

2 X 500 MW NEW NLC TPP

VOLUME II B

**TECHNICAL SPECIFICATION
FOR
ELECTRICAL LAB EQUIPMENT**

**SPECIFICATION NO. : PE-TS-400-556-E001A
REV. 01**



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

	2 X 500 MW NEW NLC TPP	Doc. No. PE-TS-400-556-E001A	
		Volume	Section
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10.0	DATA SHEET – B	03
TOTAL NO. OF SHEETS		= 19
(INCLUDING COVER/ SEPARATOR SHEETS)		

 BIDDER'S STAMP & SIGNATURE
 (REFER INSTRUCTION NO. 1 OF 'INSTRUCTIONS TO BIDDERS')

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INSTRUCTIONS TO BIDDERS FOR PREPARING TECHNICAL OFFERS

1. Two signed and stamped copies of the following shall be furnished by all bidders as technical offer :
 - a) Unpriced Price Schedule (Annexure-A as enclosed with the specification) with bidder's signature and company stamp.
 - b) Datasheet-B.
 - c) A copy of the sheet "Instructions to Bidders for Preparing Technical Offer" with bidder's signature and company stamp.
 - d) A copy of sheet "List of Contents" with bidder's signature and company stamp.
 - e) Deviation schedule sheet
 - f) General arrangement drawing showing constructional features, accessories, connections, range and rating, mounting arrangement, space requirement etc.
 - g) Technical leaflets/ Catalogues on following
 - Testing of equipment
 - Instruments
 - Misc. Equipment
2. Confirmations/ comments (if any) regarding delivery schedules shall be furnished as part of the commercial offer. Any reference elsewhere/ covering letter of technical offer shall not be considered by BHEL.
3. 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.
4. Any changes made by the bidder in the price schedule with respect to the item description/ quantities, notes etc. from those given in Annexure-A to Section-C of specification [Bill Of Quantities] shall not be considered (i.e., technical description, quantities, notes etc. as per specification shall prevail).
5. Bidder to furnish "No deviation" against each item quoted by them unless specifically indicated in Deviation sheet (part of GCC (General conditions of contract)). Deviations from technical specification are generally not acceptable. In case of deviations from technical specification, the tenderer shall give cost of withdrawal of such deviation in Sealed Cover as per Annexure-II of GCC. In absence of any cost of withdrawal by bidder in sealed envelope, no price implication on any deviation withdrawal by bidder shall be acceptable.

 BIDDER'S STAMP & SIGNATURE
 (REFER INSTRUCTION NO. 1 OF ABOVE)

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PREAMBLE

- 1.0 The Tender document contains three (3) volumes. The bidder shall meet the requirements of all three volumes.

1.1 **VOLUME - I CONDITIONS OF CONTRACT**

This consists of four parts as below:-

Volume – IA This part contains Instructions to bidders for making bids to BHEL.

Volume – IB This part contains General Commercial Conditions of the Tender & includes provision that vender shall be responsible for the quality of item supplied by their sub-vendors.

Volume – IC This part contains Special Conditions of Contract.

Volume – ID This part contains Commercial conditions for Erection & Commissioning site work, as applicable.

1.2 **VOLUME – II TECHNICAL SPECIFICATIONS**

Technical requirements are stipulated in Volume – II, which comprises of:-

Volume – IIA General Technical Conditions.

Volume – IIB Technical Specification including Drawings, if any.

1.2.1 **VOLUME – IIB**

This volume is sub-divided in to following sections:-

Section – A This section outlines the Intent of Specification

Section – B This section provides “Projection Information”.

Section – C This section indicates Technical Requirements specific to Contract, not covered in Section - D

Section – D This section comprises of Technical Specifications of Equipments Complete with Data Sheets A , B , C.

Data sheet - A :- Specific data and other requirements pertaining to the equipments.

Data sheet - B : Specific Data to be filled by bidder (Data Sheet - B is Contained in Volume - III).

Data sheet – C :- Indicates data / documents to be furnished after the award of Contract as per agreed schedule by the vendor (as applicable).

- 2.0 The requirements mentioned in Section – C / Data Sheet – A of Section – D shall prevail and govern in case of conflict between the same and the corresponding requirements mentioned in the descriptive portion in Section – D.

