

NATIONAL INSTITUTE OF TECHNOLOGY

TIRUCHIRAPPALLI – 620015

DEPARTMENT OF MECHANICAL ENGINEERING

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TENDER DOCUMENT

Tender Notification No.: NITT/Mech/Materials Characterization Lab/Micro Measuring Instruments/2012

Dated: **16.05.2012**

Name of the Item	Micro Measuring Instruments
Quantity Required	01 each
Delivery	Within four weeks from the date of purchase order delivery
Last Date of submission of quotation	31.05.2012 up to 3.00 p.m.
Date of opening of quotation	31.05.2012 at 3.30 p.m.



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NOTICE INVITING QUOTATION

The National Institute of Technology, Tiruchirappalli (NITT) is an autonomous body under MHRD, Government of India, University, imparting Technical Education and engaged in Research Activities. It is proposed to procure the following equipment for the departmental academic/research activities.

Sealed quotations are invited for the following equipment subject to the following terms and conditions, from the reputed manufacturers or their authorized dealers so as to reach this office on or before scheduled date and time. The Quotations will be opened on the same day in the presence of the Registrar.

Requirement: Micro Measuring Instruments– 01 No. each

Item no. 1 : PIEZO ACTUATORS

Specifications	
Open-loop travel	90 μm $\pm 20\%$
Closed-loop travel	90/- μm
Integrated feedback sensor	SGS/-
Closed-loop / open-loop resolution	1.8/1.9 nm
Static large-signal stiffness	10 N/ μm $\pm 20\%$
Pushing forces to	1000 N
Pulling forces to	50 N
Max. torque limit (on tip)	0.35Nm
Electrical capacitance	9.0 μF $\pm 20\%$
Dynamic operating current	12.5 $\mu\text{A}/(\text{Hz. } \mu\text{m})$

coefficient (DOCC)	
Unloaded resonant frequency	6 kHz \pm 20%
Operating temperature	-20 to +80 °C
Voltage connection	LEMO
Sensor connection	LEMO
Length L	122 mm \pm 0.3

Operating Conditions:

- Closed-loop models can attain linearity up to 0.15% and are shipped with performance reports.
- Resolution of piezo actuators is not limited by stiction or friction. Value given is noise equivalent motion with E-503 amplifier
- Dynamic small-signal stiffness is ~ 30% higher.

Recommended amplifiers / controllers

- Compatible with Single-channel: E-610 servo-controller / amplifier, E-625 servo-controller, bench-top, E-621 controller module.
- Single channel: modular piezo controller system E-500 with amplifier module E-505 (high-power) and E-509 controller.

Item No. 2 : PIEZO AMPLIFIER

Model	E- 610.00
Function Piezo Amplifier	Piezo Amplifier, 1 Channel, OEM Module
Amplifier	
Control input voltage range	-2 to +12 V
Output voltage	-30 to 130 V
Peak output power	18 W (< 15 ms)
Average output power	10 W
Peak current	180 mA (< 15 ms)
Average current	100 mA
Current limitation	Short-circuit proof
Noise,	1.6 mVrms
Voltage gain	10 ± 0.1
Input independence	100 kΩ
Interfaces and operation	
Input / Output	32-pin (male) on rear panel, (DIN 41612 / D)
Piezo connector	LEMO
Sensor connection	Yes
Miscellaneous	
Operating temperature range	+5° to +50° C
Dimensions	7HP/3U
Mass	0.3 kg
Operating Voltage	12 to 30 V DC, stabilized
Current consumption, max.	2 A

Item No. 3 : STEREO COIN MICROSCOPE

- 3.5X-45X super wide zoom magnification power
- Intensity- and light- direction variable cool, even and bright 144-LED illumination
- 3.0 Megapixel high resolution USB2.0 color digital camera
- Saves still images in BMP, TIFF, JPG, PICT, PTL and other formats
- Advanced editing & measuring software compatible with Windows XP/Vista/7

