

1 X 370 MW YELAHANKA CCPP

VOLUME IIB

**TECHNICAL SPECIFICATION FOR
ELECTRICAL LABORATORY EQUIPMENTS**

SPECIFICATION NO.: PE-TS-409-556-E001 (REV. 0)



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-201301
INDIA**

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	TECHNICAL SPECIFICATION FOR ELECTRICAL LABORATORY EQUIPMENTS 1 X 370 MW YELAHANKA CCPP		VOLUME II B	
			SECTION	
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SECTION – I

SPECIFIC TECHNICAL REQUIREMENTS

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COMPLIANCE CERTIFICATE

The bidder shall confirm compliance to the following by signing/ stamping this compliance certificate and furnishing same with the offer.

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusion/ deviation with regard to same.
2. There are no deviation with respect to specification other than those furnished in the 'schedule of deviations'
3. Only those technical submittals which are specifically asked for in NIT to be submitted at tender stage shall be considered as part of offer. Any other submission, even if made, shall not be considered as part of offer.
4. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.
5. Any changes made by the bidder in the price schedule with respect to the description/ quantities from those given in Annexure-A [BOQ-Cum-Price schedule] of the specification shall not be considered (i.e., technical description & quantities as per specification shall prevail).
6. All essential accessories for each electrical laboratory equipment required for testing various electrical equipment /devices during Commissioning, Operation and Maintenance of power plant to be ensured by bidder in their offer.

BIDDER'S STAMP & SIGNATURE

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1.0 SCOPE

- 1.1 Design, manufacture, inspection and testing at manufacturer's work, proper packing and delivery to site of Electrical Laboratory Equipment as mentioned in different sections of this specification.
- 1.2 General technical requirements of the Electrical Laboratory Equipment are indicated in Section – II. Project specific technical requirements/changes are listed in section-I.
- 1.3 Electrical Laboratory Equipment shall be supplied along with all essential accessories required for the successful operation of the equipment.
- 1.4 Detailed technical parameters of Electrical laboratory equipment are listed in Annexure – I of Section-I.

2.0 BILL OF QUANTITIES

Quantity requirement shall be as per 'BOQ cum price schedule' enclosed in NIT.

3.0 SPECIFIC TECHNICAL REQUIREMENT

S.No.	Reference Clause No. of Section-II (if any)	Specific Requirement/Change
1)	Cluse 1.10 of section II	List of equipments shall be as per Annexure – I of Section-I

4.0 DRAWING & DOCUMENTS TO BE SUBMITTED

- 4.1 Following documents/drawings for each Electrical Laboratory Equipment shall be submitted after placement of order for BHEL & customer's approval in addition to the documents/drawings listed in clause No. 8.2 of section-II:

Sl. No.	Drawings/Document description	Drawings/Document Number
1	Technical Data Sheet	PE-V0-409-556-E001
2	Catalogue	PE-V0-409-556-E002



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ANNEXURE-I OF SECTION – I

DETAILED TECHNICAL PARAMETERS

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1. Insulation Tester (Megger)

i. Insulation Tester 5 KV : 2 Nos

Test Voltages: 5 KV DC either continuously or variable in steps of 500/1000/2500/5000 V
Display : Digital Display
Mega Ohm Range: 1 TΩ or More
Accuracy : ± (5 % + 5 digit)

ii. Insulation Tester 2.5 KV : 1 No

Test Voltages: 2.5 KV DC either continuously or variable in steps of 500/1000/2500 V
Display : Digital
Mega Ohm Range: 1 TΩ or More
Accuracy : ± (5 % + 5 digit)

iii. LV Insulation Tester 1000V : 5 No

Test Voltages: 1000 V DC variable in steps of 500/1000 V
Display : LCD 3 ½ Digit
Mega Ohm Range: 1000 MΩ
Accuracy : ± (3 % + 5 digit)

iv. LV Insulation Tester 500V : 10 No

Test Voltages: 500 V DC variable in steps of 250/500V
Display : LCD 3 ½ Digit
Mega Ohm Range: 500 MΩ
Accuracy : ± (3 % + 5 digit)

2. Battery operated Insulation Tester (Megger) : 4 Nos

Test Voltages: 1000 V DC variable in steps of 500/1000
Display: LCD 3 ½ Digit
Mega Ohm Range: 500 MΩ or More
Accuracy : ± (3 % + 5 digit)

3. Mega Ohmmeter 10 KV : 1 No

Test Voltages: 10 KV DC either continuously or variable in steps of 500/1000/2500/5000/10000 V
Mega Ohm Range: 1 TΩ or More
Accuracy : ± (5 % + 5 digit)

4. Clip on Ammeter :

i. Clip on Ammeter (AC): 5 Nos

Range: upto 600A
Accuracy : ±2 % to ±3 %
Resolution: 0.1A/1A
Voltage test range: Upto 600V AC
Resistance Range: 200 Ω.

ii. Clip on ammeter (DC): 2 Nos.