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SECTION- A
SCOPE OF ENQUIRY

1. This specification covers the design, manufacture, inspection and testing at manufacturer's work, proper packing and delivery to site of ELECTRICAL LABORATORY EQUIPMENTS as mentioned in different sections of this specification for 2 X 500MW NEW NLC TPP.
2. It is not intent 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.
3. The general terms and condition, instruction to tenderer and other attachment referred to elsewhere are hereby made part of the tender specification.
4. The tenderer shall be responsible for and governed by all requirements stipulated herein after.
5. The offer should be complete with technical data, catalogue, brochures and drawings, as applicable.
6. The bid shall be in English language and MKS system of unit.

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SECTION-B
PROJECT INFORMATION

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SALIENT FEATURES OF THE SITE & GENERAL PROJECT INFORMATION

1.1 Introduction

The project site at Neyveli has distinct location advantages, being at pit-head distance from the source of lignite supply from Mines, making it convenient for transportation of lignite by belt conveyor. Water source is readily available from the nearby mines lake. Besides, other infrastructure such as access road, railway connection etc, already exist.

1.2 Power Plant Site

The power plant site is located at Neyveli, opposite to the now defunct Fertilizer and Briquetting & Carbonization Plant, near TPS-I Expansion and TPS-II.

1.3 Project & Site Information

- | | |
|------------------------------------|--|
| (i). Owner / Purchaser | : Neyveli Lignite Corporation Limited (NLC Ltd), Neyveli, Cuddalore District, Tamil Nadu State, India |
| (ii). Consultant | : Lahmeyer International (India) Pvt. Ltd (LII), Gurgaon, NCR, India. |
| (iii). Project Title | : 2x500 MW Neyveli New Thermal Power Project (NNTPP) |
| (iv). Location | : 200 kms south of Chennai and 50 kms south-west of Cuddalore |
| (v). Latitude | : 11° 34' 00" N to 11° 35' 00" N |
| (vi). Longitude | : 79° 26' 00" E to 79° 27' 00" E |
| (vii). Elevation above MSL | : (+) 67 m |
| (viii). Nearest Railway Station | : Neyveli, |
| (ix). Nearest Sea Port | : Chennai, at a distance of 200 km |
| (x). Nearest Airport | : Chennai, at a distance of 200 km |
| (xi). Road Access/Approach to Site | : Connected by Chennai-Thanjavur NH 45C road and state highway connecting Cuddalore – Virudhachalam via Neyveli. Both NH and state high way roads are well connected to NLC township roads. The approach road is approximately 15 kms from Chennai–Thanjavur NH – 45C road |
| (xii). Site Meteorological Data | |
| • Max ambient temperature | : 42.8° C |
| • Min Ambient Temperature | : 26.9° C |

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- Wet bulb temp : 29° C
- Max. Relative Humidity : 92 % in the month of September
- Min. Relative Humidity 23 % in the month of May
- Rainfall About 1265.7 mm annually (average)
- Wind direction South West to North East direction
- Wind Speed 97.2 km/hr (maximum recorded)
4.3 km/hr (average wind speed)
- Seismicity As per IS: 1893 (part 4) (Zone-II)
Importance factor: 1.75.



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SECTION-C

SPECIFIC REQUIREMENTS

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1.0 SCOPE OF SUPPLY

Electrical Laboratory Equipment mentioned in this section along with all essential accessories required for the successful operation of the equipment.

The bill of quantities shall be as per enclosed Annexure – A with technical specification.

Technical requirements of Electrical Laboratory Equipment shall be as per Annexure – II of Section-C with technical specification.

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.
- vii) Any other relevant National/ International standards as mentioned in the Annexure – II of 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 SPECIFIC REQUIREMENTS & RATINGS:

- 4.1 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.
- 4.2 Equipment shall be complete with applicable accessories like power supply, mains leads, screened guard test leads, screened line test leads, earth leads, connectors and clips leather carrying case, input card, clip on current transformers with measurement leads and connectors, suitable hand spikes, main adpater, spare fuses, range extending devices, acoustic calibrator, extension cable input lead, microphones of suitable capacities, vibration pickup, probe pick up cable, camera, external hull detector, hammer, test cell with spherical and mush room type electrodes, spacing gauges, stirrers, inductive sensing heads suitable for different cable sizes etc
- 4.3 The instrument shall be suitable for satisfactory operation at an ambient temp. from 0°C to 50°C.
- 4.4 The Analog instruments shall be provided with knife-edge pointer and anti – parallax mirror.

