



Telephone :

044. 2257 5284

EN

Department of Civil Engineering

# Indian Institute of Technology, Madras

I.I.T.P.O., MADRAS - 600 036.

Ref. No. 

CIE	TRN	2013.	JMK	Spl.
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Date : 13.11.13.

Dear Sirs,

DUE DATE : 06.12.13.

1. Quotations are invited in duplicate for the various items shown below / overleaf / enclosed list.
2. The Quotations duly sealed and superscribed on the envelope with the reference No. and due date, should be addressed to the undersigned so as to reach him on or before the due date stipulated above.
3. The Quotations should be valid for sixty days from the due date and the period of delivery required should also be clearly indicated.
4. If the item is under DGS & D Rate contract. Rate Contract Number and the price must be mentioned. It may also please be indicated whether the supply can be made direct to us at the Rate contract price. If so, please send copy of the R.C. (Please note that we are not Direct Demanding Officers)
5. Relevant literature pertaining to the items quoted with full specifications (and drawing, if any) should be sent along with the Quotations, wherever applicable samples if called for, should be submitted free of charges, and collected back at the supplier's expenses.
6. Local Firms : Quotations should be for free delivery to this Institute. If Quotations are for Ex-Godown, delivery charges should be indicated separately.
7. Firms Outside Chennai : Quotations should be for F.O.R. Chennai. If F.O.R. consignor station, freight charges by passenger train / lorry transport must be indicated. If-Ex-Godown, packing, forwarding and freight charges must be indicated.
8. The rate of Sales / General Taxes and the percentage of such other taxes legally leviable and intended to be claimed should be distinctly shown along with the price quoted. Where this is not done, no claim for Sales / General Taxes will be admitted at any stage and on any ground whatsoever. The taxes leviable should take into consideration that we are entitled to have Concessional Sales Tax applicable to Non-Government Educational Institutions run with no profit motive for which a concession. Sales Tax Certificates will be issued at the time of final settlement of the bill.
9. Goods should be supplied carriage paid and insured.
10. Goods shall not be supplied without an official supply order.
11. Payment : Every attempt will be made to make payment within 30 days from the date of receipt of bill / acceptance of goods, whichever is later.

Details as per enclosed list. ✓

Yours faithfully

For HEAD OF THE DEPT.

\*Strike out whichever is not applicable.

etc.

## Technical Specifications for Cone/Plate and Parallel Plate Rheometer

### ***General Specification***

The rheometer must be capable of working with different geometries- parallel-plate, cone-and-plate, and concentric cylinders. The corresponding attachments, especially 25mm parallel-plate attachment and 25mm cone-and-plate attachment with  $2^\circ$  cone angle, must be provided by the vendor. It must be capable of working in both stress-controlled and strain/strain-rate-controlled modes. In any type of geometry, the instrument must be able to apply a stress of 10,000 Pa at the least, and a shear rate of  $10 \text{ s}^{-1}$  at the least. The resolution in torque and angular deflection must be at least 0.1 mNm and 0.1 mrad, respectively. Ability to apply oscillatory load is not a requirement, but preferred. The vendor should list the complete list of parallel-plate, cone-and-plate and concentric cylinders geometries possible for use with this equipment.

### ***Temperature Controls***

The instrument must have a Peltier-based temperature control for the parallel-plate and cone-and-plate geometries. The temperature controller must have a temperature range of 0 to  $120^\circ \text{ C}$  at the minimum. The controller must be able to keep the temperature stable with an accuracy of  $\pm 0.5^\circ \text{ C}$ . The controller should allow dynamic temperature changes during an experiment; temperature-sweep must be possible.

### ***Controls, Data Acquisition and Data Visualization***

The rheometer must be controllable from a personal computer through an application. Standard templates for steady-shear, creep-recovery and stress-relaxation experiments must be readily available. In addition, the application must contain programmable features to run custom tests including multiple cycles of creep and recovery at multiple stress levels. The software must have the ability to control temperature and shear stress and shear rate simultaneously. The time interval between subsequent measurements of data must be programmable. Raw data of torque exerted on the top plate, and angular deflection and angular velocity of the top plate must be obtainable along with the temperature at every measuring point.

The software must have the capability to visualize the results obtained from a test. It should be possible to plot a graph between any two measured. It should also be possible to compare results from two different tests. The software should also have features to conduct simple analysis of obtained data.

### ***Accessories***

The vendor should include in the quote all the optional accessories available for the equipment.

### ***Power Supply***

The instrument should be able to run in 220-240 V, 50/60 Hz AC with single phase power supply.

### ***Technical Support***

It is expected that the vendor should guarantee round the clock technical support not only during the warranty period but even beyond that upon the payment of annual maintenance contract. Demonstration of having provided such satisfactory technical support to customers in India will be an added advantage.