



**NATIONAL INSTITUTE OF TECHNOLOGY  
ROURKELA-769008 (ODISHA)**

An Institute of National Importance under Ministry of HRD, GOI

**NOTICE INVITING TENDER**

**Tender Notification No: NITR/PW/CR/2019/128**

**Dated: 25/06/2019**

The National Institute of Technology, Rourkela invites bids from the eligible bidders for procurement and installation of **Universal Testing Machine** at NIT Rourkela.

Last date of Submission of Bid : **23/07/2019 at 11:00 AM**

Date of opening of techno-commercial Bid : **24/07/2019 at 11:00 AM**

**For Details:** [https://nitrkl.ac.in/OldWebsite/Jobs\\_Tenders/9Equipment/Default.aspx](https://nitrkl.ac.in/OldWebsite/Jobs_Tenders/9Equipment/Default.aspx)

**Contact:** Dr. Arindam Paul, Ceramic Engineering; Ph: +91-661-2462215;

Email: [paula@nitrkl.ac.in](mailto:paula@nitrkl.ac.in)

Bidding through: <https://eprocure.gov.in/eprocure/app>

**Sd/-  
REGISTRAR**



**NATIONAL INSTITUTE OF TECHNOLOGY  
ROURKELA-769008, ODISHA**

(OPEN TENDER NOTICE NO.: NITR/PW/CR/2019/128

Dated: - 25/06/2019)

**(PROCUREMENT OF UNIVERSAL TESTING MACHINE)**

Item No	Description	Quantity
1	Universal Testing Machine	01 Unit

- Quantity required : **As mentioned above (All information regarding technical specification provided in the Annexure-I)**
- Delivery : Within **90 days after dispatch of goods on opening of L/C** from the date of purchase order
- Last Date of submission of bid** : **23/07/2019 at 11:00 AM**
- Date of opening of techno-commercial bid** : **24/07/2019 at 11:00 AM**
- The firm should not have been black listed at any time.
- The submission of following bids by the tenderer should be through <https://eprocure.gov.in/eprocure/app> .Please follow the guidelines as per the portal.

**Procurement of Universal Testing Machine**

**Tender Notice No.: NITR/PW/CR/2019/128 dated: 25/06/2019; Due on 23/07/2019 at 11:00 AM**

- Liquidated damage clause** will be charged for any delay in supply of goods.
- The validity of the tender shall be **120 days** from the date of opening of the bids.
- Detailed advertisement including all tender documents is also available in our website at [http://nitrkl.ac.in/OldWebsite/Jobs\\_Tenders/9Equipment/Default.aspx](http://nitrkl.ac.in/OldWebsite/Jobs_Tenders/9Equipment/Default.aspx) .
- NIT reserves the right to qualify or deny prequalification of any or all applicants without assigning any reasons.

**(REGISTRAR)**  
**NIT, Rourkela**  
**Fax No- 0661-2462022**  
**Ph. No -0661-2462021**

**Specifications for 'Universal Testing Machine'**

<b>Sl. No.</b>	<b>Description</b>		
<b>1.</b>	<b>Function</b>		Minimum 10kN capacity, computer controlled, floor standing rigid Universal Testing Machine to carry out static tensile, compression, bending tests. It should be equipped with high-resolution digital AC servo motor, non-backlash precision ball screws and timing belts. The system should be capable to also have environmental chamber for operation between -70°C to 250°C. The system shall be provided with software for machine control, data acquisition and data analysis. All of these components should be fully integrated and supported by vendor.
<b>2.</b>	<b>Applications</b>	2.1	The machine should be capable of carrying out Tensile, compression and flexure tests on ceramic samples and various non- metallic materials.
<b>3.</b>	<b>Standards</b>	3.1	The machine should comply with all ASTM / ISO and any other equivalent international standards for tension, compression, flexural, shear tests for metals and non-metallic materials at ambient as well as at sub temperature.
<b>4.</b>	<b>Loading Frame and Controller</b>	4.1	The machine should have robust construction having dual column frame which is vertically oriented with easy access for the job mounting and dismantling, grips changing, furnace positioning, extensometer positioning.
		4.2	It should include a digital closed loop command and feedback motion control system with a high performance, AC brushless servo motor.
		4.3	The moving cross head shall be driven by two precision screws each with dual preloaded nuts providing zero back lash.
		4.4	For lateral stiffness and robustness purposes, the load frame shall include adequate diameter rods for the moving cross head to ride on.
		4.5	The frame shall include dual level limit switches on the front of the frame that prevent the cross head from travelling too high or too low.
		4.6	Total crosshead travel should be more than 1350 mm

