 mm, 8 mm/10 mm/12 mm of alumina or WC or stainless steel or zirconia or alumina ( <b>please specify</b> and provide availability of size)
Pin Holder	Both Pin and Ball holders (3, 6 and 10 mm)
Sample Holder	Highly corrosion resistant sample holder required for each unit
Lubrication	<b>Required</b> → for performing tests with lubricant/pulverization module. A lubricant holder cup must be attachable for the tests with sealant (O-rings to be provided along with). Additional O-rings also to be supplied along with the equipment. <b>Desirable</b> → Please check if continuous pumping of fluid is also possible.
Load Cell	Required to measure frictional force and normal load
Sensor	LVDT sensor for measuring linear displacement
Linear Wear	Few mm distance
RPM	Between 50-600 rpm ( <b>please specify</b> )
Heating Option	Up to 60 °C (heaters and thermocouple to be attached) Needed for performing accelerated tests.
Wear Motion	<b>1. Linear:</b> - Up to few mm (min) to 30-40 mm (max) length - Need control of length, and speed - Reciprocation frequency (few Hz depending upon distance) <b>2. Circular:</b> - few mm (min) to ~20 mm (max) diameter - should be able to control rotational speed <b>3. Butterfly:</b> - ~8-10 mm (min) to ~50-60 mm (max) length - To be able to control the length of the same <b>4. Square:</b> - say 5-10 mm (min) to 30-50 mm (max) - should be able to change/control the dimensions
Imaging/ Camera	- Results should be displayed on computer screen - Must be able to capture indent images - Need attached CCD camera (minimum 3.2 mega-pixels)

Calibration samples	Must provide calibration standard samples (ISO, ASM/ ASTM, DIN standard).
Test Standard	Must follow standard of any of: ISO, ASM/ ASTM, DIN ( <i>please specify for wear/tribology modules</i> ). Preferred: ASTM G99 and ASTM F732
Stage control	Automatic as well as knob controlled stage
Tool-kit	Tool kit required for any routine repair/maintenance
Spares	Additional pins/balls must be provided with the system for its working for the total of 5 years
Software	<ul style="list-style-type: none"> <li>- Complete set of accessories for normal working of the system</li> <li>- Tests should be programmable as per provided global/national standard</li> <li>- The instrument should be installed with latest available version of licensed version of software for control, operation and analysis.</li> <li>- The supplier should upgrade the software as and when the upgradations become available for at least five years from installation</li> <li>- Should have intelligent calibration logic.</li> </ul>
Data Output/ Display	<ul style="list-style-type: none"> <li>- Results should be displayed on screen</li> <li>- Raw data and results MUST be exportable in ASCII or Excel or any other format.</li> </ul>
Repeatability	<ul style="list-style-type: none"> <li>- 0.5% or less at working set of parameters</li> </ul>
Computer/printer/UPS	<ul style="list-style-type: none"> <li>• The equipment should come with a high performance computer (i3 equivalent ~3.7 GHz processor, with min 500 GB hard-disk, and 24” or more LED HD screen, with all the requisite software installed on it.</li> <li>• An ‘<i>additional</i>’ computer with 24” monitor with all the required licensed softwares MUST also be included <i>for stand-alone analysis</i> of the data procured from the bio-tribometer.</li> <li>• Automatic duplex laser printer (b/w or colour) should also to be supplied along with the system</li> <li>• Required UPS must also be supplied with system</li> </ul>
Safety Norms	<ul style="list-style-type: none"> <li>• The instrument should be compliant with international norms for safety and environment</li> <li>• Must come with spillage protection during testing</li> <li>• Must provide a cover for protection when not in use</li> </ul>
Installation, Commissioning and Training	<ul style="list-style-type: none"> <li>• The delivery of the equipment should be considered complete only after successful commissioning of the instrument</li> <li>• The pre-installation requirements should be communicated to IIT Kanpur well in advance of the installation</li> <li>• The Installation, commissioning and training should be done only by well-trained factory engineers at NO ADDITIONAL COST.</li> <li>• At least 2-3 COMPLETE days of training ‘required’ (excluding the time required for installation of the equipment).</li> <li>• The supplier should provide training to at least two candidates at the installation site to make them familiar with smooth operation of the instrument</li> </ul>
After-sales Service	<ul style="list-style-type: none"> <li>• The supplier should provide a prompt after-sales service such as regular instrument maintenance, troubleshooting and fixing</li> <li>• The list of service centers in India should be included.</li> </ul>

