



TATA INSTITUTE OF FUNDAMENTAL RESEARCH

TIFR Centre for Interdisciplinary Sciences

Plot No.21, Brundavan Colony, Narsingi, Hyderabad - 500 075.

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PUBLIC TENDER NO :	TCIS/PCH/IC14-0156
PUBLISHED ON :	20.12.2014
DUE DATE :	16.01.2015
COST OF TENDER :	Approx. Rs. 50 Lakh
TYPE OF TENDER :	TWO PART

DESCRIPTION OF MATERIAL

Dynamic Mechanical Analyser (DMA)
(detailed specifications as per attached sheet)

Closing time and date :	13.00 Hours on 16.01.2015
Tender will be open at :	15.30 Hours on 16.01.2015

Both Technical Bid (Part A) and Financial Bid (Part B) to be submitted within the due date and time in separate envelopes and marked on top as Part A and Part B. These two sealed envelopes should be further put in one Master Envelope superscribed with the Tender No., Due Date in Bold Letters.

Please see attached sheet for conditions of tender.



Specifications of DMA with Accessories

Mechanical design must incorporate graphite air bearings for “frictionless” movement of the drive shaft and provides a full 25mm travel without the use of steel springs or lead screws and stepper motors

Detection of drive shaft movement should be done by the of a linear optical encoder that provides one (1) nanometer resolution over the full 25mm drive shaft travel (Resolution is 1 in 25,000,000)

Unit must be provided with:

- I) Tension Film Fiber (sample length range of 5 to 30 mm, width to 6.5 mm, and thickness to 2 mm.)
- II) Parallel plate compression (15 mm diameter and 40 mm diameter plate sets for testing soft materials like adhesives, elastomers and gels in compression mode)
- III) 3-point bend (20 and 50 mm)
- IV) 35mm dual cantilever bending fixture
- V) Special Fiber Fixture 5 to 25 mm length

Sample length measurement should be automated in the tension mode

Sample thickness measurement should be automated in the compression mode

Unit must be able to scan multiple frequencies while simultaneously step or ramp heating

Drive shaft should be rectangular design that prevents turning (torquing) of the shaft (and sample during loading and testing)

Ability to perform creep, stress-relaxation, oscillation, force ramp-rate and strain-rate of extension/compression/flexure (Instron-like experiments)

Automated furnace movement

Furnace must be bifilar wound

DMA must contain color touch-screen display for ease-of-operation

DMA must incorporate automated clamp calibrations that are specific for each clamp type, and can be performed when switching clamps. Clamp compliance must be calibrated for each clamp type during this calibration

Module must be controlled with an operating system that has the ability to also operate DSC, MDSC, TGA, TMA, DTA, SDT and DEA modules at the same time. This provides expandability to

other techniques at a lower cost

Viscoelastic Measurements Specifications:

Modulus Range (dependent on geometry)	10^3 to 10^{12} Pascals
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Modulus Precision	+/- 1%
Frequency Range	0.01 to 200 Hz in 0.01 increments at lower frequencies, 1.0 Hz at higher frequencies
Maximum Force	18 Newtons
Minimum Pretension (for tensile)	0.001 Newton
Force Resolution	0.0001 Newton
Tan δ Range	0.0001 to 10
Tan δ Sensitivity	0.0001
Tan δ Resolution	0.00001
Dynamic sample deformation Range	+/- 0.5 to 10,000 microns
Amplitude Resolution	1 nanometer (0.001 micron)

Temperature Control Specifications With :

Temperature Range	Ambient to 600°C
Heating rate	0.1 to 20°C/min in 0.1°C/min increments
Isothermal Stability	+/- 0.1°C
Automated Furnace Movement	Yes

Specification for Modes of Operation:

The DMA must have the ability to program stress or force, and strain or amplitude in oscillation experiments.

The DMA must also allow the following control features:

- The Stabilization and Data Collection Cycles allow better control of data collection.
- The Stress/Force Accuracy option should allow you to specify how close you need to be to the target stress or force. Applies to the Multi-Stress & Multifrequency-Stress modes.
- The option Collect Data when Stable should allow you to in experiments on samples with rapidly changing properties. (Applies to the Multi-Strain & Multifrequency Strain modes).
- The option Ability to Track Length should allow the DMA to track dimensional changes thereby accurately evaluating the material properties in real-time. Applies to temperature ramp experiments in Tension & Compression.
- The Measure after Equilibrate option Should allow samples to be re-measured after first Equilibrate method segment.