		4.7	The load capacity : $\pm 10\text{kN}$
		4.8	Stiffness of the frame should be $>47\text{kN/mm}$
		4.9	Crosshead Speed range: 0.0005-1960 mm/min, with a speed accuracy of greater than $\pm 0.1\%$ of set speed measured over full speed range.
		4.10	Crosshead return speed at least 2500 mm/min
		4.11	The load frame shall include an operator panel which can be used to run and stop tests at frame as opposed to through the PC and software.
		4.12	The system should include bright red emergency stop switch. For safety purposes, the system shall not restart the cross head moving when the emergency stop button is released.
		4.13	Interface to a standard PC with an industry standard Ethernet connection with a data transfer rate of 2kHz.
		4.13.1	Resolution 24 bit with a data sampling frequency of 400kHz or better.
		4.13.2	The Specimen protect feature to avoid overloading of samples while gripping.
		4.13.3	Automatic safety stop feature while freely positioning the system by user defined limits to prevent accidents/injuries.
<b>5.</b>	<b>Measurement Transducer</b>		
	<b>5.1 Load</b>		Load Measurement through a single <b>10 kN &amp; 500 N</b> Capacity, Pan Cake type strain gauge load cell for both tension and compression applications. The smaller load cell can be directly mounted on the larger load cell without any tools.
		5.1.1	Load Range 0.2% to 100% of the capacity, force measurement should confirm to ASTM E4, ISO7500-1 Standards.
		5.1.2	Load Accuracy $\pm 0.1\%$ of the full scale
		5.1.3	Load resolution : $1/\pm 900,000$ of capacity or better
		5.1.4	The load cell shall have an over load capacity without permanent zero shift of 150% of the capacity
	<b>5.2 Displacement</b>		Displacement measurement through suitable transducer
		5.2.1	Displacement Accuracy $\pm 0.02$ mm of the displacement

		5.2.2	Displacement Resolution 0.001 $\mu\text{m}$ or better
	<b>5.4 Calibration of transducers</b>		All transducers and thermocouples should be calibrated to traceable international standards
	<b>5.5 Self-recognition electronics</b>		All transducers available for the system shall include self-identification (recognition) electronics in the connector directly attached to these transducers which automates the calibration of these devices.
<b>6.</b>	<b>Flexure Kit/Compression Platens</b>	6.1	The machine should have versatile removable grips and fixtures so that it can change quickly to meet variable requirements in tension, compression, flexure, peeling, tearing, punch, shearing etc.
		6.2	A 3 Point bend test kit (20kN) for testing metals must be quoted with span length separation 4...250 mm and test travel of 40mm minimum. Flexure fin and supports radius 2 and 4.5 mm respectively, Temperature range -70 ... +250 °C. The device should include a tool to easily position the sample in the center of the test axis.
		6.3	A set of compression platens round with about 30 and 90mm diameter must be quoted. These must be mounted on either of the 2 load cells.
<b>7.</b>	<b>Software</b>		
	<b>7.1 Test frame control</b>	7.1.1	The control software shall be a true graphical user interface meeting all of the Microsoft Windows standards (OS: Windows XP, VISTA or windows 7, windows 10).
		7.1.2	The software must have multi levels of user access based on login name and password.
		7.1.3	The testing software must be able to perform tensile, compression, flexure tests and include appropriate calculation list for each type of test as per relevant international test standards (ASTM E 8M, E9, ASTM E 517, ASTM E 646, ISO 6892-1, ISO 10275, ISO 37, ASTM D 412, ISO 572-1, ISO 34, ASTM D 3574 etc.) for tensile, compression, flexure, cyclic and tear tests.
	<b>7.2 Tension test software</b>		The Tension Test software shall provide test control and result calculations required for most tension testing requirements. The tension test software shall display the results such as Yield Stress, Ultimate Tensile strength, Modulus of Elasticity, Upper Yield Strength, Lower Yield strength, Non- proportional elongation, 0.2% elongation, % Plastic Elongation, total

