

Indian Institute of Technology – Kanpur
Department of Biological Sciences & Bioengineering

Enquiry Number: BSBE/AK/2017-2018/NC-03;

Dated: 16-10-2017

Sub.: Inquiry for the supply of: “MECHANICAL TESTING EQUIPMENT (TENSILE/COMPRESSION TESTING MACHINE)”

Opening date: October 16, 2017 at 10:00 AM

Closing date: November 2nd, 2017 at 5:00 PM

Sealed quotes (technical bid and price bid separately sealed) are invited for the above-mentioned laboratory products as per the specifications given in the next page.

Your quote should mention/include the following:

- Maximum discount if any should be offered and mentioned.
- Quoted price should include the cost for installation, warranty, and required accessories.
- Validity of the quote at least for 90 days.
- FOB (indicating port of shipment) and CIF (New Delhi) values should be quoted separately if import is required. For quotes in INR, the price quote should be for delivery at Kanpur.
- The quote should cover insurance for transport up to Kanpur.
- Indian agency commission if applicable (should be certified by the principal if no agency commission is applicable) in case of import.
- Authorization certificate from the principal if you are a local agent.
- Terms and conditions for the payment, including the banker’s name of the principal and the account number, if any, for electronic transfer.
- Include proprietary item certificate if applicable.
- Technical literature to support your product (in technical bid).
- Users’ list with contact address in technical bid.

Note: Only principal manufacturers or authorized representatives are requested to send the quote along with proper certificates. The envelope should be marked as “Quote for MECHANICAL TESTING EQUIPMENT (TENSILE/COMPRESSION TESTING MACHINE)”

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“MECHANICAL TESTING EQUIPMENT (TENSILE/COMPRESSION TESTING MACHINE)”: Quantity (1)

GENERAL SPECIFICATIONS

Quotation should be submitted in Two Bids- Technical and Financial, both put in a separate envelope.

For Imported systems FOB Cost should be quoted in the currency of the origin country.

The testing instrument shall consist of a **5 kN capacity Load frame, a Load weighing system, and Software for machine control, data acquisition and data manipulation.** All of these components must be fully integrated and supported by the vendor. The Supplier should have supplied the same series systems to IITs, NITs. Following should be the general specifications for **5 kN UTM** consisting of following sub major items:-

A. LOADING FRAME:-

1. The loading frame shall be capable of tension, compression, flexure, it must include a digital closed loop command and feedback motion control system with a **high performance DC permanent magnet brushed servo motor.**
2. For lateral stiffness and robustness purposes, Guidance columns should be there along with Lead Screw. These Lead screws should be preloaded for backlash elimination.
3. The vertical Test Space (distance between the upper surface of the base platen to the bottom surface of the moving crosshead) shall be at least **1380 mm** for load cells, grips and fixtures.
4. The total height of the load frame shall be a minimum of **1625mm.**
5. The maximum load capacity shall be at least **5kN.**
6. The speed range should be **0.05 mm to 1000 mm per minute** and shall be settable continuously. The return speed should be at least **1000 mm/min.**
7. Maximum force at full speed should be at least **5 kN** and Maximum Speed at Full force should be at least **1000 mm/min.**
8. The steady state speed accuracy shall be **+/-0.2%,** of set speed measured over full speed range.
9. The system should be operated with Single Phase AC voltage and power consumption must not exceed **300VA.**
10. The systems should conform to all relevant European standards and carry a CE mark positively.
11. System should be able to withstand the operating temperature range of **10 degree C to 38 degree** and a storage temp of **-40 Deg C to +66 Deg C.** Humidity range **10 to 90 %** Non-Condensing.
12. The frame must communicate to the computer through an **Ethernet interface** to give a high data transmission rate from system to PC.
13. For Safety Purpose, the frame shall include **the two limit switches** on the frame, each of them having two levels of micro switches.
14. **40,000 Hz A/D** Sampling Rate for all channels and 32-bit Digital Signal Processor.

15. Weight of the system with typical Load Cell should **not exceed 55 kgs.**

16. Self-Diagnostics Feature is a must.

B.LOAD CELLS: -

1. A load cell of **5 kN and 50 N capacity** should be given with the system.
2. The Load Cell should be able to withstand **150% static rating load** without permanent zero shift AND **300% static rating without mechanical failure**. The load cell should allow the user to zero out the weight of the fixtures up to 50% of the load cell capacity
3. Load cell and extensometer transducers should include self-identification (recognition) electronics in the connector directly attached to these transducers which automates the calibration of these devices. System should allow **for manual calibration of third party transducers also**.
4. The load weighing system accuracy shall be within **+/-0.5%** of reading down to **1/200th** of the load cell capacity and **within 1 % from 1/200th to 1/500th** of the capacity for both load cells.
5. The Least count of **5 kN Load Cell** should be **less than 1 gram**.
6. Linearity should be **< ±0.25%** of reading over a range of **1% to 100%** of load cell static rating
7. Repeatability **< 0.25%** of reading over a range of 1% to 100 % of load cell static rating
8. The residual indicated force after removing a series of forces is not greater than **±0.05%** full rated output
9. Hysteresis **0.1%** of full rated output
10. Compensated Temperature range should be **0 deg C to 50 Deg C**.
11. Zero Recovery should be **0.1%** of reading over 3 minutes

