Tender Notification for Procurement of ONE "Universal Testing Machine (UTM)" at IISc
(Last Date of Submission of Tenders: 5:00 PM, 24th April 2020)

Dear Sir/Madam,

To accomplish the goals set in a Department of Science and Technology, Government of India funded project, we are looking for a computer controlled universal testing machine (UTM) with a minimum capacity of 20kN capacity. The UTM should be able to carry out static tensile, compression and bending tests on metallic samples (such as Al alloys, steels, superalloys, etc.) and non-metallic systems, such as ceramics and polymers. As an option, the system should be capable of upgradation to add a high temperature furnace for operation up to 1000 °C in near future. The system should be fully integrated comprising state-of-art hardware-software control and appropriate data analysis tools. Below, the detailed technical specifications of an ideal machine are mentioned.

TECHNICAL SPECIFICATIONS

Item	**Specification(s)**
Testing standards	All ASTM and ISO and other equivalent international standards. A certificate for the same should be supplied.
Load frame	Vertical, dual column rigid frame (both vertical and lateral) Easy access for mounting of samples and dismantling, grips changing, furnace positioning and extensometer positioning.
	The load capacity: ± 20kN
	Width of the load frame: ≥ 600 mm Depth of load frame: ≥ 550 mm
	Total crosshead travel: ≥1350 mm
	Stiffness of the frame: ≥ 60 kN/mm
	Crosshead Speed range: 0.0005-1000 mm/min (or equivalent, providing a range of ~7 orders)
	Accuracy of crosshead speed: ± 0.05% of set speed measured over full speed range or better
	The moving crosshead shall be driven by precision screws with zero backlash.
	Load frame should fulfil the CE conformity guidelines a per 2006/42/EG
Controller	A digital closed-loop command and feedback motion control system with a high-performance AC brushless servomotor
	Limit switches to set a limit on crosshead travel
	Drive system travel resolution: ≤ 0.5 nm
	Drive system positioning and repetition accuracy: ±2 μm or better
	In addition to computer control, an operator panel for running and stopping tests should also be provided
	A failsafe emergency stop switch should be provided

	24-bit actual resolution with a data acquisition rate of 400 kHz or better
Load Measurement	A single 20 kN capacity pancake type strain gauge-based load cell for both tension and compression.
	Load range: 0.4 to 100% of the capacity Force measurement should confirm to ASTM E4, ISO7500-1 Standards.
	Load accuracy: 0.5% to ISO 7500-1 or equivalent ASTM standard
	Overload capacity without permanent zero shift: 150% of the capacity or better
	Load cells should be able to resist the unnecessary parasitic influences like bending moment, torque, temperature fluctuations and humidity
	Limiting bending moment: ≥ 200 Nm
	Load cells should be calibrated as per international standards Supplier should be able to calibrate the load cells as per compliance to NABL norms in future
Mechanical Grips (Tensile tests)	Capacity: 20 kN or more
	Temperature range: -60 to 250 ºC
	Maximum opening: ≥ 25 mm
	Option: High temperature 20 kN mechanical grip (25 mm opening) with appropriate pull rods that can go up to 1000 ºC (Material: MAR M 246/ 247 or equivalent) in place of the abovementioned pull rod-mechanical grip assembly
Software	Ability to perform tensile, compression, flexure tests Include appropriate calculation list for each type of test as per relevant international test standards (a list of standards should be provided)
	Graphical user interface based, meeting all of MS Windows standards
	Capable of controlling the movement of the crosshead as a function of load, stress, strain or true strain in addition to displacement control.
Data acquisition and analysis	Sampling frequency: 500 Hz or more for load, displacement, up to two optional temperature channels and up to four optional strain channels. Data rates should not be affected by the number of temperature and strain channels connected.
	Real time display of graph and calculated results simultaneously.
	Test control software must be able to automatically store raw data and calculated results in an ASCII file. Data should be easily exported to Excel
	Capability to define correction factors such as machine compliance, slack, pretension, load and gauge length.
	The ability to re-analyse past test data using different calculations must be provided. The software should have the capability to save the test method along with the start position, limit positions etc. so that the machine automatically comes to the start position for testing when the file is opened.