Display: 3½digit LCD
Range: upto 10A
Accuracy : ±2 % to ±3 %
Resolution: 0.01A



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5. Digital ducer Ohmmeter : 1 No

Range: Upto 200 Ohm available starting from $1\mu\Omega$.
Accuracy : $\pm 0.2\%$ to $\pm 0.5\%$.
Display: Digital

6. Analog Multimeters (AVO Meters): 5 Nos

1. DC Voltage 0-600 Volts, Accuracy ± 2
2. AC Voltage 0-600 Volts , Accuracy $\pm 3\%$
3. DC Current 0-10 Amps , Accuracy $\pm 1.5\%$
4. AC Current: 0-10 Amps. , Accuracy $\pm 3\%$
5. Resistance: 0-20 M Ohm, Accuracy $\pm 3\%$

7. AC Milli- ammeter: 2 Nos

Type: Digital type
Range: 0-1 A in multi range with smallest range.
Accuracy : $\pm 1.5\%$

8. AC Milli- Voltmeter : 2 Nos

Type: RMS Measurement, Digital type, Desktop model, $3\frac{1}{2}$ Precision Display.
Range: 0-20 V in multi range.
Accuracy : $\pm 0.5\%$.

9. Substandard Frequency Meter: 1 No

Range: 45-55 Hz
Accuracy Class : $\pm 0.2\%$
Scale Length: no less than 100 mm.
Input Voltage: 63.5/120/240/415 V AC

10. Digital Time Counter: 2 No

Time Range: 0-999.99 Sec
Resolution: 1 milli second
Accuracy Class : $\pm 0.05\%$
Input: Potential free NO/NC contact or voltage application for start/Stop.

11. High Voltage Discharge rods:

- I. upto 39.5 KV : 5 Nos
 - II. Upto 230 KV : 6 Nos.
- a. Length: 1250 mm (main rod and each extension)
 - b. Voltage rating: up to 230 kV, class F insulated
 - c. Total length 5 m (upto 230kV)

12. Portable cable core identification Kit: 2 Nos

- i. The equipment shall be capable of identifying 16 or more cores in a multicore cable. The display shall be either LED or LCD.
- ii. The instrument will consist of two units namely sender and receiver. The receiver unit shall be protected against in-advertant connection of live terminals.

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iii. The instrument shall be capable of identifying faulted cores.

13. Phase Sequence indicator: 5Nos

Voltage: 110 to 480V (Line to Line)
Frequency : 45-55 Hz.
Type : Digital/Analog

14. Portable recording meters: 2 Nos

The recording meter shall be of multi speed and direct acting/ transducer interfaced. Chart width of the recorder shall not be less than 100mm. These recorders shall be electric clock wounds

AC Voltage: 0-125 volts
AC Current: 1 mA to 10 Amps
Frequency: 45-55 Hz
Kilowatts: 1-5 amps (of CT secondary), 110 volts, 3 phase and 220 V signal phase
KVAR: 1-5 amps (of CT secondary), 110 volts, 3 phase and 220 V signal phase
Accuracy: +/- 2.5% of the full scale.

15. Moving Iron Ammeters (0-5A range): 6 Nos

Range: 0-1A and 0-5A (Duel Scale)
Frequency : 45 – 55 Hz.
Accuracy: ±1%

16. Moving Iron Ammeters (0-100 A range): 6 Nos

Range: 0-10A/25A/50A/100A (Quadruple Scale)
Frequency : 45 – 55 Hz.
Accuracy: ±1%

17. Precision Portable Digital Frequency Meter: 1 No

Range: 0-100 KHz/0-1000Hz.
Accuracy: ±0.5% of reading.
Display: LED Display
Resolution: 1 KHz/0.1 Hz.
Auxiliary Power Input: 230V,1Ph, 50Hz, AC.