Item No. 4 : GRIP FORCE SENSOR

Input parameters	Voltage excitation	1-10V DC or AC
	Recommended voltage excitation	< 6V
	Resistors Value	1000Ω ± 25%
	Resistance matching	±10%
	Deflection of the beam at full scale (FS)	~70μm
	Load at tip of the beam at FS	0.12N (12.2gram)
	Safe overload	120% of FS
Output Parameters 25°C	Full scale output (FSO)	30mV/V ±30%
	Gauge factor of individual resistors	55 - 70
	Non-linearity (typical)	±0.25% FSO
	Hysteresis (typical)	±0.1% FSO
	Temperature increase by internal power dissipation	0.25 °C/mW in oil, 1 °C/mW in free air
	Breakdown voltage between resistors	min. 15V
Environmental Parameters	Temperature range (operating and storage)	-55 °C to + 125 °C
	Temperature coefficient of individual resistors	0.8 x10 ⁻³ / °C ± 25%
	Thermal zero shift	±0.02% FSO/ °C
	Thermal sensitivity shift	-0.17 ±0.05% of reading / °C
	Natural resonance frequency (in air)	~12kHz
Electrical Insulation	Isolation voltage between header and leads	minimum 200 V DC

Mechanical Data	Modules of elasticity	1.6 x 10 ⁵ N/mm ²
	Spring constant at full length (typical)	2 N/mm
	Weight approximate	120 mg
	Total sensors length	10mm
	Sensor element length	5mm
	Electrical connection wires (length)	30mm
	Diameter of header	1.8mm

Item No. 5 : MICROFORCE SENSING PROBE

Specifications:

- Unique force sensing range (5 nN to 10 mN)
- Optimized technology for microforce sensing (parallel sensor motion/no tip slippage)
- Fast microforce sensing: can measure force at a bandwidth of up to 8 kHz
- Sensors are individually calibrated which results in unmatched accuracy
- Repeatable outputs during its entire lifetime (no performance degradation/change in its calibrated sensitivity over more than 100000 load cycles)
- Insensitive to changes in the environment (temperature, humidity)
- Low output signal drift (highly stable)
- Low cross-sensitivity to off-axis forces (highly selective)
- High aspect ratio, customizable sensor probes (axial force application)
- Sensor probe can be set to an electric potential
- 300% full-scale overload protection
- Air, liquid and vacuum compatible (application inside a SEM)
- FT-WSO1 force sensing software

Terms & Conditions

1. The item to be used is strictly according to the specification and subject to test by the Institute/concerned authorities. It must be delivered and installed in good working condition.

2. The bidder should give details of their technical soundness and provide list of customers of previous supply of similar items to Universities, Institutes or Government Departments / Undertakings / public sectors with contact details. The details of the agency/profile should be furnished along with the copy of all related documents.
3. **Payment:** No advance payment will be made. Payment will be made only after the supply of the item in good and satisfactory condition and receipt of performance security by supplier. In case of imports, the payment will be made through LC after installation and performance security need to be submitted at the time of LC commitment.
4. Rate shall be inclusive of all taxes. The Institute is eligible for customs duty and excise duty exemption.
5. The sealed cover should be addressed to

**The Director,
National Institute of Technology,
Tiruchirappalli – 620 015**

The cover should be subscribed with the following details:

1. **Kind Attention to Dr. T. Ramesh, and Prof. N. Sivashanmugam, Assistant Professors / Mechanical Engineering.**
2. **Quotation Notification No.**
3. **Date of Opening**
6. The clear specification, make, model range etc of product shall be mentioned in the quotation.
7. Guarantee and Warrantee period should be specified.
8. Period required for the supply and installation of item should be specified.
9. The Director reserves the right to reject any or all the offers without assigning any reasons thereto.
10. Time for completion of supply after placing purchase order: One month
11. Last Date of submission of quotation: 30.05.2012
12. Place, Date and time of opening of Quotations

**Date : 30.05.2012
Time : 3:30 PM
Venue : Director Office**

13. Note: The Institute shall not be responsible for any postal delay about non-receipt / non delivery of the bids or due to wrong addressee.