



An ISO 9001  
Company

**Bharat Heavy Electricals Limited**  
(High Pressure Boiler Plant)  
Tiruchirappalli – 620014, TAMIL NADU, INDIA  
**CAPITAL PURCHASE / MATERIALS MANAGEMENT / MANUFACTURING**

<b>ENQUIRY</b>	Phone: +91 431 257 79 38 Fax : +91 431 252 07 19 Email : <a href="mailto:tvenkat@bheltry.co.in">tvenkat@bheltry.co.in</a> Web : <a href="http://www.bhel.com">www.bhel.com</a>
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	<b>Enquiry Number:</b> <b>2620700021</b>	<b>Enquiry Date:</b> <b>23.06.2007</b>	<b>Due date for submission of quotation:</b> <b>25.08.2007</b>
Your are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order			

Item	Description	Quantity	Delivery Schedule
10	Universal Testing Machine 1000 kN as per the technical specification & commercial conditions applicable (to be downloaded from web site <a href="http://www.bhel.com">www.bhel.com</a> )	1 No.	20.02.2008

**Note:**

**Confirmation of acceptance for BHEL commercial terms & conditions and Price Bid formats have been posted in BHEL Corporate web site [www.bhel.com](http://www.bhel.com) under Enquiry reference “2620700021”. Your offer should be based on all the above documents.**

Tenders should reach us before 14:00 hours on the due date  
Tenders will be opened at 14:30 hours on the due date  
Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present

Yours faithfully,  
For BHARAT HEAVY ELECTRICALS LIMITED

Manager / Capital Purchase / MM / Manufacturing

## **PART A**

### **QUALIFYING CRITERIA FOR THE SUPPLY OF UNIVERSAL TESTING MACHINE 1000kN capacity**

#### **SECTION – I QUALIFYING CONDITION**

The BIDDER / VENDOR has to compulsorily meet the following requirements to get qualified for submitting an offer for the impact tester.

<b>S. No.</b>	<b>REQUIREMENTS</b>	<b>VENDOR's COMMENTS</b>
<b>1.0</b>	The BIDDER / VENDOR shall have a minimum of FIVE Years of continuous experience in the Design, Manufacture & Supply of UNIVERSAL TESTING MACHINES (1000kN). Indicate the actual experience.	
<b>2.0</b>	The BIDDER / VENDOR shall have supplied at least one number of UNIVERSAL TESTING MACHINES (1000kN) in the last ten years in India. Indicate the number of equipments sold in India	
<b>3.0</b>	The BIDDER / VENDOR shall have supplied at least one number of UNIVERSAL TESTING MACHINES (1000kN) (of the MODEL quoted) within the last five years. Kindly confirm and indicate the number of equipments (quoted model) sold around the world.	
<b>4.0</b>	Performance Certificate from at least two customers for satisfactory performance of supplied equipment (one for the model quoted and one for any model of Universal Testing Equipment)	

#### **SECTION – II**

The BIDDER / VENDOR is requested to provide the following information:

<b>S. No.</b>	<b>PARTICULARS</b>	<b>VENDOR's RESPONSE</b>
<b>5.0</b>	Number of Years of Experience of the BIDDER/ VENDOR in the field of design, manufacture and supply of 'UNIVERSAL TESTING MACHINES'	