18. Portable Multi range Capacitance meter: 2 Nos

Range: 0-199.9 pico farads
0-199.9 Nano Farads
0-199.9 Micro- farads
0-1999 Micro farads in Multi range
Accuracy: ±0.5% upto 200 Micro Farads & 2% or better for higher ranges.

19. Digital Tachometer (Non-Contact type)(Photoelectric optical): 2 Nos

Type: Non-Contact, Photo Electric Optical
Range: 10-99999 RPM
Resolution: 0.1RPM to 999 RPM
Accuracy: ±0.1% to ±0.15 %.
Display: LCD Display

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20. Relay Repair Tool Kit: 3 Nos

Comprising following Minimum tools:

- i. Spring Setting Tool
- ii. Inspection Mirror and torch
- iii. Ring Spanners
- iv. Box Spanners
- v. Contact Pressure Guage
- vi. Factor Gauges
- vii. Test Plugs and link Plugs
- viii. Screw drivers
- ix. Nose Pliers
- x. Scissors.

21. Universal Bridge (LCR-Bridge): 1 No

Capacitance : 1pF to 1000 μ F
Accuracy : $\pm 0.3\%$ of the reading or better
Resolution : 1 pico farad
Inductance : 1 μ H to 1000H
Resolution : 1 micro henry
Accuracy : $\pm 0.3\%$ of the reading or better
Resistance : 0.001 Ω to 1M Ω
Resolution : 0.1 milli ohm
Accuracy : $\pm 0.3\%$ of the reading or better
Q-Factor : 0 to 10 at 1 kHz
Mains Input 240V 50 Hz 1 Phase AC (and)/or Battery operated.

22. Standard Current transformer : 4 Nos

Primary current : 50-1500A in multiple ranges
Secondary current : 5A
Voltage rating : 1000V /50Hz
Class of accuracy : +/- 0.2%

23. Standard Potential transformer : 2 Nos

Voltage Grade : 650 V
Primary Voltage : 415/240/110 V
Secondary Voltage : 110V/63.5V
Frequency : 45-55Hz
Accuracy Class : ± 0.2

24. Primary Injection Kit: 1 No

Input Voltage: 0-240 V, 1 Ph.
Output current in Amps: 0- 3000A
Resolution in Amps: 0.001
Accuracy: 0.1% + 2 Digits
CTs: Standard class CT's of accuracy 0.5

25. Secondary Injection Kits: 3 Nos

Power Supply: 240VAC, 50Hz, 1phase



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Output current: 0-5A/10A/100A
Range of timer: 0-9999 seconds
Resolution of timer: 0.1 ms in lowest range
Accuracy of timer: $\pm 0.1\%$ of reading
AC voltage output: 0-240 V conti. Variable Continuous operation for 5 minutes in all ranges provided

Metering: Ammeter (0-5A CT operated, CT Class 1.0)
Class 1.5 FS, Analog Display
Voltmeter 0-240V
Class 1.5 FS, Analog Display
Time Interval Meter 0 – 9999Sec
Resolution in lowest range 0.1mSec.
Digital LED Display

Secondary Injection kits shall have following features:

1. Auxiliary output for testing directional relays.
2. Integrated custom timer for testing IDMT relays or Circuit breakers.
3. Automatic protection against current or thermal overloads.
4. Digital display of output current or voltage and time.

26. Single Phase Auto Transformer (Variac) : 10 Nos

Input Voltage: 240 V, 1 Ph, 50/60 Hz.
Output Voltage: 0- 240/0-270 V Continuously variable.
Current Rating: 20 A Continuous.

27. Three Phase Auto Transformer (Variac) : 10 Nos

Input Voltage: 415 V, 3Ph, 4 wire, 50/60 Hz.
Output Voltage: 0- 415/0-470 V Continuously variable.
Current Rating: 15 A Continuous (Minimum).