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- 4.5 Instrument/ meters suitable for DC supply should be provided with re-chargeable batteries, chargers and low battery charge indication.
- 4.6 All bidders to be advised to quote only 'one' make/model against each equipment best to suit specification requirement.
- 4.7 Power supply for AC Operating Instruments shall be 240 V AC, 50 Hz, single phase.
- 4.8 The instrument shall be suitable for hand held operation, rugged in construction and suitable for field use.
- 4.9 **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.**

5.0 TESTS:

- 5.1 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.
- 5.2 Equipment shall be completely assembled, wired, adjusted and tested in factory as per the latest edition of relevant standards.
- 5.3 Bidder shall follow his standard procedure for quality control. However the said procedure/ quality checks shall be submitted for purchaser's approval.

6.0 DRAWING DATA & MANUAL:

- 6.1 To be submitted with the bid
- Compliance to Technical requirement of various equipments as specified in technical specification. Also, bidder to furnish Data Sheet – B.
 - General arrangement drawing showing constructional features, accessories, connections, range and rating, mounting arrangement, space requirement etc.
 - Technical leaflets/ Catalogues on following
 - Testing of equipment
 - Instruments
 - Misc. Equipment
 - "No Technical Deviation" sheet/ Deviation sheet as per Annexure II of GCC (General conditions of contract). Deviations from technical specification are generally not acceptable. In case of deviations from technical specification, the tenderer shall give cost of withdrawal of such deviation in Sealed Cover as per Annexure-II of GCC. In absence of any cost of withdrawal by bidder in sealed envelope, no price implication on any deviation withdrawal by bidder shall be acceptable.

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.

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

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DRAWING NO.	DRAWING TITLE	PRIMARY/ SECONDARY
PE-V0-XXX-556-A001	Data sheet/GA of equipment with detailed BOM	Primary
PE-V0-XXX-556-A002	CATALOGUE of equipment	Primary
PE-V0-XXX-556-A004	O & M Manual (IF APPLICABLE)	Secondary
PE-V0-XXX-556-A003	CALIBRATION/TC	Secondary

Documents in line with above are required to be submitted within 2 weeks of LOI by the successful bidder for BHEL approval.

6.3 Instruction 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.

6.4 Number of copies of document/data to be submitted by the successful bidder shall be as per enclosed ANNEXURE – I.

6.5 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.

6.6 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. Test certificates/ Test reports shall be furnished by bidder to BHEL at contract stage for review/acceptance. No additional cost for the same shall be payable by BHEL.

7.0 PACKING:

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

8.0 DELIVERY:

The delivery of Equipment shall be completed as per NIT (Notice Inviting Tender)

9.0 Bidder shall furnish unit rate for each item in the "Schedule of prices for Electrical Lab Equipment" enclosed in Technical Specification as Annexure –A. Purchaser reserves the right to add/ delete any item during detailed engineering as finally required for the project. Unit rate quoted shall be applicable for price adjustment in such cases.

10.0 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.

11.0 The modality of approval of technical documentation & priority of supply shall be mutually discussed & agreed upon with successful bidder in kick – off meeting after placement of LOI.

12.0 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.

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

The charges for the same has been fixed as per "Annexure- B".

13.0 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.

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ANNEXURE – I

No. of prints to be submitted by vendor after award of contract for project shall be as under:

DRAWING/DOCUMENT DISTRIBUTION LIST

All documents & drawings shall be in English and in metric units

Sl		LII	NLC (HQ)	NLC-SITE	BHEL SITE	PMG BHEL	PEM/ UNITS/ PSSR	REMARKS
1	Master list of drawings / document (duly indicating schedule of submission)	Soft copy	Soft copy	Soft copy		Soft copy	Soft copy (S)	
2	Drawings / document for Approval/Information (First Submission)	Soft copy + 2 prints	Soft copy + 3 prints	Soft copy + 1 print		Soft copy	Soft copy (S)	
3	Return with comments/approval	Soft copy (S)	Soft copy	Soft copy		Soft copy	Soft copy	
4	Drawings / Documents for approval (second & subsequent submissions till approval)	Soft copy	Soft copy	Soft copy		Soft copy	Soft copy (S)	
5	Drawings / documents for distribution (Approved by NLC, in cat. 1 or Received for Information)	Soft copy + 2 print (HQ+ Site)	Soft copy + 3 prints	Soft copy + 3 prints	Soft copy + 5 prints	Soft copy	Soft copy (S)	
6	Erection Drawings / documents	-	Soft copy + 1 print	Soft copy + 3 prints	Soft copy + 5 prints	Soft copy	Soft copy (S)	
7	As built Drawings / documents	Soft copy + 1 print	Soft copy + 1 print	Soft copy + 3 prints	Soft copy + 5 prints	Soft copy	Soft copy (S)	
8	Operation & Maintenance Manual	-	Soft copy + 1 print	Soft copy + 10 prints	Soft copy + 5 prints	Soft copy	Soft copy (S)	
9	Type Test Certificate	Soft copy	Soft copy + 1 print	Soft copy + 3 prints	Soft copy + 5 prints	Soft copy	Soft copy (S)	