<b>6.0</b>	Number of UNIVERSAL TESTING MACHINES (1000kN) supplied, installed and commissioned till date, in the following category (in India and other Countries) a) up to 1000kN b) 1000 kN	
<b>7.0</b>	YEAR of LAUNCH of the Model quoted against this ENQUIRY	
<b>8.0</b>	Is there any other model launched after the quoted Model? Otherwise, indicate the likely year in which the next model is likely to be launched	
<b>9.0</b>	Number of UNIVERSAL TESTING MACHINES (1000kN) supplied, installed and commissioned till date in the QUOTED MODEL	
<b>10.0</b>	Number of UNIVERSAL TESTING MACHINES (1000kN) supplied, installed and commissioned till date for the following category of CUSTOMERS (within INDIA): c) Government Organisations d) Private Sector Companies [Large Scale Industries]	
<b>11.0</b>	Number of UNIVERSAL TESTING MACHINES (1000kN) supplied, installed & commissioned till date in the following Category (around the GLOBE): a) Universities b) R&D Labs c) Reputed Heavy Engineering Works/Manufacturing Firms	
<b>12.0</b>	Details on International Standards followed in Design of the Equipment (including Analysis Methodology and Calibration of Equipment)	
<b>13.0</b>	Comprehensive Details on Performance Testing – of the Equipment quoted, to be ensured in presence of BHEL Executives, before dispatch	
<b>14.0</b>	Details of Quality System followed (Kindly furnish the salient aspects of the QA system followed)	
<b>15.0</b>	Details on SERVICE-AFTER-SALES Set-Up in India including the addresses of Agents / Service Centres in India and Asia	

<b>16.0</b>	Any Additional Data to supplement the manufacturing capability of the BIDDER	
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### **SECTION – III**

The BIDDER / VENDOR to note the following:

<b>S.No.</b>	<b>REQUIREMENTS</b>	<b>VENDOR'S COMPLIANCE</b>
<b>17.0</b>	The BIDDER / VENDOR shall submit the offer in TWO PARTS - Technical [ <b>with PART A &amp; PART B</b> ] & Commercial and Price Bid.	
<b>18.0</b>	The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. A just 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	
<b>19.0</b>	The BIDDER / VENDOR shall assure a continuous support for SPARES and SERVICE for TEN Years, from the date of commissioning of the equipment at BHEL Works.	
<b>20.0</b>	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details of 'Bought-Out-Items' with copies of Product Catalogue and Selection Criteria	
<b>21.0</b>	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation	
<b>22.0</b>	The reference List of Customers to whom similar equipment has been supplied shall be accompanied with the details (Phone Number /E-Mail ID) of the CONTACT PERSON for cross reference by BHEL	

