BHARAT HEAVY ELECTRICALS LIMITED
ELECTROPORCELAINS DIVISION
BANGALORE 560 012

Purchase Specification for Universal Testing Machine (computerized)

<table>
<tr><th>Sl No</th><th>Specification</th><th>Requirement</th></tr>
<tr><td>1</td><td>Instrument Description</td><td>1000 kN Universal Testing Machine (Vertical Type).</td></tr>
<tr><td>2</td><td>Purpose</td><td>To test Mechanical properties of Metal parts used in Disc insulators upto 420 kN rating and their representative test bar and Unit Disc Insulator.
Mechanical Properties consists of mainly with standability of test piece at specified load for specified time, breaking load test, yield load, %elongation, UTS etc.</td></tr>
<tr><td>3</td><td>Components</td><td>Complete equipment along with suitable Hydraulic unit, operation and control unit with programmed controller, electronic extensometer for gauge length 50 mm (min) along with suitable software and computer, component mounting unit jig and fixtures.</td></tr>
<tr><td>4</td><td>Jigs and fixtures</td><td>Details of the jigs and fixtures which are required in 2 sets, are as mentioned below.
<table>
<tr><th>Insulator rating (kN)</th><th>Designation as per IEC 120</th><th>Items to be tested</th><th>Designed max. load</th><th>*Min Mech. Strength of fixture</th></tr>
<tr><td>70/90</td><td>16 mm</td><td rowspan="4">Socket Cap, Ball Pin, Disc Insulator, Test Bar</td><td>160 kN</td><td>250 kN</td></tr>
<tr><td>120/160</td><td>20 mm</td><td>280 kN</td><td>450 kN</td></tr>
<tr><td>210/320</td><td>24 mm</td><td>360 kN</td><td>540 kN</td></tr>
<tr><td>420</td><td>28 mm</td><td>600 kN</td><td>900 kN</td></tr>
</table>
* Minimum mechanical Strength is decided keeping 1.5 times factor of safety Drawings of jigs and fixtures to be submitted along with offer)
Two sets of fixtures having no deformation on applying mechanical load upto 300kN, to check mechanical properties of test bars of diameter ranging from 10mm to 30mm
Refer Annexure-A for component Drawings that will be tested for mechanical properties.
Equipment to be supplied in complete for regular testing.
Equipment to be supplied along with standard accessories.
Detailed technical specification is shown in clause 17 and 18 of this specification.</td></tr>
<tr><td>5 & 6</td><td>Spares and softwares</td><td>Two years trouble free maintenance spares to be supplied along with the main equipment including software (parts, labor, travel for repair and replacement for items are to be covered under warranty)
All software updates (not upgrades) to be provided along with telephone support during normal business. Damaged CD of warranted software are to be replaced for free.</td></tr>
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7	Drawing Approval	Master list of drawings used for manufacturing/assembly are to be approved by BHEL in the event of order placed by BHEL. Detailed drawing of critical components are also to be approved by BHEL	
8	Inspection	Equipment will be inspected by BHEL engineers during the course of manufacture as per Quality plan and the equipment to be dispatched only after final inspection and acceptance	
9	Qualifying Requirement:	Manufacturer & / Principles of Original manufacturer should have supplied at least **two** similar equipments for use in testing of mechanical properties and supplier client list to be furnished by supplier.	
10	Utilities Requirement:	Information on requirement of various utilities such as power, hydraulic oil, cooling facility (if required), handling facilities such as cranes are to be furnished.	
11	Equipment Layout Plan	Information on the requirements for proper layout plan for erection and installation of equipments with set off dimensions to be furnished along with the offer in order to enable BHEL to check suitability in the identified location	
12	Control assistance:	Manufacturer has to assist BHEL in establishing suitable control parameters during trial run of testing in the plant. manual/proper work instruction are also to be provided.	
13	Instrument capability.	Equipment has to be demonstrated for continuous operation of 8 hours without disturbance.	
14	DATA acquisition System	Suitable DATA acquisition system to be provided along with the equipment for local/remote monitoring using suitable Computer	
15	Safety Devices	Equipment to be provided with suitable Safety and fire prevention devices. Any other safety information/training to be provided during training.	
16	Any other information	Supplier can furnish any other additional information, considering the overall requirements	
17	Technical Specfication	**PARAMETER**	**REQUIRED VALUES**
		Measuring Capacity	1000kN
		Measuring Range	0 – 1000kN
		Least Count	0.1kN