NOTES:

1. The above schedule of submission does not include Docs/Drgs. of quality assurance/inspection and delivery/dispatches. QAP documents to be submitted as per distribution schedule.
2. Date of submitting soft copy is to be taken as date of submission.
3. S – Source for generation of document.

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Annexure-II of SECTION-C
TECHNICAL REQUIREMENTS

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4.2.8 Hand held Programmable Power Analyzer 1 Nos.

Voltage Range: 150/300/600V (IN STEPS OR CONTINUOUSLY VARIABLE RANGE)
 Allowable Input: 10 – 110% of each range
 Display Range: 5 to 120% of each range
 Accuracy: $\pm 1\%$
 Current Range: 50/100/200/500A (IN STEPS OR CONTINUOUSLY VARIABLE RANGE)
 Allowable Input: 10 – 110% of each range
 Display Range: 1 to 120% of each range
 Accuracy: $\pm 1\%$

Measurements Carried Out: Voltage, Current, Active power, Reactive power, Apparent power, Power factor, Frequency, Current flowing on the neutral line (Only on 3 phase 4 wire measurement), Active power energy, Reactive power energy, Apparent power energy, Demand measurement

Accessories: Current clamps, Voltage test leads, carry case

Equipment shall be able to run through PC or having the RS-232/ USB ports for interfacing with PC.

4.2.13 Digital Tong Tester (AC/DC) 3 Nos.

Digital clamp-on volt-ammeters for AC & DC measurements
 Range: 0-5/25A, 0-60/300/600V
 0-1/5A, 0-60/300/600V
 0-10/30/300/1000A, 0-60/300/600V
 Accessory: Carry case

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ANNEXURE-A

PRICE SCHEDULE FOR ELECTRICAL LAB EQUIPMENT

ITEM SL. NO	<u>BOQ</u>	ITEM DESCRIPTION	QUANTITY	MAKE	MODEL	UNIT PRICE EX- WORKS	TOTAL PRICE EX-WORKS
	ITEM CODE						
4.2.8	556-11142-A	Power Analyser (Hand held, programmable)	1				
4.2.13	556-11292-A	Digital Tong Tester (AC/DC)	3				

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ANNEXURE – B

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:

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



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DATA SHEET-B

SL. NO.	ITEM SL. NO.	ITEM DESCRIPTION	QTY.	Description (Detailed Specification)	MAKE	MODEL NO	COUNTRY OF MANUFACTURE	EQUIPMENT & ACCESSORIES CONFIRMS TO EACH TECHNICAL PARAMETER AS MENTIONED IN SPECIFICATION (YES/NO)	REMARKS
1	4.2.8	Power Analyser (Hand held, programmable)	1	Voltage Range: 150/300/600V (IN STEPS OR CONTINUOUSLY VARIABLE RANGE)					
				Allowable Input: 10 – 110% of each range					
				Display Range: 5 to 120% of each range					
				Accuracy: $\pm 1\%$					
				Current Range: 50/100/200/500A (IN STEPS OR CONTINUOUSLY VARIABLE RANGE)					
				Allowable Input: 10 – 110% of each range					
				Display Range: 1 to 120% of each range					
				Accuracy: $\pm 1\%$					
				Measurements Carried Out: Voltage, Current, Active power, Reactive power, Apparent power, Power factor, Frequency, Current flowing on the neutral line (Only on 3 phase 4 wire measurement), Active power energy, Reactive power energy, Apparent power energy, Demand measurement					
				Accessories: Current clamps, Voltage test leads, carry case					
2	4.2.13	Digital Tong Tester (AC/DC)	3	Digital clamp-on volt-ammeters for AC & DC measurements					
				Range: 0-5/25A, 0-60/300/600V					
				0-1/5A, 0-60/300/600V					
				0-10/30/300/1000A, 0-60/300/600V					
				Accessory: Carry case					