

CORRIGENDUM

With reference to Tender Id (2019_DARE_521716_1) published on 26-11-2019 for the Purchase of Air Bearing advanced Rheometer ".The following updated specification in the corrigendum may be read as the correct specification for the Purchase of Air Bearing advanced Rheometer and last date of submission of tender may be read as 26/12/2019 instead of 17/12/2019. The other terms & condition contained in the original tender shall remain intact.

Asst Admin Officer
Division of Agricultural Chemicals

<u>Technical Specification for Air Bearing advanced Rheometer</u>			Whether complied with YES/No	It, yes, please attach tech literature of the equipment duly printed & clearly specify page No. Of Bulletin which specifically confirm this
MAIN INSTRUMENT				
1.	MOTOR TECHNOLOGY	Synchronous EC motor or Brushless DC motor or drag cup motor		
2.	MOTOR BEARING	Radial: Air bearing Axial/Thrust: Air or magnetic bearing		
3.	TORQUE RANGE	Min. (rotation): ≤ 10 nNm Min. (oscillation/steady shear): ≤ 10 nNm Max.: ≥ 200 mNm		
4.	ANGULAR VELOCITY RANGE	Min.: $\leq 10^{-5}$ rad/s Max.: ≥ 300 rad/s		
5.	FREQUENCY RANGE	Min.: $\leq 10^{-6}$ rad/s Max.: ≥ 600 rad/s		
6.	MEASUREMENT TYPES	Rotational, Oscillatory and Transient		
7.	STRAIN SENSOR	High resolution optical encoder		
8.	GAP SETTING	Automatic gap control		
9.	NORMAL FORCE RANGE	Min.: ≤ 0.01 N Max.: ≥ 50 N		
10.	STEP RATE	≤ 10 ms		
11.	STEP STRAIN	≤ 15 ms		
12.	AUTO RECOGNITION	Must include system for automatic recognition of geometries and environment		
MEASURING SYSTEMS				
13.	GEOMETRIES	Suitable parallel plate geometries like the following or equivalent: <ul style="list-style-type: none"> • Smooth surface SS plate with diameter 25 mm – 01 No. • Smooth surface SS plate with diameter 50 mm – 01 No. • Rough surface SS plate with diameter 40 mm – 01 No. Suitable cone geometries like the following or equivalent: <ul style="list-style-type: none"> • SS Cone with diameter 60 mm and angle 1° – 01 No. 		
14.	SOLVENT TRAP	Suitable solvent trap along with P/P and C/P geometries for evaporation blocking		

must be quoted

TEMPERATURE CONTROL FOR MEASURING GEOMETRIES

15. TYPE Peltier temperature control with cooling option (both plate and hood/cover)

16. TEMPERATURE RANGE
Min.: $\leq 0\text{ }^{\circ}\text{C}$
Max.: $\geq 200\text{ }^{\circ}\text{C}$

RHEOLOGY SOFTWARE

17. TESTING PROTOCOLS*

Instrument should be able to measure following test parameters like –

- Rotational with rate/control stress/ combination of csr+css
- Oscillatory with strain/direct strain amplitude/control stress/combination of strain+ css
- Transient with creep (single/multi-level)/ step-strain (stress relaxation)
- combination with any modes above – for e.g. transient+rotational or oscillatory+rotational
- Superimposed testing of steady shear over oscillatory simultaneous operation
- Linear Amplitude Sweep, stress relaxation modulus, creep compliance
- Frequency sweep
- Strain - stress - temperature sweep
- Controlled stress - controlled strain/rate
- Linear visco-elastic limit (linearity) to verify linear viscosity region
- Phase angle vs. temperature (frequency)
- Modulus vs. phase angle
- Elastic and viscous modulus vs. temperature or frequency
- Viscosity vs. strain rate, viscosity vs. shear stress, viscosity vs. time, viscosity vs. temperature
- Angular frequency vs. complex viscosity, angular frequency vs. storage modulus, angular frequency vs. viscous modulus, angular frequency vs. phase angle.
- Creep/creep recovery measurement, constant stress creep and recovery, automatic sensing of steady state during creep test
- Stress relaxation measurements, constant strain and stress relaxation test

		<p>(* Authentic compliance documents of the testing protocols may be provided at the time of uploading the quotation to support the claim)</p> <p>All raw data or instrument parameters must be accessible at anytime.</p> <p>The system should be supplied with necessary instrument control and data analysis based on Windows operating system.</p>		
18.	ANALYSIS MODULE	Suitable rheology module for analysis must be quoted		
19.	UPGRADABILITY*	<p>The Rheometer should be upgradable to Rheo-microscopy, Small Angle Light Scattering Systems (SALS), Dielectric analysis, Humidity Control Chamber and Tribology.</p> <p>(*This should either be clearly mentioned in the Product Catalogues or otherwise certificate from principal manufacturer should be provided at the time of uploading the quotation to support the claim)</p>		
PRE-REQUISITS				
20.	AIR COMPRESSOR	100 psi, 5 cfm, oil free system		
21.	AIR DRYER	Multistage membrane type with microfilters		
22.	COMPUTER	<p>Branded computer system having minimum specifications as: Processor i5, 2.67 GHz or higher, 8 GB RAM or more, SSD with 240 GB or more, DVD drive, Intel HD Integrated Graphics, Wireless WiFi Operating System, Windows 7 or above, cordless mouse and Keyboard.</p> <p>3KVA on line UPS with 30 min back up, Ethernet, High speed 2.0 USB and all other standard ports in compliance with Rheometer and accessories, LCD monitor, printer.</p>		
WARRANTY AND AMC SERVICES				
23.	The instrument cost should include cost of two years warranty (excluding one year's standard warranty).			
TRAINING				
24.	Training and Installation at ICAR-IARI, New Delhi should be given free of cost.			
OPTIONAL ITEMS				
25.	CLIMATIZER	2 ton acclimatizer (split) with stabilizer of reputed brand		

General Conditions:

1. Original and licensed Software for the equipment should be provided
2. List of service staffs and centers available in India.
3. List of the Indian users of quoted model for last three years
4. Firms should not quote obsolete / discontinued models.
5. Equipment should work under 220 to 240 V/50Hz conditions.
6. Original brochures at the time of bid submission should be provided.

(सहायकप्रशासनिकअधिकारी)Asstt. Admn. Officer