The DMA must be capable of performing experiments in each of the following modes.

Force-Track (Autotension) Modes	Constant Stress/Force Static/Dynamic Load Ratio during oscillation
Preview Measurement	Quick single Modulus measurement at one frequency at room temperature
Temperature Ramp/Single Frequency	Linear heating rate applied while measuring the viscoelastic response at a single frequency

Temperature Ramp/Frequency Sweep	Linear heating rate applied while simultaneously scanning through a frequency table pre-selected with up to 50 frequencies
Temperature Step & Hold/Frequency Sweep	Temperature stepped and held isothermal for a selectable amount of time followed by a frequency sweep after which the temperature is stepped to the next isothermal for another frequency sweep
Constant Temperature, Stress/Strain Sweep	Isothermal temperature and constant frequency while measuring the viscoelastic response to operator selected forces or amplitudes of oscillation
Constant Strain Rate	A constant strain rate is applied to the sample at a constant temperature (instron-style)
Isostrain	A constant strain is applied to the sample while the temperature is ramped (measures shrinkage force).
Creep	A constant stress (load) is applied and displacement is observed. This creep test and creep recovery can be done at a sequence of isothermal temperatures.
Stress Relaxation	A constant strain (displacement) is achieved and the force (stress) required to maintain this strain is observed. This test and recovery can be done at a sequence of isothermal temperatures.

Specification for Analysis Software:

Ability to graph, plot in tabular format, as well as analyze peak for temperature or signal values, onset points, slopes, peaks, integration of any curve, curve values, and curve subtractions. Data should be available in an ASCII format and or spreadsheet format. Program should employ programmable macros to automate analyses, as well as the ability to automatically generate custom analysis reports.

Master Curve software has ability to automatically shift data and fit with the WLF or Arrhenius equations. All data should be manually available for shifting in addition to the automatic shifting.

Specification for Output Values:

Log plots, 1st and 2nd derivatives and ability to plot any of the listed signals on the x or y axis

Storage Modulus	Strain
Loss Modulus	Amplitude
Relaxation Modulus	Length
Tan δ	Dimension Change
Complex Viscosity	Frequency
Dynamic Viscosity	Temperature
Storage Compliance	Position
Loss Compliance	Static Force
Creep Compliance	Dynamic Force
Strain Recovery	Time
Stress	

General Terms and Conditions

1. **PART "A" (Technical Bid) consisting of Technical Bid & Commercial Terms and PART "B" (Financial Bid) consisting of only Price** shall be submitted in **separate** sealed envelopes duly superscribed with the tender enquiry number, and the due date in bold letters, addressed to the Administrative Officer, Tata Institute of Fundamental Research, 21, Brundavan Colony, Narsingi, Gandipet Road, Hyderabad - 500 075. The envelopes should be clearly marked on top as either PART "A" or PART "B". The two sealed covers should be further put in a master cover superscribed with the Tender Enquiry No., Due Date in bold letters, addressed to the Administrative Officer, Tata Institute of Fundamental Research, 21, Brundavan Colony, Narsingi, Gandipet Road, Hyderabad - 500 075. The sealed master envelop has to be delivered by hand/courier at the security Gate Officer of TIFR, Hyderabad on or before 13.00 hrs on the due date specified. The technical bid will be opened in the presence of attending tenderers at 15.30 hrs on the due date at Administration Section, TIFR, Hyderabad. Tenders submitted after 13.00 hrs. on due date will not be considered.
2. **In case the PART „A" and Part „B" bids are not sealed in separate envelopes the tender will be rejected.**
3. **The technical bid should not contain any indication of the price.**
4. After scrutiny of Technical Bids, Financial bids of only those bidders who are shortlisted on technical basis will be opened at on later date. The opening date, time and venue will be intimated to the technically successful bidder.
5. After downloading the documents please inform your company details such as name, address, telephone nos., contact person and email address etc. by email to us. (harid@tifrh.res.in), to enable us to inform prospective bidder for any corrigendum/changes if any; in the Tender document before due date.