28. Di-Electric Loss Factor Test Set (Tan-Delta Test Kit): 1 No

Input Power Supply: 240V, 50Hz 1 Phase AC
Output Voltage: 0 to 12 K Volts Continuously adjustable
Capacitance range: 0.06 microfarad at 10kV up to 1. 2 μ F at 2.4 KV
Display: Backlit LCD Display for indicating Test Status & Test Results
Data storage: Can store up to 70 readings and memory can retain the readings even when instrument is switched off

29. Earth Resistance Tester : 2 Nos

Earth Resistance: 0-20 /20-200/200-1000/1000-10000 Ohm.
Resolution: 0.01/0.1/1/10 Ohm.
Accuracy: $\pm(5\%+5\text{digit})$
Display: 3½ Digit Alpha numeric Display
Test Current: 20 mA
Maximum Output voltage < 50 V (RMS)

30. 100 KV Fully Automatic Oil Breakdown Voltage Test Set : 1No

Test Voltage: 0-100 KV (RMS)
Accuracy: $\pm 3\%$
Resolution: 0.1 KV

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Display

Alpha Numeric Digital display.

31. Clamp on Wattmeter : 1No

Input Voltage: upto 600 V, AC/DC
Current: upto 2000 A,
0-1 A and 0-5 A range shall be provided for measuring power from CT Secondary.
Frequency range: 45-55 HZ
Accuracy: $\pm 1.5\%$

32. High Voltage Testing Kit

- 5kVA (DC) High Voltage testing Kit: 1 No.
Output: 15KV DC
 - 1kVA (DC) High Voltage testing Kit: 1 No.
Output: 25KVDC
 - 150kVA (AC) High Voltage testing Kit: 1 No.
Output: 0-70 KV AC
 - 10kVA (AC) High Voltage testing Kit: 1 No.
Output: 0-25 KV AC
- Duty cycle of all the High Voltage Kits shall be 15 Min ON & 15 Min OFF.
Input voltage 220V/230V, 50 Hz, single phase.

33. DC Earth Fault locator : 2 Nos

Frequency of injected signal upto 20 Hz (lesser than specified value) to avoid interference with the DC ripples.
Open circuit signal strength not more than 15 volts (RMS)
Receiver sensitivity: 25 kilo ohms fault resistance
Frequency Resolution: 1 Hz
Frequency Accuracy: $\pm 0.1\%$ of full scale

34. Portable Digital Multimeters : 10No

- DC Voltage **mV Range:** 60/600 mV,
 $\pm 2\%$ Accuracy.
V Range: 6/60/600/1000V, $\pm 1\%$ Accuracy.
- DC Current **Range:** 60mA/600mA/6A/20A,
 $\pm 2\%$ Accuracy.
- AC Voltage **mV Range:** 60/600 mV,
 $\pm 2\%$ Accuracy.
Voltage Range: 6/60/600/750V, $\pm 2\%$ Accuracy.
- AC Current **Range:** 60mA/600mA/6A/20A,
 $\pm 2\%$ Accuracy.
- Resistance **Range:** 600 Ω /6K Ω /60K Ω /600K Ω /6M Ω /60M Ω ,
 $\pm 3\%$ Accuracy.

35. Portable Three phase substandard wattmeter : 6 Nos

Voltage Range: 110/240/440 Volts

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Current Range: 1/5 Amps
Power factor: 1.0 (Unity)
Accuracy: 0.5% of full scale

36. DC Milli Ammeter : 2Nos

Range: 0- 300 mA.
Accuracy: $\pm 1\%$ of Full Scale
Type: Digital

37. DC Milli Voltmeter : 2Nos

Range: 0- 50V AC & DC in Multi range
Accuracy: $\pm 1\%$ of Full Scale
Type: Digital

38. DC Moving Coil Micro-Ammeter : 1No

Range: 0- 500 μ A and 0-1 mA (Duel Scale)
Accuracy: $\pm 1\%$

39. DC Moving Coil Milli Ammeter : 1No

Range: 0- 500 mA and 0-1000 mA (Duel Scale)
Accuracy: $\pm 1\%$

40. Portable Light Intensity Meter (Lux Meter) : 1No

Range: 0-3000 Lux in multiple ranges.
Accuracy: $\pm 5\%$ of reading.

41. AC Voltage/Current Source : 1No

Input Power: 230 V, 50 Hz, 1 Phase, 50 HZ
Voltage Ranges: 200mV, 2V, 20V, 200V, 1000V
Load: 10mA
Current Range: 20mA, 200mA, 2A, 20A, 50A
Burden: 50VA
Frequency Range: 45 to 55 Hz
Accuracy: $\pm 1\%$ of Setting.

