INDIAN INSTITUE OF TECHNOLOGY DELHI
HAUZ KHAS NEW DELHI

Date: 21-05-12

Notice Inviting Quotation

Quotations are invited for the purchase of **Rotational Rheometer** for the Department of Textile Technology. Interested suppliers are required to submit their quotations as per the specifications given below. The sealed quotations are to be submitted in two Separate envelops:

A- for Technical Quote (to submit design) &
B- for Financial Quote
(For details, see Annexure I)

Both these envelops should be further enclosed in an outer envelop, which should also be sealed and addressed to, clearly mentioning on top right corner of the envelop "quotations for **Rotational Rheometer**".

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The quotations should reach the above office by 5 PM, 15-06-12. If needed the suppliers may be asked to make a technical presentation before the committee.

Institute reserves the right to accept or reject any of the offers without assigning any reasons.

The Rotational Rheometer should have the following features:

Items	General Features	Requirements
1.	**Type**	Rotational Rheometer
2.	**Model**	Internationally known, advanced model
3.	**Design/Construction**	Bench top model with rugged construction, not susceptible to damage from atmospheric humidity, particulates or slight vibrations

4.	**Specifications**	• **Minimum torque rotation :** ≤ 10nNm • **Maximum Torque:** ≥ 200 mNm • **Minimum torque oscillation:** ≤ 2nNm • **Torque resolution:** ≤ 0.1 nNm • **Bearing type:** Air or Magnetic Bearing • **Motor type :** EC motor or Drag cup Motor • **Motor inertia:** ≤ 20 µNms • **Angular deflection resolution:** ≤ 10 nrad • **Min. Normal force:** ≤ 0.005 N • **Max. Normal force:** ≥ 50 N • **Normal force resolution:** ≤0.5 mN • **Step in Rate (response time):** ≤ 5ms • **Step in strain (response time):** ≤15 ms • **Minimum rotational speed:** ≤ 0 rad/s • **Maximum rotational speed:** ≥ 300 rad/s • **Minimum oscillation frequency:** ≤ 10 e-7 Hz • **Maximum oscillatory frequency:** ≥ 628 rad/s
5.	**Control Mode**	**Must be capable of operating in following modes** • Control stress/Oscillation mode • Control strain/amplitude/flow mode • Transient mode/creep mode/stress relaxation mode. • Should also be able to perform tests like temperature sweep, time-temperature superposition.
6.	**Temperature control**	• **Range:** Peltier cooling and heating (≤ -20 °C to ≥ 120 °C) with chiller (if necessary) for cooling. • **Resolution:** ≤ 0.1 °C, cooling and heating rate ≥20°C/min.

		• **Control:** Read the sample temperature precisely and start the test once the set temperature is reached. • Method of temperature control should be detailed. • Any patented technology for actual/true temperature control (if available as an option) **should be quoted separately as indicated under item 14**. • Other temperature control options **should be quoted separately as indicated under item 14.**
7.	**Solvent trap/evaporation blocker**	• Efficient solvent trap and evaporation blocker so as to block the effect of humidity on the exposed sample as well as completely block the evaporation of solvent.
8.	**Environmental chamber/hood/purge gas cover**	• A closed chamber that should allow working in inert atmosphere i.e. Nitrogen • Any peltier cooling option for environmental hoods to maintain the temperature inside the chamber **should be quoted separately as indicated under item 14.**
9.	**Gap control**	• Automatic gap control to maintain the required gap with change in temperature. • Position sensors to make real time corrections for the effects of thermal expansion/contraction and ensure most accurate gap between geometries. • Method of gap control should be detailed • Any patented technology for precise gap control (if available as an option) **should be**