Spares	• An undertaking that the vendor will supply all the spares and services for the equipment for at least 5 years from the date of commissioning
Annual Maintenance Cost	Include the cost of annual maintenance for each year for time period after five years after the coverage (guarantee followed by AMC period). Provide the amount and the terms. Note that those providing better after sales service and support with written evidence will be given preference
Other	Please provide the quotation of the “FULL SYSTEM” that system MUST FUNCTION with the listed items, and should be able to utilize all its features.
Warranty	Warranty of 2 years with 3 year AMC must be provided at no additional cost with the system.

**TRIBO-CORROSION MODULE**  
*Compatible and linkable (plug/snap-fit) to all of the work-stations for electrochemical characterization*

Electrode	4-electrode system (Working electrode, Counter electrode, reference electrode, and Sense electrode)
Current	± 10 nA to ±100 mA (Current resolution of 50 pA with <0.5% accuracy)
Potential	± 5 V (Resolution of ± 1 µV, with < 0.5% accuracy)
Scan rate	10 <sup>-6</sup> -10 <sup>3</sup> V/s
Frequency range	42 Hz (or lower) to 5 MHz
Impedance	Up to 100 G Ω (100 Giga-Ohms)
Data collection	10 <sup>4</sup> -10 <sup>5</sup> data points per second
ADC & DAC	16 bit resolution
Communication	USB communication with computer
Techniques required	Voltammetry (linear sweep, cyclic, pulsed), Corrosion measurement and analysis (OCP measurement, Tafel analysis, Linear polarization), Electro-deposition, bio-sensing, other user-defined (solar-cell testing, battery/fuel-cell)
Warranty	2 years + 3 years AMC (to be provided at no additional cost)

**DEDICATED POTENTIOSTAT (ACCESSORY UNIT)**

Electrode	3-electrode system (Working electrode, Counter electrode, reference electrode)
Current	± 10 nA to ±100 mA (Current resolution of 50 pA with <0.5% accuracy)
Potential	± 5 V (Voltage resolution of ± 200 µV, with < 0.5% accuracy)
Scan rate	10 <sup>-6</sup> -10 <sup>3</sup> V/s
Frequency range	42 Hz (or lower) to 5 MHz
Impedance	Up to 1 G Ω (Giga-Ohms)
Data collection	~10 <sup>3</sup> data points per second

ADC & DAC	16 bit resolution
Communication	USB communication with computer
Connecting wires	Two connecting wires of platinum of 0.5 mm diameter (99.95%+ purity) and 1.3 m length must also be provided
Software	<ul style="list-style-type: none"> <li>• Tests should be programmable as per provided global/national standard</li> <li>• The instrument should be installed with latest available version of licensed version of software for control, operation and analysis.</li> </ul>
Computer/ Printer/UPS	<ul style="list-style-type: none"> <li>• The equipment should come with a high performance computer (i3 equivalent ~3.7 GHz processor, with min 500 GB hard-disk, and 24" or more LED monitor, with all the requisite software installed on it.</li> <li>• Automatic laser printer (b/w) should also to be supplied along with the system</li> <li>• Required UPS must also be supplied with system</li> </ul>
Warranty	2 years + 3 years AMC
<b>ACCESSORY: 3-D Printer for Design of Polymeric Test Samples</b>	
Specification	<p>A 3-D printer to be able to take design input files in variable formats (say CAD files, Corel draw, etc) and print polymeric designs to the tune of size 150 × 150 mm samples.</p> <p>Resolution: ~200 μm × 200 μm (of pixels)</p>
Computer /Software	A good quality laptop/computer along with required licensed software for the printing of polymeric samples. Must accept design input files in variable formats (say CAD files, Corel draw, etc)
Printing material	The required material for printing to be supplied in enough quantities to last for the next three years. In case the material is perishable, the supply can be after every 6 months to 1 year period.
Warranty	2 year warranty + 3 years AMC
<p><b>*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.</b></p>	