42. Portable Hand Held infra-red Temperature Scanner: : 1No

Range: 10 $^{\circ}$ C to 999 $^{\circ}$ C in multiple ranges.
Response: 8 to 14 Microns
Ambient Temperature: 0-50 Deg C
Field of View: 20" X 20" Spectral
Accuracy: $\pm 4\%$ of reading

43. Portable reference meter and Phantom Load test set: 1 set

Portable reference meter: Solid state portable reference meter suitable for calibration of commercial grade energy meters (both active and reactive). Accuracy class of commercial grade energy meter shall be 0.5% or better.
Accuracy class of the reference meter



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- Active 0.2% or better.
- Reactive 0.2% or better

Range of current : 10 mA to 10 A direct, 50 mA to 100 A

Range of test voltage : Star connected 50-280 volts.

Delta-connected 90-490 volts

Suitable for single phase - 2 wire and 3-phase - 3 & 4 wires

Phantom load test set : Three phase load test set

Current rating: 1 A / 5 A/ 10 A

Phase shift: 0 to +/- 180 Deg

Power supply: 110/440V, 3Ph

44. Transformer Turns ratio Tester : 1No

Ratio Range 0.8 to 1000

Frequency : 45-55 HZ

Data Displayed: Vector Group, Phase, Tap Position, Ratio, Ratio Deviation, % error V/s
Name plate with pass/fail indication.

Excitation Voltage 8V, 40 V and 80 V

Excitation current: 0-500 mA with accuracy of $\pm 2\%$ of the reading.

Display 8.4 " VGA Display.

Ratio accuracy: $\pm 0.1\%$ to $\pm 0.3\%$ **45. Three Phase Shifter: 1 No**

Power Supply (Input Voltage): 415, 50Hz

Output Voltage: Same as input voltage $\pm 3\%$ Phase Shift: 0 to $\pm 180^\circ$ or 0 to 360°

VA Rating: 500VA

46. Kelvin Double Bridge: 2 Nos

Resistance range: 0.02 micro ohm – 1.1 ohm

Resolution 0.02 micro ohm

Accuracy $\pm 0.5\%$ of reading or ± 1 slide wire division whichever is greater

Power supply for DC Source: 1 Phase, 240 V AC.



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SECTION-II

STANDARD TECHNICAL SPECIFICATION

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1.0 TECHNICAL REQUIREMENTS

- 1.1 Basic technical requirements for Electrical Lab Equipment shall be as indicated in this section, in addition to technical requirements specified in Section-I.
- 1.2 The intent of specification is not to specify herein all the details of design and manufacture. However the equipment shall confirm in all respect to high standards of design engineering and workmanship and shall be capable of performing in continuous commercial operation up to vendors guarantee.
- 1.3 The Bidder may note that the equipment range, rating, quantities as detailed herein, are the minimum requirement only. All accessories for the equipment not covered here, if necessary for satisfactory and trouble free operation of the equipment, shall be quoted by the Bidder.
- 1.4 The instrument shall be suitable for satisfactory operation at an ambient temperature from 0°C to 50°C
- 1.5 The Analog instruments shall be provided with knife-edge pointer and anti – parallax mirror.
- 1.6 Instrument/ meters suitable for DC supply should be provided with re-chargeable batteries, chargers and low battery charge indication.
- 1.7 The Bidder to quote only 'one' make/model against each equipment best to suit specification requirement.
- 1.8 The instrument shall be suitable for hand held operation, rugged in construction and suitable for field use.
- 1.9 All the equipment components shall be procured from reputed manufacturers and make of equipment shall be subject to the approval of BHEL/ BHEL's Customer.
- 1.10 Standard list of Electrical Lab Equipment as per CEA guidelines is enclosed as per Annexure-III of Section –II. This list of Equipment shall be applicable only if Annexure-I of Section-I is not defined.
- 1.11 Bidder to note that "In case any recommended make / model become obsolete or is stopped manufacturing by manufacturer, next higher make / model of the same company may be considered for ordering / supply at contract stage and no additional cost shall be paid by BHEL to supplier. Bidder is required to furnish confirmation that "next higher make / model is technical equivalent or better" in case of above condition.

2.0 CODES AND STANDARDS

Some of the standards, which shall generally be followed, are listed below. Other applicable Indian standards for any component part, even if not covered in listed standards shall be followed.

