

**INDUSTRIAL TRIBOLOGY MACHINE DYNAMICS AND MAINTENACE  
ENGINEERING CENTRE**

**INDIAN INSTITUTE OF TECHNOLOGY, DELHI.**

**Notice inviting quotations (NIQ)-(last date for submission 28<sup>th</sup> Nov 2011, 5-30 PM)**

**SPECIFICATIONS OF VISCOMETERS**

**TWO TYPES OF VISCOMETERS ARE TO BE PURCHASED.**

- 1. FOR DYNAMIC/ABSOLUTE VISCOSITY MEASUREMENT**
- 2. FOR KINEMATIC VISCOSITY MEASUREMENT**

Desired Specifications (better/higher if available, should be quoted separately with price difference) are as follows.

**1. TECHNICAL SPECIFICATIONS FOR VISCOMETER FOR DYNAMIC VISCOSITY**

The viscometer is to be used to measure Dynamic/absolute viscosity of samples (fresh and used) (low viscous to highly viscous) such as

- Industrial oils
- Samples like pastes
- Greases

The viscometer should require low quantity of samples for the measurement typically not more than 2 ml.

Following measurement geometries are required:

1. Cone and plate measuring geometry with the following dimensions to cover the desired range of viscosity.
  - Cones of 2<sup>0</sup> with Diameter = 40-50 mm and 28-30 mm (1 Each)
  - Plates of Diameter = 40-50 mm and 28-30 mm (1 Each)
2. Concentric Cylinders for low viscosity samples with sample requirement not more than 10 ml and a narrow gap less than 0.5 mm.

The viscometer must be Rotational type (230V; 50 Hz), with the following operating modes:

- CR (Controlled Rate)
- CD (Controlled Deformation)

The viscometer must be capable of using plate-plate and concentric cylinders measuring geometries also with temperature control from -5 to +100<sup>0</sup> C. (for cone and plate) and up to 150<sup>0</sup> C for concentric cylinders measuring system. The system must supplied with refrigerated circulator and viscometer stand.

The Viscometer must have following parameters:

- a. Yield point determination for gel like samples
- b. At least 10 user programmable procedures
- c. At least 60 selectable shear rate values
- d. Output to RS232 printer and LED display
- e. Minimum Speed range 0.5 - 800 rpm
- f. Minimum Shear rate range 0.6 - 30000 1/s
- g. Minimum Torque range 0.1 - 30 mNm

The viscometer must have a complete control software along with computer and printer.

## **2. TECHNICAL SPECIFICATIONS FOR VISCOMETER FOR KINEMATIC VISCOSITY**

The viscometer should measure kinematic viscosity of liquids from ambient temperature to 150<sup>0</sup>C and viscosity index of fresh oils. It should be based on capillary tube method and should measure VI as per ASTM D 2270 – 04; D 445, IP 71, ISO 3104, or ISO 2909. The unit should have following features.

1. Temperature Controlled Stirred Liquid Bath with accuracy of controlling temperature up to 0.01°C with built in Thermometer holder. The bath should be supplied with a certificate of temperature stability, accuracy and uniformity.
2. Over temperature cut-out
3. Upper Temperature limit warning,
4. Low temperature limit warning
5. 5-7 capillary tube positions with full visibility
6. Cooling Coil built-in
7. Low liquid level switch
8. Robust stainless steel casing & top plate with all parts corrosion resistant
9. Small size preferably 1.5 ft x1.5 ft x1.5 ft
10. Splash proof keypad
11. Should be supplied with Calibrated tubes and Viscometer Stand

## Terms and Conditions

1. All quoted models must be compatible with Indian power supply: 220 Volts/50Hz for single phase and 440 V/50 Hz for three phase supply.
2. Technical & commercial quotations must be submitted separately in a sealed envelope. Both the envelopes must be submitted in another sealed envelope. It should be marked as a quotation for Dynamic or kinematic viscometer.

The quotation must be submitted in a main sealed envelope containing two separate sealed envelopes inside for Technical and commercial quotations with a subject (Quotation for **EITHER DYNAMIC VISCOSITY OR KINEMATIC VISCOSITY**) written on a main envelope as well as envelopes inside it. For each viscometer, different envelopes are to be used.

### Technical bid must contain the following:

- a. It must contain your letter in a tabular form indicating yes or no for each specification as above-mentioned. Quotation without this document will not be entertained. If a single feature is skipped in a consent Table, it will be treated as invalid.
- b. Quotation should be directly from the Original manufacturer or authorized sales agent. Sole agency certificate (if applicable) and its validity from Foreign Principals (in case of foreign manufacturer) should be submitted.
- c. Proprietary certificate (if applicable, for any component or instrument quoted) should be submitted.
- d. Delivery period should be specifically mentioned and should be as small as possible.
- e. Details on installation, commissioning and training of the equipment must be specified.
- f. State service support for the equipment in India, specifically in Delhi; give details of service centres with address, telephone numbers response time during warranty and afterwards.
- g. **Original brochures and original specification sheets (from equipment manuals)** directly obtained from the principal manufacturer of the quoted model must be enclosed along with supporting data.

### The Financial Bid must contain the following:

- (a) Prices of the quoted model should be FOB and include all taxes, delivery, installation and onsite training charges and **warranty for at least 1 year**.  
All duties & taxes must be separately indicated in the offer.
- (b) The products will be used for educational purposes. Any applicable academic institution discounts should be offered and stated.
- (c) Guarantee or warranty conditions must be clearly specified; exemptions if any must be clearly stated.
- (d) Validity of quotation must be till 90 days,

(f) Mode of payment is through LC only for foreign purchases. Name and address of the company on whose name the LC is to be opened should be clearly mentioned.

(g) Supplier must submit TIN number/PAN number as applicable.

Institute reserves the right to accept or reject any or all the quotations without assigning reasons thereof.

Technical and commercial bids should be submitted separately in sealed covers by **28<sup>th</sup> Nov 2011, 5-30 PM** Indian standard time to the following address:

Attn of:

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