			elongation at rupture, stress-strain Diagram, Load-elongation diagram, elongation to rupture, creep/Relaxation etc.
	<b>7.3 Compression test software</b>		The Compression Test software shall provide test control and result calculations required for most compression testing requirements. System shall display the results such as compression stress, elasticity limit value, proportional limit, Yield strength, modulus of elasticity, Compression Strength at X%, Stress-strain diagram, load elongation diagram, Creep/Relaxation, etc.
	<b>7.4 Enhanced control</b>		System shall be capable of controlling the movement of the crosshead as a function of load, stress, strain or true strain in addition to displacement control.
	<b>7.5 Data acquisition</b>	7.5.1	The control software shall be capable of acquiring data at 2KHz across load, displacement, and up to four optional strain channels. Data rates should not be affected by the number of strain channels collected.
		7.5.2	Run time screen must be capable of displaying both the real time graph and the calculated results of multiple specimens simultaneously.
		7.5.3	Test control software must be able to automatically store raw data or calculated results in an ASCII file. Data should be easily exported to Excel.
	<b>7.6 Data control in software</b>	7.6.1	The software shall offer the following calculations: Maximum Peak (all available channels), Minimum Peak (all available channels), Specimen Break Point (all available channels), Yield (Zero slope, Offset and Energy at Yield), Modulus (Secant, Tangent, Automatic Young's, User-defined Young's, Chord).
		7.6.2	The software must include the capability to define correction factors such as machine compliance, slack, pretension, load and gauge length.
		7.6.3	The ability to re-analyse past test data using different calculations must be provided.
<b>8.</b>	<b>Computer with printer</b>		The machine should be supplied with PC for control of UTM. It should have following configuration or better. [Computer Configuration: 8 GB RAM, 2 TB hard drive, Windows 10 operating system]
<b>11.</b>	<b>Power</b>		230 V +/-10% (1Ph, N, PE), 50/60 Hz.
<b>12.</b>	<b>Manual</b>		Both operation and maintenance manual should be supplied with the machine

**Details of the configuration and deviation must be provided along with technical bid**

**Other Terms and Conditions**

1.	<b>Installation and Commissioning</b>		To be done by supplier
2.	<b>Training</b>		To be done by qualified personnel of the supplier
3.	<b>Warranty</b>		<b>Comprehensive warranty of 2 years.</b> The supplier will be responsible for supply any parts that may become faulty. The warranty will be effective from the date of successful installation at NIT Rourkela.
4.	<b>General Points</b>	4.1	Please give detailed specifications, catalogues, list of users & technical details, pre-installation requirements, delivery period etc. very explicitly 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 adequately explaining and confirming compliance of the features of the model of the equipment being quoted with those given in the tender enquiry. Without this, the quotation may be liable to be rejected. If there are features in the quoted equipment which are better than what are indicated in the enquiry, they must also be clearly explained.
		4.2	<p>Compliance Statement</p> <p>All manufacturers/suppliers must submit the compliance statement (in tabular format with column heads given below) along with the technical bid.</p> <p>a] NIT Rourkela's Enquiry specification, b] Specification of the equipment offered by the supplier, c] Compliance to NIT Rourkela's specification (yes/No), d] Details of deviation, if any, as per NIT Rourkela's specifications</p>
		4.3	<p>Offers must include sufficient technical documents in support of claims made.</p> <p>Statements like "conform/Comply/Yes" without supporting documents will not be considered for technical evaluation</p>
		4.4	At least three user name and detail contact from IITs/NITs/reputed Indian Institutes/Govt. Research organizations must be provided where the similar or higher capacity equipment has been supplied in last six years along

			with copy of purchase order.
		4.5	Certificate from OEM or its Indian representative to have a complete after sales service set up unit in India.
		4.6	If the bidder is not an OEM, the representative must submit a certificate from OEM for serving the same OEM in India at least for 5 years.
		4.7	Price should include installation and delivery of the Item to CIF Kolkata basis. Price should be quoted in foreign currency for imported items and in Indian rupee for indigenous item.

**Terms of Payment:** 90 percent of the total amount (contract value) will be paid through L/C against dispatch of goods, remaining 10 percent will be paid through wire transfer after successful completion of installation and testing.

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