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		Load range with accuracy of Measurement ±1%	20 kN to 1000kN
		Maximum tensile Clearance	50-850 mm
		Maximum clearance for compression	0-850 mm
		Minimum clearance between Columns	750mm
		Power Supply	3 phase, 415 V, 50 Hz AC
		Minimum Table size (Width x depth)	750mm x 750mm
		Testing speed	80 mm / min
		⇒1 Designed for Tensile, compressive, bend/flex, and shear testing.	
		⇒3 Should be able to hold at specified load for any specified time.	
		⇒4 User selectable system of units: SI, metric	
		⇒6 Strain measurement accuracy: meets or exceeds ASTM E83, BS 3846, ISO 9513 and EN 1002-4 standards.	
		⇒1 Interfacing and Software (with ease-of-operation and flexibility). Computer interface includes data-acquisition Card and cable.	

Sl No	Specification	Requirement
18	Specification for the software	⇒2 Window's based graphical user interface. ⇒3 Provides platform for basic materials measurement, test control, report generation and ⇒4 Set-up and configuration of the display screen and control panel. Set-up of limits and gain controls. ⇒5 Security with user login passwords. ⇒6 User calculation creator for defining custom calculations. ⇒8 On-line help and reference guide. ⇒ 9. Automatic grip control (frame dependent). ⇒10 Saving and retrieval of test methods and data. Advanced data management and high-speed data retrieval system for accessing history. Option to edit/change/modify history. ⇒11 Warning signals of vital parameters/settings in equipment.

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		⇒12 Display of error messages in plain text Error listing
19	System commissioning	⇒1 Leveling and mounting of the equipment; guidance for special flooring (if needed) ⇒2 Mount and test all peripheral fixtures and transducers. ⇒3 Install any environmental chambers, advanced extensometers, etc, check correct operation of any/all hydraulic, pneumatic, mechanical assemblies. ⇒4 Check correct operation of all electrical components and transducers. ⇒5 Configure controller and test for correct operation including any/all adjustments and tuning. ⇒6 Calibration and certification of equipment after commissioning.
20	COMPUTER REQUIREMENT	PC – HP Compaq Model: dc7600SFF with 17" TFT monitor

Sl No	Specification	Requirement
21	**TRAINING**	Training should comprise of 2 parts, namely Basic system introduction and software introduction
	Basic system introduction	⇒1 Overview for up to 3 operators on the system. ⇒2 Safety awareness. ⇒3 General materials testing safety precautions and system safety features. ⇒4 Integration and set-up of load frame and computer. ⇒5 Mounting and testing of all peripheral fixtures and transducers. ⇒6 Setup of hardware to the users immediate requirement. ⇒7 Review of the major system components. ⇒8 Powering on/off of instrument and software. ⇒9 Console and software console controls. ⇒10 Calibration procedures. ⇒11 Review basic operation manual and related documentation. ⇒12 Creation, if necessary, of 1 user test method to the user's requirement. ⇒13 Testing of specimens to confirm or verify test method. ⇒14 Review of test method results. ⇒15 Review of default/standard report format

	Software introduction	⇒1 Includes test method development and training for up to 3 operators. ⇒2 Review user's application needs. ⇒3 Creation, if necessary, and running (with training) of up to 5 user test methods. ⇒4 Set-up of sample and specimen parameters. ⇒5 Set-up of test control parameters. ⇒6 Results calculations set-up for applications. ⇒7 Review and set-up of report templates. ⇒8 Testing user supplied specimens to validate/verify developed test methods. ⇒9 Instruction on simple modifications to test methods and report templates.
22	Erection and commissioning	In scope of supplier>
23	Warranty	12 Months from date of commissioning