Power	230 V ± 10% (1Ph), 50/60 Hz.
Safety	The testing machine should satisfy relevant safety requirements for testing systems A list of same should be provided
	Automatic shutdown: There must be a provision to automatically shut off the electrical power to the machine when the specimen breaks
Training and User Manuals	Training: 5 personnel need to be trained by qualified personnel of the supplier during the time of installation and commissioning (i.e., at Indian Institute of Science, Bangalore)
	User manual (both operation and maintenance) and certificates: 1 soft copy in a CD/DVS/USB and 1 hard copy (optional but will be highly appreciated) of the detailed user manual, complete with circuit diagrams (mechanical, electronic and electrical) and calibration certificates.
	Installation files: Installation DVDs/USB for the PC and the software shall be supplied along with the equipment.
Warrantee and post-supply services	Warrantee: 1 year. The supplier will be responsible for service and supply of any parts that may become faulty.
	AMC (Optional): Cost of two-year AMC after warranty should be provided.
	Service: The supplier should have an office or an associate (agent) in India to provide after sales service, support and maintenance. Undertaking shall be given for provision of after sales service, software updates and spares for a minimum period of 10 years after warranty.
Pre-installation preparation at IISc	Detailed pre-installation requirements and delivery period should be explicitly mentioned without any ambiguity. The quotation must clearly specify make and model of the equipment. All relevant technical literature / brochures, application notes and specifications must also be provided.
Installation and Commissioning	To be done by supplier
Acceptance Criterion	The supplier has to demonstrate all the functions of the system according to the specifications after successful installation at IISc
Track Record of Supplier	Supplier must have installed and commissioned at least 5 same or similar capacity of machines in last three years in IISC/IIT's/NIT's/ CSIR labs or DRDO. Details and installation certificates to be provided along with the technical bid.
Spares (optional)	The vendor should quote for the most common spares that will be required for 5 years of smooth operation after warranty (mention the spares, cost & use of individual items. The quoted prices must be valid for a minimum period of 3 months from the date of opening of the bid.

TERMS AND CONDITIONS

1. Two-bid system (separate technical and financial bids) in sealed tenders.
2. The technical bid must clearly specify the prescribed technical specifications without including the prices. Please provide in detail the specifications under each subhead and bullet point. Unique characteristics may be highlighted.
3. Vendors who include price information in the technical bids will be automatically disqualified.
4. IISc may ask for 3 or more independent reference letters from users in India. The committee will have right to reject a bid based on reference letters.
5. The financial turnover of the equipment manufacturer in the previous financial year should be more than or equal to 10 times the total order value. The bidder shall furnish specific details of the company performance.
6. Technical bids will be opened first. IISc may seek clarifications after opening of technical bids and may ask vendors to perform some example experiments on the samples given by IISc to demonstrate the promised technical specifications. Vendors may be required to give presentations.
7. There are several items that require detailed information to be provided by the supplier. If information is not provided against any of these items, this will disqualify the supplier.
8. After technical evaluation by a committee, vendors may be asked to re-quote in a specific format to facilitate comparison of prices.
9. Price bids of only technically qualified vendors will be considered.
10. The price bids must offer CIF Bangalore prices.
11. Prices to be quoted separately for baseline system and options. Prices should be quoted in adequate detail with relation to packing details to cover insurance compensation in case of damage to any specific modules
12. Indicate separately price of spares listed above in terms of unit cost. The price of these spares will be included in the price comparison. Any additional spares recommended by the company will be considered for ordering but not included in the comparison. The buyer reserves the right to make the final decision on ordered spares.
13. IISc also reserves the right to cancel the tender at any time without assigning any reason whatsoever.
14. Indicate delivery period
15. Order will be placed on lowest bid from technically qualified vendor
16. The tender documents can be sent at the following address:

    The Chairman
    Interdisciplinary Center for Energy Research (ICER)
    Indian Institute of Science, Bangalore 560012
    Karnataka (INDIA)
    Attn: Professor Praveen Kumar