**PART B****TECHNICAL SPECIFICATIONS FOR  
SERVO HYDRAULICALLY OPERATED UNIVERSAL TESTING MACHINE 1000 kN**

<b>S. No.</b>	<b>PARTICULARS</b>	<b>BHEL SPECIFICATIONS</b>	<b>BIDDER's OFFER [with Complete Technical Details]</b>
<b>1.0</b>	Area of Application	Universal Testing Machine is meant for use in testing of Test specimens (Tensile, Bend, High Temperature Tensile) prepared from Test Plates taken out for Critical Pressure Parts coming in High Pressure Boilers, Castings and wide range of materials from Plain Carbon Steel, Low Alloy, Quenched & Tempered Steels & High Alloy Steels	
<b>2.0</b>	Principle of Operation	Application of Tensile/Compressive force by Servo Hydraulic System	
<b>3.0</b>	Design Base	The equipment shall meet all the requirements specified under <b>ASTM E4, E9 &amp; E21</b> (latest), <b>ISO 7500-1</b> ;(latest) (Calibration of the equipment along with accessories). The equipment is meant for testing as per <b>ASTM E8</b> .	
<b>4.0</b>	Equipment Configuration	The minimum desired features are enlisted below:	
<b>4.1</b>	Testing Capacity	1000 kN (Floor mounted) – Static	
<b>4.2</b>		Dual or Single test space design for tension and compression	
<b>4.3</b>		Motorized adjustable crosshead with controls	
<b>4.4</b>		Over-travel safety limit switches	
<b>4.5</b>		Independent strain gage load cell	
<b>4.6</b>		Protective Piston cover	
<b>4.7</b>		Backlash elimination system	
<b>4.8</b>		Antirust plated column	
<b>4.9</b>		Provision for maintaining the load accurately at different desired levels	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
5.0	<b>Frame Specification</b>		
5.1	Height of the UTM	2.6 meter max (preferred)	
5.2	Tension opening	At least 0 - 600 mm	
5.3	Compression Opening	At least 0 - 600 mm	
5.4	Horizontal opening	550 mm (approx)	
6.0	<b>Hydraulic Power Supply</b>		
6.1		Compact design to reduce floor space	
6.2		Gage for temperature & oil level	
6.3		Air cooling (preferred)	
7.0	<b>User Control Panel: It shall have:</b>		
7.1		User control panel to provide friendly flexible user interface conveniently mounted designed to work with the system software shall be provided	
7.2		Provision for ensuring zero load (actual load) on specimen after gripping before application of testing load.	
7.3		Test start/stop and return to start	
7.4		Reset position button	
8.0	<b>Operating Voltage</b>	230V± 10%, Single phase 50 Hz/ 400V± 10% 3 phase 50 Hz	
9.0	<b>Grips:</b> UTM shall be provided with following grips		
9.1		The machine should have semi open or fully open cross heads for easy loading and unloading of test specimens	
9.2		Hydraulically actuated grips	
9.3		Set of (4) Wedge Grips of jaws for flat specimens from 0 to 50mm thick by up to minimum 80 mm wide	
9.4		Set of (4) Wedge Grips of jaws for round specimens from diameter 6.0 to 85 mm.	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
9.5		Compression bridge assembly for use in UTM to permit the mounting of compression test fixture without the removal of the tensile grips and fixtures.	
10.0	<b>Extensometer</b>		
10.1		State-of-the-art Strain Gage Extensometer which can be removed from the specimen during the test	
10.2		25 & 50 mm gage length	
10.3		-10 to 10% maximum strain	
10.4		Accommodate round specimen diameter 1 to 15 mm.	
10.5		Flat specimen to 20 mm wide and 1 to 18 mm thick	
10.6		It shall satisfy the ASTM Specification E 83 Class B-1 or better.	
11.0	<b>Computer Based Data Acquisition System with Servo Control</b>		
11.1		Load, stroke and strain control and measurement channel	
11.2		Automatic recognition and calibration of transducers for different loads	
11.3		System of Units in SI	
11.4		Suitable data sampling rate and data logging rate on all channels (Vendor to specify)	
11.5		Single range system to eliminate range cross over transients	
11.6		AC excitation with synchronous sampling to reduce noise on transducer signals	
11.7		Load measurement accuracy $\pm 0.5\%$ of reading down to at least 1/250 of maximum load range	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
11.8		Strain measurement accuracy $\pm 0.5\%$ of reading down to 1/50 of full range with ASTM E83 Class B1 extensometer	
12.0	<b>High Temperature furnace:</b> It shall have the following features:		
12.1		Split type furnace	
12.2		Made up of SS shell and terminal covers	
12.3		1. Maximum Test Specimen temperature for testing: 1200°C 2. Vendor to specify & confirm the furnace temperature/ design to suit this 3. Furnace Rating (kW) – Vendor to specify	
12.4		Internal heated size: 60 – 80 mm diameter	
12.5		Height of the furnace shall be 250-300mm	
12.6		Power Supply: 230 $\pm$ 10% & 50 Hz	
12.7		3 nos. of suitable thermocouples for temperature control within the chamber	
12.8		Test Specimen Temperature shall be maintained to an accuracy of $\pm 1^\circ\text{C}$ and also the variation within the furnace	
12.9		The furnace shall reach the set temperature within 60 minutes from room temperature	
12.10		Furnace shall be provided with appropriate insulation capable of adequately withstanding the highest testing temperature	
12.11		Power shall be controlled by suitable <b>POWER CONTROL DEVICE</b> with Auto/Manual options	