		quoted separately as indicated under item 14.
10.	**Measuring systems and geometries**	• Easy fitting • Quick connect geometries • Automatic recognition and calibration of the measuring system • Geometry material- made of corrosion resistant stainless steel for lower and upper geometries • Aberration resist/sandblasted surface for samples containing silica and mineral acids like nitric acid **should be quoted separately as indicated under item13**. • Upper geometries of various diameters 80-50mm, 40-10 mm and cone angles 0°, 1°, 2°and 4° **should be quoted separately as indicated under item 13.** • Double gap concentric cylinder for measuring very low viscosity to high range of viscosity using low volume (5-12 ml or lower) of sample **should be quoted separately as indicated under item 13**.
11.	**Control/Panel**	• Should have both LCD display and Control panel on the main instrument for manual control of system.
12.	**Software**	• User friendly software that allows users to change test parameters, units and plot areas as and when required. • Curve fitting models like Oldroyd-B, Maxwell, FENE-P model etc. and allow various mathematical calculations. • Capable of performing LAOS tests

		• Molecular weight determination • **All software modules should be quoted as main part of quotation or optional (as applicable).**
13.	**Optional accessories (must be quoted)**	• Quote all the available upper plate geometries ranging from diameters 80-50mm, 40-10mm and cone angles 0°, 1°, 2°and 4° to choose from. • Double gap concentric cylinder for measuring very low viscosity to high range of viscosity using low volume (5-12 ml or lower) of sample. Viscosity range should be specified. • Aberration resist/sandblasted surface for samples containing silica and mineral acids like nitric acid to avoid damage of lower plate. • **All optional accessories should be quoted separately**.
14.	**Other options**	• Patented technology for measuring/recording actual sample temperature during the test. • Patented technology for actual gap positioning during expansion and contraction of geometries at the time of increase or decrease of temperature. • Other temperature control (heating /cooling) options • Peltier cooling options for environmental hoods to maintain inner chamber temperature. • Pressure cell • Interfacial accessory like DuNouy ring/ Bicone system. • **All other options should be quoted**

		separately.
15.	**Warranty Terms**	• 5 years comprehensive warranty
16.	**Quality**	• Internationally known brand • Provide name and email ids of users of the quoted models belonging to reputed organizations from India or abroad for reference.
17.	**Application support/Service**	• Technical and Application support from India and abroad should be readily available for the duration of the comprehensive warranty. • Should have service network in India, preferably near Delhi for prompt service.

Annexure I

Envelop A: Technical Quote: The following details are to be enclosed *(Mention clearly on this envelop –* ***Technical Quote****)*

1. All quoted models must be compatible with Indian power supply: 220 Volts/50Hz for single phase and 440 V/50Hz for three phase supply.
2. Quotation should be directly from Original manufacturer or authorized sales agent.
3. Sole agency certificate (if applicable) and its validity from Foreign Principals (in case of foreign manufacturer).
4. Proprietary certificate (if applicable, for any component or instrument quoted).
5. Mention any optional equipment / accessory / spares recommended to enhance the capability and/ or utility of the equipment.
6. Indicate all installation requirements including platforms, gases and chillers, UPS, etc.
7. State service support for the equipment in India, specifically in NCR.

Envelop B: Financial Quote: The following details are to be enclosed/ ensured. *(Mention clearly on this envelop –* ***Financial Quote****)*

1. Prices of the quoted model should be CIF Delhi inclusive of all taxes, delivery charges, installation and training charges; Please note that IIT Delhi is exempted

from central excise and attracts concessional custom duty. Institute also provides institutional form for concessional VAT for interstate transactions.

2. The products will be used for educational purposes. Any applicable academic institution discounts should be offered and stated.
3. Guarantee and warranty conditions must be clearly specified; exemptions if any must be clearly stated.
4. Validity of quotation must be 90 days.
5. Mode of payment for local suppliers is through cheque after successful delivery and installation of the above equipment and for imported equipment through LC.
6. 90% payment will be made by LC at the time of dispatch and remaining 10% after successful installation.
7. For imported equipment, the address of the company in whose name the LC is to be opened should be stated.
8. Supplier must submit TIN number/ PAN number as applicable.
9. Institute reserves the right to order equipment with better quality over lower price and to accept or reject any or all the quotations without assigning reasons thereof.