C. SOFTWARE

1. Main features

- a) The software must have multi levels of user access based on loginname(s) and password(s).
- b) The testing software must be able to **perform tensile, compression, flexure, peel, tear, friction and simple cyclic tests and includes an appropriate calculation list for each type of test**.
- c) Digital displays on the computer monitor should **show liveload, displacement, and optional strain values** engineering units that can be selected to be Metric, S.I., U.S. customary Up to 4 live display windows shall be available for display simultaneously.
- d) The control software shall include set-up of the following: test speed, limits on all channels, one step calibration and balance of transducers, specimen dimensions, and results tables at a minimum.
- e) There should be a provision of at least one result table, one graphs in the method design screen.
- f) To help simultaneous view of several results, Provision for extra live displays on display screen of software while test is in progress is a must.
- g) The Facility of **CUSTOMIZED REPORT CREATION** is a must.

- h) The software shall allow the user to be prompted during testing and **provide a mechanism for the user to select images or video clips** to be included in the prompt area when running tests.
- i) There should be a provision to copy the graph and results table from the main test screen to any **microsoft application like Ms Word, Ms Excel, etc.**
- j) Main Test Screen must have a separate window provision of the Real Time Display of the Raw Data being collected while test is in progress.
- k) For detailed view, Unlimited Zooming in/out feature in Graphs is a must.
- l) There should be a provision to display Result Table and Graph in the main screen.
- m) Facility to program an Audio alert is required in software.
- n) Feature of addition of a video clip and picture to provide additional guidance to operator.
- o) Automatic Export of results or reports to an e-mail address, database, printer or a network drive is required in software.
- p) Ability to build own formulae and expression builder feature.
- q) Real Time Calculation in Live displays is a must.

2. **Data acquisition**

- a) Run time screen must be capable of displaying both the “real time graph” and the “calculated results” of multiple specimens simultaneously.
- b) The control software shall be capable of acquiring data at 500 Hz across load, displacement, and up to two optional strain channels.
- c) A real time X-Y plot of two selected variables should be displayed
- d) Test control software must be able to automatically store raw data or calculated results in an Excel format.
- e) The software shall offer the multiple user inputs:
- f) Provision of display of analog meters on Load, Extension, Strain Channels.

3. **Data manipulation**

- a) The software should have PDF reporting format.
- b) The software must include the capability to define correction factors such as machine compliance, slack, pretension, load and gauge length.
- c) The ability to re-analyze past test data using different calculations must be provided.
- d) Replay feature of already conducted tests with altered method parameters.
- e) The software shall allow the user to define the company logo as a part of the method and on the report also.

D. Pneumatic Tensile Grip

1. **250 N** capacity Pneumatic Grips with dual side actuation principle should be provided for tapes, films, foils, threads, plastic tapes, fine wires and soft materials
2. Rotatable air inlet and Maximum operating Air pressure should be 90 psi

3. Overall width should not exceed **70 mm**.
4. Overall length should not exceed **125mm**.
5. Overall weight should not exceed **350 grams**.
6. It should have jaw face shields to prevent finger pinching hazard and this shield must have a central notch and graduation marks for centering and best alignment of specimens.
7. Temperature range **-20 deg C to +100 deg C**.
8. Facility for local and remote operation
9. Smooth Jaw faces with swivel arrangement in both, vertical and horizontal axis.

E. Tensile Grips for rigid materials

1. Basic Screw Side Action Grips with Jaw Faces, capacity – **5kN**
2. Specimen Thickness up to **15 mm**.
3. Dual Acting Screw Design
4. Weight should not be more than **1.25 kgs**.
5. Type of loading- Tensile, Static and tension-tension cyclic tests.
6. Left and Right, both handed operation design.

F. FLEXURE FIXTURE :-

1. The Flexure Fixture should have a capacity of **5 kN**.
2. It should conform to **ASTM/ISO and DIN Standards**.
3. Lower Rollers should have an adjustable span distance from **10 to 200 mm**.
4. It should be able to withstand a temperature range from **-100 degrees C up to +350 degrees C**.
5. It should be able to handle Type of loading: Static flexure, cyclic flexure tests.

G. COMPRESSION PLATENS:-

1. Compression platens with **Dia 50 mm** should be provided.
2. The temperature range should be **-70 deg C to +315 Deg C**.
3. Hardness should be **55-65 HRC**
4. Overall height should not be more than 50mm.

H. SERVICEABILITY AND SYSTEM STATUS

1. Annual maintenance contract (AMC) for two years should also be quoted.
2. Factory trained service engineer must be available for additional training or warranty service.
3. The supplier shall install the system and provide basic on-site training