

**INDIAN INSTITUTE OF TECHNOLOGY GOA**  
Goa College of Engineering Campus, Farmagudi, Ponda -403401, Goa

Enquiry No. IITGOA/2018-19/122

Date: 19/03/2019

**Corrigendum to the Tender for supply of Tensiometer vide Enquiry No. IITGOA/2018-19/122 dtd. 12/03/2019.**

For the tender for supply of Tensiometer at IIT Goa, the following clauses / paragraphs have been modified:

# In specifications, the following points are amended,

SI No.	Technical Specifications
01	It should be capable to measure surface tension, interfacial tension, contact angle, dynamic contact angle, critical micelle concentration, liquid density, adhesion force measurement, sedimentation.
02	Instrument should be able to measure different quantities on solid surfaces, semi solids, fluids, viscous materials paints, single fibres, thin films, powders etc.
03	Different probes such as Platinum Du Nouy ring, Platinum Wilhelmy Plate, Platinum rod (for low volume samples), Powder Wettability containers, Adhesion Force probe, Density probe, Sedimentation probe, calibration tools and ring re-form tool, pH probe, temperature probe must be included in the quotation and spare set of these probes must be quoted separately as optional item
04	Calibration set must be quoted
05	Sample stage travel distance should be equal or more than 75mm and with resolution of 0.1 $\mu\text{m}$
06	The travel speed should be 0.1 mm/min or less to 500 mm/min or more
07	It should include simple platform, thermostated jacket of different sizes, cone shaped vessel (inverse cmc) and integrated sample stage with two titronic vessel.
08	The adjustment should be fully automatic including locking mechanism and weight adjustment
09	The measurement rate of the instrument can be 5Hz or more
10	In force measurement the maximum capacity must be 200 gm or more with resolution of 10 microgram or better
11	The temperature control measurement should be present with range -10 °C or less to 200 °C or more, with resolution 0.01 °C or better and accuracy of $\pm 0.5$ °C and proper internal/external sensors
12	Bubble level, glass windshield doors, control pad, touch panel and corrosion resistance thermally stable wide measurement compartment must be present
13	Proper Micro dosing unit for measurement of surfactant CMC must be included
14	The measurement using du nouy ring should have range of 1 to 2000mN/m and resolution of 0.001mN/m with different correction options like Zuidema-Waters, Huh-Mason, linear correction.
15	The measurement using rod method should be included with a range of 1 to 2000mN/m and resolution of 0.02mN/m
16	The measurement using Wilhelmy plate should be included with force measurement range of 1 to 2000mN/m or better and resolutions of 0.002mN/m or better. Wilhelmy plate should also be able to measure contact angle with range of 0° to 180° and resolution of 0.01°
17	Instrument should be able to do advancing contact angle based washburn method for contact angle with range of 0°-90° and resolution of 0.01°
18	Instrument should be able to calculate the surface free energy of solids using equation of state, Zisman, fowkes, Wu, Owens-Wendt-Rabel-Kaelble, extended Fowkes and acid base theory.
19	It should measure liquid density with range of 1 or less to 2200kg/m <sup>3</sup> or more, resolution 1kg/m <sup>3</sup> and $\pm 3$ kg/m <sup>3</sup>
20	Instrument should also be able to perform sedimentations experiments with result produced in different graphs

21	All accessories and consumables compatible with the quoted model but not quoted with the base module, must be quoted separately as optional items. These includes a) different measuring probes for analysing different liquids and dispersions using different methods, different sample volume, density measurement probes, sedimentation, adhesion measurements; b) sample holders and preparation set for solids, powder wettability, sedimentation tools c) equipment for measurement of CMC, d) sample vessels and matching adapters, e) equipment for controlling temperature, f) gas and atmosphere (quote as optional item and separately).
22	All the experimental parameter and protocols can be easily controlled by a user friendly keypad.
23	The power supply should according to Indian standard
24	Proper interfaces should be included for PC (USB 3.0, RS-232 port), thermostat and inert gas
25	A PC or laptop with processor speed of 3GHz or more, windows 10 OS, 8 GB or more RAM, 1TB hard drive, MS Office 2016 and proper interfacing with the instrument must be included in the quotation. Quotation must include Monitor of size of at least 14" for laptop and 23" for Desktop PC
26	Advanced Software capable of controlling the instrument and advanced analysis must be included in the quotation and installed in the PC/laptop provided with life time free upgrade option
27	Free installation including demo of handling and safety precautions
28	Must provide a user manual
29	Should have user-friendly menu
30	5 Years comprehensive warranty. In case warranty is less than 5 years, AMC must be quoted after warranty period is over
31	Bidders must ensure supply of spare parts till minimum of 5 years after warranty period
32	The supplier of the instrument must confirm in writing that the spares for the entire instrument will be available for a period of at least 10 years after the installation of the instrument
33	The complete instrument and accessories should be under warranty for a period of 5 years or more from the date of installation. The service personnel should respond within 24 hrs and be on campus in 48 hrs for repairs
34	Additional features/accessories if any that can potentially increase the productivity and safety of the instrument should be quoted as optional items

All other terms will remain same.

Sd/-  
Assistant Registrar