- i) IS – 6103 Method of test for specific resistance (resistivity) of electrical insulating fluid.
- ii) IS – 6700 Requirements of general purpose Cathode Ray Oscilloscope.
- iii) IS – 722 Specification for AC electricity meters.
- iv) IS – 8143 Specification for plugs & keys for resistance boxes.
- v) IS – 6104 Method of test for interfacial tension of oil against water.
- vi) IEC-51 Direct acting indicating analogue electrical measuring instruments and their accessories.

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vii) Any other relevant National/ International standards as mentioned in Section-C with technical specification.

3.0 DESIGN CRITERIA:

- 3.1 Electrical Laboratory Equipment shall be used for testing various electrical equipment/ devices during Commissioning, Operation and Maintenance of power plant.
- 3.2 The Equipment will be kept in a clean but hot, humid and tropical atmosphere when not in use. Equipment will be placed in dust laden, hot, humid atmosphere during its use.
- 3.3 For continuous operation at specified rating, temperature rise of various equipment/ components shall be limited to the permissible value stipulated in the relevant standards and this specification.

4.0 TESTS:

- 4.1 All acceptance and routine tests as per relevant standards and specification shall be carried out by the manufacturer. Charges for all these routine and acceptance tests for all the material shall be deemed to be included in the bid price.
- 4.2 Equipment shall be completely assembled, wired, adjusted and tested in factory as per the latest edition of relevant standards.
- 4.3 Bidder shall follow his standard procedure for quality control. However the said procedure/ quality checks shall be submitted for purchaser's approval.

5.0 PACKING:

The equipment shall be properly packed in Galvanized sheet steel trunk/box with proper lock & key arrangement.

6.0 DEMONSTRATION & HANDING OVER TO BHEL / BHEL'S CUSTOMER

The bidder shall be responsible for demonstration of the supplied equipment at site to BHEL / BHEL's customer and ensure handing over the same to the satisfaction of BHEL / BHEL's Customer.

Bidders to identify the equipment requiring commissioning by expert(s) from vendor.

The charges for the same has been fixed as per Annexure- I of Section-II.

7.0 PERFORMANCE GUARANTEE

The bidder shall guarantee that the equipment offered shall meet the requirement as stipulated in this specification and as confirmed by them in Technical Data Sheet. In case the performance of equipment is not as per performance guarantee, the bidder will have to replace the equipment at site free of cost.

8.0 DRAWING DATA & MANUAL

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	TECHNICAL SPECIFICATION FOR ELECTRICAL LABORATORY EQUIPMENTS 1 X 370 MW YELAHANKA CCPP		VOLUME II B	
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8.1 To be submitted with the bid as technical offer:

- a) **Compliance to Technical parameters of various equipment as specified in Annexure-I of Section-I in Data Sheet – B (as enclosed).**
- b) **Technical leaflets/ Catalogues/Product Manual of the Equipment**

The Bidder may note that the drawing, data and manual listed herein are minimum requirement only. The Bidder shall ensure that the other necessary write-ups, curves and information required to fully describe the equipment are submitted with the bid.

8.2 To be submitted after award of contract for BHEL/customer approval:

- a) General arrangement drawing showing constructional features, accessories, connections, range and rating, mounting arrangement, space requirement etc.
- b) Detail instructions for application, assembly & testing of equipment.
- c) Wiring and schematic diagrams (if applicable).
- d) Tests Reports and calibration curve
- e) Instruction manual/ O&M manual of individual equipment

8.3 Instruction manual/O&M Manual of individual equipment

The manual shall clearly indicate in English the installation and connection method, check list of the tests to be carried out before commissioning of equipment. Maintenance and Calibration method shall also be provided in the manual.

8.4 Bidder to furnish all user instruction manuals, maintenance, handling, installation manuals & all test reports complete in all respect in bound volumes & soft copies to BHEL / BHEL's customer at the time of handing over the same to BHEL / BHEL's Customer.

8.5 Bidder to note that quoted item cost shall include cost of main item, cost of all accessories required for successful operation of equipment and testing cost of all acceptance & routine test as per relevant standard.

8.6 Test certificates/ Test reports shall be furnished by bidder to BHEL at contract stage for review/acceptance. BHEL/BHEL's customer may witness the testing of equipment (if required). For imported Electrical Lab Equipment only test certificates shall be submitted.