6. Quotations must be valid for a period of 180 days from the due date.
7. Tenders containing correction, overwriting will not be considered. Late or delayed/Unsolicited quotations/offers shall not be considered at all. These will be returned to the firms as it is. Post tender revisions/corrections shall also not be considered.
8. Tenderer should sign on all the pages of the technical bid and the price bid.
9. The offer for Import item should indicate separately the price on Ex-works basis (duly packed airworthy and of international standard). The gross weight and net weight of the package and the dimensions of package(s) should be indicated in the quote for our reference to calculate the total landed cost in INR.
10. If equipment offered is to be imported, arrangements for import will be made by us for direct import.
11. Tenders who do not comply with any of the condition are liable to be rejected.
12. The Institute shall be under no obligation to accept the lowest or any other tender received in response to this tender notice and shall be entitled to reject any tender without assigning any reason whatsoever.
13. TIFR reserves the right to place the order for part/reduced quantity than what is specified in the tender.
14. PAYMENT TERMS: **80%** payment shall be made through irrevocable L/C on presentation of complete and clear shipping documents and balance **20%** of the amount shall be released after the receipt, installation, commissioning and acceptance of the equipment.
15. For Import cases: **No Agency commission will be paid as per Govt. of India rules.**
16. TIFR is exempted from paying of **Custom Duty** under the notification No.51/96 dated 23.07.1996, **Excise Duty** under the notification No.10/97 dated 01.03.1997, **Octroi Duty** under the registration No. 27664 dtd. 07.07.1953 & Letter No. OCT/755/HCCI Dtd.13.08.14 for all procurements/supply meant exclusively for Educational, scientific and research purpose. Whenever the exemption certificate not honored by the authorities, the applicable duty will have to be paid. Hence Excise & Custom duties, if any, should be shown separately.
17. SALES TAX: TIFR does not have any exemption/concession on payment of Sales Tax/VAT and we are not authorized to issue any Sales Tax Form „C“ & „D“
18. The delivery period should be specifically stated and earlier delivery may be

preferred.

19. The Supplier shall arrange to ship the ordered materials within the mutually agreed delivery period mentioned in the order unless extended with/without penalty.

- a. In case of delay in supply on part of the supplier, a penalty @0.5% per week of order value will be charged for delayed period subject to a maximum of 10% order value.
- b. If the delay in the shipment of the ordered materials attributable to the supplier exceeds agreed time period from the date of original agreed upon date of shipment and extended with/without penalty, the TIFR, Mumbai shall have the right to cancel the contract / purchase order and recover the liquidated damages from other dues of the party or by legal means. It will also affect the other/future business dealings with such suppliers.
- c. The same rate of penalty shall be applicable for late installation of the equipment/instrument also.

20. COMMENCEMENT OF WARRANTY PERIOD: The warranty period of an item shall commence from the date of receipt of the item in good working condition and satisfactory installation/commissioning/demonstration at the project site.

21. ANNUAL MAINTENANCE CHARGES: The party must mention in the quotation, the rate/amount of annual maintenance charges, if we opt for maintenance contract after expiry of the warranty period if necessary.

22. Specifications are basic essence of the product. It must be ensured that the offers must be strictly as per our specifications. At the same time it must be kept in mind that merely copying our specifications in the quotation shall not make the parties eligible for consideration of the quotation. A quotation has to be supported with the printed technical leaflet/literature of the quoted model of the item by the quoting party/manufacturer.

23. OBSERVANCE OF LOCAL LAWS: Wherever applicable (particularly for Local vendors), the vendor / contractor shall comply with all law, statutory rules & regulations etc. The vendor/ contractor shall obtain all necessary permits / approval from the local Governing Body, Police, and other concerned Authorities as may be required under law. The vendor /contractor shall pay all types of taxes, fees, license charges, deposits, duties, tolls, royalty or other charges that may be leviable on account of any the operations connected with the execution of this work/ contract.

24. In case of any interpretational issues arises in this tender, the interpretation/decision of TIFR shall be final and binding on the bidder.
25. It is the responsibility of the vendor to make sure that the system being proposed can be exported to India with TIFR as the end user. All clarificatory documentation must be submitted with the Bid.
26. TIFR reserve the right to ask for or to provide any clarification, changes after the release of this tender. **Any changes or clarifications provided by TIFR may be checked at TIFR website <http://www.tifrh.res.in/tcis/contact/tenders.html>**

Administrative Officer
TIFR - Hyderabad