OFFICE OF THE COORDINATOR TEQIP III
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

No.: NIT/TEQIP19/ 45　　　　　　　　　　　　　**Date: 18/01/2019**

<u>MINUTES OF MEETING</u>

With reference to the **"Invitation for bids for Engine Tribotester with Tribocorrosion" IBF No. TEQIP-III/nits/237** dated **21-12-2018**; a pre bid meet was held on **11-01-2019** at **1400** hours at the following venue:

TEQIP III Conference Room
National Institute of Technology, Srinagar
Hazratbal, Srinagar-190006

Following suppliers attended the pre bid conference:
1. Mr Kamaldeep Singh representative of Rtec Instruments, Inc
2. Mr Harkesh Kumar representative of Ducom Instruments Pvt. Ltd

The revised technical specifications can be found at Annexure I.

Moreover the last date for the submission of bids has been extended upto **15-02-2019.**

Dr Shahid Saleem
(Nodal Office Procurement TEQIP III/
Chairman Purchase Committee)

Prof M F Wani
(Indenter)

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1. Incharge Institute website for uploading on website.
2. Concerned File.

ANNEXURE I

Sr No.	Description	Qty
1	**Basic Platform**	
	Main Frame and Control System	1
	High density/high stiffness floor stand supporting platform with anchor design	
	Max. loading force up to 1000N	
	Z travel distance up to 150mm, resolution: 0.5 microns	
	Stepper motor-controlled loading, fully programmable/ Electromagnetic loading	
	Travel Speed: 0.002-5mm/s	
	In-situ wear-depth monitoring, Accuracy: 5 microns	
	Software and Control System	1
	Computer, Monitors and Software	
	Dell PC, i7 core 8th generation, 64 bit, Windows 10, 16GB RAM	
	24-inch LCD monitor	
	Electrical controller and data acquisition system	
	Data acquisition rate : 500 kHz or better	
	Control Software and Data Analysis Software	
	Output Parameters (display and store) 1. Frictional Force 2. Temperature 3. Test Load 4. Wear (Accumulative)	
	Additional Drivers, Controllers	1
	Temperature Controller	
2	**Normal Load Force and Friction Force Measurement**	
	Load cell + Z Force Sensor Includes suspension (usable range with Suspension) for measuring normal load with resolution of 150mN	1
	Range: upto 1000 N;	
	High Frequency Piezo Force Sensor (For Reciprocating Motion Only)	1
	Piezo Driver and Amplifier (Same Controller for any Piezo Fx sensor)	
	Range: 0.45 to 45 N; Resolution: 0.45 mN	
3	**Lower Oscillating Drive**	
	Maximal stroke length : 30 mm; Frequency : 0.1-70 Hz Stroke/ Frequency	1
	400C Chamber with oil cell	
4	**Upper Sample Holders (ball, pin, disk, Cylinder etc.)**	
	Special Testing Functional Holders	
	Piston ring holder for piston ring on cylinder liner testing	1
4	**Tribocorrosion modules as per** **ASTM G 119** **ASTM G 102** **ASTM G 3**	
	Tribocorrosion - Includes Platinum Electrode, Refrence Electrode and 1 Sample	
	Capable of "Floating" for operation with other potentiostats, grounded cells and	1

electrodes	
Specialized filters for float mode operation for enhanced signal/noise ratio at 50/60 Hz	
Analog filter selections on current and voltage channels for superior signal/noise measurements (NONE, 200 kHz, 1 kHz, **100 Hz, 10 Hz, 1 Hz**)	
±2 A/±10V polarization range as standard	
An internal frequency response analyzer option that provides impedance analysis over the frequency range 10µHz to 1MHz	
Metal of Construction (MOC): Laboratory grade glassware or equivalent steel grades such as 304 or 316. (For anti-corrosion material - suitable for acidic medium)	

Potentiostat Specifications:

Compliance voltage: ± 20 V or better at ± 400 mA

Output Voltage Range: ± 10 V

Applied Voltage Resolution	For ±10mV Signal = 300nV
	For ±100mV Signal = 300µV
	For ±1V Signal = 30µV
	For ±10V Signal = 300µV
Applied Voltage accuracy	±0.2% of value ± 2mV
Maximum scan rate	5000Vs^{-1} (50mV step) (10Vs^{-1} VersaSTAT – 100)
Maximum scan range/resolution	±10V/300µV

Maximum Output Current: ± 400 mA expandable up to 8A

Current Ranges: smallest current range: ± 10 nA to current range 100 mA in different ranges

Measured current resolution: 40 fA on 10 nA full scale range

Applied current accuracy	±0.2 % of value ±2 % of range, ±200pA
Maximum current range/resolution	±650mA / 60 µA
Manimum current range/resolution	± 4nA/120fA

Potentiostat Rise/fall Time: 350 ns or lower

Interface: USB interface for connection with PC

Input bias current: < 1 pA

Input Impedance of electrometer: >100GΩ

EIS module:

Hardware and software for EIS measurements in potentiostatic and galvanostatic control, over frequency range of 10 µHz to 1 MHz upto 8 A with booster. Signal generator frequency range 10 µHz - 30 MHz.

Frequency range in 10 µHz - 1 MHz combination with potentiostatgalvanostat.

Frequency resolution-0.003%,

Input range- ± 10 V.

Minimum AC voltage amplitude   0.1mV RMS

Sweep   Linear or Logarithmic

Data presentation: Nyquist, Bode, Admittance, Dielectric, Mott-Schottky, Data analysis: Fit and Simulation, Find circle, Element subtraction.

Electrochemical Software:

Software should have facility to record additional signal viz EQCM, bi-potentiostat etc. Import/export ASCII. Ready-to-use Vis & Generic interface for .Net applications should be included. It should have facility to display up to 4 plots simultaneously. The software should support following basic electrochemical measurements: Cyclic Voltammetry, Sampled DC Voltammetry. Taffel Plots, Differential Pulse Voltammetry, Square Wave Voltammetry. Electrochemical methods like Chrono-Amperometry,Chrono-Coulometry&Chrono-Potentiometry.

Optional:

Current Booster:

Current booster to enhance the maximum current of the system. Specifications: Max Compliance Voltage: ±20 Volts, Maximum Output Potential: ±10 Volts, Maximum Current: ±8Amp, Accuracy: ±0.5%, Operation Mode: Potentiostatic and Galvanostatic.

Electrochemistry Cell & Electrodes:

50 mL Glass cell-1no.

disc working electrodes with active area diameter 2 mm of GC-1no.

Pt wire Counter electrode.

Ag/AgCl reference electrode double junction type for use in Aqueous and Non-Aqueous media. Suitable Lid for the cell and purge tube with valve.

Accessories:

Corrosion Cells

The corrosion cell should be designed to measure the corrosion properties of circular samples immersed in an electrolyte. Three options be quoted:

- 1 L model
- 400 mL model
- Flat cell for extra large samples

The 1 litre corrosion cell must be designed according to ASTM standards, the sample holder must fit 16 mm diameter samples. The exposed surface area should be 1.0 cm^2. The holder is made of PolyPropylene with a seal of PTFE.

The 400 ml corrosion cell should be designed to measure the corrosion properties of 14 mm diameter and 1 mm thick flat circular samples immersed in an electrolyte. The exposed surface area is 0.785 cm^2. The holder is made of Delrin with a Viton seal.

The flat cell should be designed for extra large samples, up to 17 cm² in size.

The cells must comprise of a glass container with a thermostatic jacket and a glass top designed to be fitted with a reference electrode, two counter electrodes, a thermometer and a gas inlet/outlet for purging. The reference electrode Should be positioned close to the sample by using a Luggin capillary.