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ANNEXURE-I OF SECTION – II
DEMONSTRATION & HANDING OVER CHARGES

	DOCUMENT TITLE		SPECIFICATION NO. PE-TS-409-556-E001	
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**SCHEDULE OF PRICES FOR DEMONSTRATION & HANDING OVER TO
BHEL / BHEL'S CUSTOMER**

SL. NO.	DETAILS	ACTIVITY	UNIT CHARGES
1	LUMP SUM ALL INCLUSIVE CHARGES PER VISIT FOR EXPERIENCED / CAPABLE ENGINEER (EXCEPT DAILY CHARGES)	1 VISIT	20000/-
2	LUMP SUM ALL INCLUSIVE CHARGES FOR EXPERIENCED / CAPABLE ENGINEER PER DAY	1 DAY	5000/-

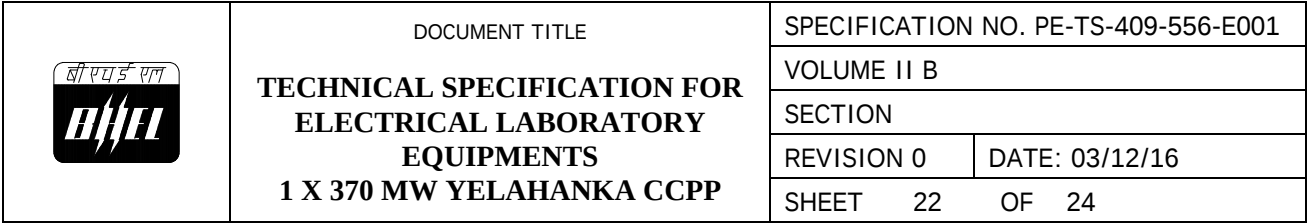
Note:

- TOTAL CHARGES = (Charges as per S.No.1) + [No. of Days(*) x Unit Charges as per Sl. No. 2]
 - Bidder to note that provision of maximum 3 visits amounting to total 9 man days is envisaged for respective bidders.
- *: To be certified by BHEL site

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ANNEXURE-II OF SECTION – II

DATA SHEET-B FORMAT



DATASHEET B

[illegible]

	DOCUMENT TITLE		SPECIFICATION NO. PE-TS-409-556-E001	
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ANNEXURE-III OF SECTION – II

STANDARD LIST OF ELECTRICAL LAB EQUIPMENT



DOCUMENT TITLE

**TECHNICAL SPECIFICATION FOR
ELECTRICAL LABORATORY
EQUIPMENTS
1 X 370 MW YELAHANKA CCPP**

SPECIFICATION NO. PE-TS-409-556-E001

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STANDARD LIST OF ELECTRICAL LAB EQUIPMENT

NOT APPLICABLE

S. No.	Equipment Description
1	Portable 5KV Digital Automatic Insulation Tester
2	Portable HV Decade Resistance Box in Polystyrene case with lid and carrying handle
3	Portable HV ac Test Set comprising
4	Automatic Capacitance and Tan-Delta Test Set (Schering Bridge) with oil resistivity test cell
5	Portable Transformer Oil Breakdown Test Set
6	Portable Karl-Fischer Test Set
7	3-phase Portable Transformer Turns Ratio & Vector Group Meter
8	Portable Digital dc Resistance Meter
9	Portable High Current Digital Micro Ohm Meter
10	Portable Primary & Secondary Current Injection Test Kit with Separate Control & Loading Unit
11	Portable Automatic Earth Tester
12	Portable Three Phase Universal Protective Relay Test Set
13	Precision Digital Multimeter
14	Portable Digital Frequency Meter
15	Digital Sound Level Meter
16	Digital Tachometer
17	Cable Fault Locator
18	Portable Hand held SF6 Gas Leakage Detector
19	Portable Hand held Hydrogen Gas Leakage Detector
20	Portable Vacuum Tester
21	Portable Light Intensity Meter
22	Portable Circuit Breaker Motion Analyzer
23	Interfacial Tension Meter for Transformer Oil
24	Portable, Hand-held Thermal Imaging Camera
25	Portable High Voltage/Live Line Detector
26	Tong Testers
27	Portable Phase Sequence/Continuity Indicators
28	Relay Tool Kit
29	HV Discharge Rod & Portable Earthing Equipment
30	Hot Sticks (Live/Dead Line Tester)