S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
13.0	<b>Material Testing Software:</b> The basic software shall provide the following functions and features:		
13.1		The Personal Computer (PC) and printer for running the software, operating the PC controlled test system and printing the tensile testing graphs	
13.2		Vendor to furnish the complete specification of the PC and Printer, to suit the application	
13.3		Set up and configuration of the display screen and control panel	
13.4		Set up of limits and gain controls	
13.5		Security with user password	
13.6		Automatic calibration and balancing transducers	
13.7		User calculation creator for defining custom calculations	
13.8		Prompted test sequence creator	
13.9		Live routine test plots with automatic scaling zoom-in/out	
13.10		Loading units to be in kN. Provision for conversion load unit to N, Kg, ton, lb to be available. Displacement unit to be in mm, with provision for conversion to cm and inch	
13.11		Report generation with basic report templates	
13.12		Saving and retrieval of test methods and data	
13.13		Example of test methods for easy test creation	
13.14		User learning CD	
13.15		Tension test and compression test application package covering test control, result calculations for metals testing (including 0.2%, 0.5% Proof stress)	
13.16		Tests and graph packs	
13.17		Real time display for various kinds of curves	
13.18		Provision for drawing graphs for Load-Displacement, Load-Time, Stress-Strain, Displacement-Time etc as required	
13.19		Provision for displacement control	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
14.0	Accessories	BIDDER to list down (with UNIT RATE) the various ACCESSORIES to be procured with the EQUIPMENT to enhance the Operating Efficiency and Features of the OFFERED EQUIPMENT, over and above those mentioned in the SPECIFICATIONS.	
15.0	Spares for Main Equipment & Accessories	BIDDER has to list down the SPARES - essential Spares coming under the Category of Mechanical, Electrical & Electronic Spares for the Main Equipment as well for the essential and optional desirable Accessories. BIDDER to QUOTE with UNIT RATE for all the listed SPARES, to be procured with the equipment.	
16.0	Inspection	The Equipment & Spares shall be offered for Inspection by BHEL Engineers at the Supplier's Works of the Supplier, prior to dispatch.	
17.0	Installation and Commissioning	The Equipment with all Accessories is to be installed & commissioned at BHEL Works, FREE OF COST, by the Service Engineer of the SUPPLIER. (Civil Work & Materials are under BHEL Scope.)The same, if any, should be indicated by the supplier, in advance.	
18.0	Performance Prove-Out at BHEL	The supplier to arrange for the calibration of the Equipment & Accessories as per <b>ISO 7500-1: latest/ IS 1828 CI 1 (calibration of the equipment along with accessories)</b> at BHEL after installation, using Electronic Load Cell type calibrating equipment for load in both tension and compression mode, by any NABL accredited calibration agency.	
19.0	Documentation in ENGLISH Language	3 Copies of the Operation & Maintenance Manuals containing Electric Schematics, Circuit Diagrams, PCB Drawings, Trouble Shooting Charts, Mechanical Sub-Assemblies, Rating of Bought-Out Items, etc. shall be supplied, at the time of inspection by BHEL Engineers. In addition, one SOFT COPY in CD to be supplied.	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
20.0	Performance Guarantee	The Equipment & Accessories (including Bought-Out Items) are to be guaranteed for its performance for a minimum period of one year from the date of performance acceptance at BHEL Works.	
21.0	Training on Operation & Maintenance	Complete Training has to be provided at BHEL Works, after the successful commissioning of the Equipment & Accessories.	
22.0	Service Support Requirements.	Vendor shall ensure AMC service facilities in India after the guarantee period, through trained service personnel in India	
23.0	Annual Maintenance Contract - AMC	The BIDDER has to QUOTE for AMC under two patterns given below, for a period of THREE YEARS after the expiry of ORIGINAL WARRANTY period. The AMC to include the PC supplied with the equipment:	
23.1	AMC – CASE I	Technical Service for Preventive Maintenance, Trouble Shooting and Re- Commissioning of the Equipment <b>excluding</b> the Cost of SPARES and Consumables [BHEL will make available the required Spares & Consumables on demand]	
23.2	AMC – CASE II (Optional)	Technical Service for Preventive Maintenance, Trouble Shooting and Re- Commissioning of the Equipment <b>INCLUDING</b> the Cost of SPARES and Consumables [Timely availability of Spares & Consumables is vendor's responsibility]	
23.3	AMC - RESPONSE	The bidder has to furnish / indicate the response time for the service engineer to be at BHEL works, from the time of reporting breakdown through e-mail or telefax.	
23.4	AMC – Service Calls	The BIDDER has to furnish details on service calls for preventive maintenance (minimum two) and break-down maintenance (unlimited)	