




भारत हेवी इलेक्ट्रिकल्स लिमिटेड
BHARAT HEAVY ELECTRICALS LIMITED

पारेषण व्यापार अभियांत्रिकी प्रबंधन

TRANSMISSION BUSINESS ENGINEERING MANAGEMENT

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ELECTRICAL STRIP HEATERS FOR AIR- CONDITIONING & VENTILATION SYSTEM				दिनांक/ DATE	22.04.14	22.04.14	22.04.14	
				समूह/GROUP	TBEM	W.O. No	80012	
ग्राहक / CUSTOMER	APGENCO							
ठेकेदार / CONTRACTOR	BHARAT HEAVY ELECTRICALS LIMITED							
सलाहकार / CONSULTANT	DESEIN PRIVATE LIMITED							
परियोजना/ PROJECT	400/220KV SWITCHYARD, RAYALSEEMA, 1 X 600MW, STAGE-IV, UNIT-6							
विषय-सूचि / CONTENTS								
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Rev No.	Date	Altered	Checked	Approved	REVISION DETAILS			
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SECTION -1

INTENT, TYPE OF AIR CONDITIONING, DESIGN CRITERIA AND SCOPE

1.0.0 INTENT OF SPECIFICATION

- 1.1.0 This specification covers the design, manufacture, inspection and testing at bidder's and/ or his sub-vendor's work(s), proper packing for transportation, delivery at site of **STRIP HEATER FOR Air-Conditioning and Ventilation System** as detailed in this section and in various other sections of this specification for **Switchyard Control Building** of **1 X 600MW, Stage-IV, Unit-6 TPS at Rayalseema** of APGENCO.
- 1.2.0 The requirement(s) specified under 'SECTION 2, SECTION 3, SECTION 4' and 'SECTION 5' of this specification shall be considered as part of this section. In case of variance between various sections, requirements of Section-1 shall prevail.
- 1.3.0 It is not the intent to specify herein all the details of design and manufacture. However, the equipment shall conform in all respects to high standards of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to Purchaser/ Owner, who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material, which in his judgment is not in full accordance herewith.
- 1.4.0 The bidder shall be deemed to have understood completely all the tender drawings and documents and quoted accordingly.
- 1.5.0 The bidder has to note carefully the parameters, estimated capacities of equipment indicated and the tender drawing in the specification are only for guidance of the bidder. The system shall be designed as per relevant standards / codes and exact capacities and quantities are to be estimated by the bidder. All such estimations and design calculations shall be submitted for Purchaser's approval.
- 1.6.0 In case of any deviation, the bidder shall indicate separately the deviations clause-wise with respect to the specification in the 'Schedule of Deviation'. Deviations in any other form including clarifications / assumptions / etc will not be considered and it will be construed that the bid conforms strictly to the specification.

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1.7.0 The **contract** shall be on **UNIT RATE basis** for the package. Within the scope of the contract no variation shall be admissible to the contractor.

1.8.0 The Purchaser, Consultant and Owner in this specification stand for **BHEL, DESEIN** and **APGENCO** respectively. The successful bidder shall be referred to as Contractor.

2.0.0 ELECTRICAL STRIP HEATER REQUIREMENTS :


One number common strip heater complete with necessary mounting arrangement shall be provided in the supply air plenum for winter heating and monsoon reheating.

Relative Humidity of room shall be maintained by following means :

- Heating through duct mounted strip heaters, which shall be operated by humidistat and thermostat.

The packaged indoor evaporative units shall be kept in AHU room where as condensing unit shall be kept outside the AHU Room either on ground or on roof. Outlet of all the package units shall be collected in a common plenum chamber through flexible canvass connection & volume control dampers. The conditioned air is then distributed to various AC areas through duct along with diffuser (with volume control damper) running above false ceiling. The return air from all these areas shall be collected above false ceiling & shall be taken back to the AHU room Following major parameters shall be taken into consideration for the design of air conditioning.

Ambient Conditions	DB in °C	RH
Summer	47.2	24.5%
Monsoon	34.4	60%
Winter	18.3	60%
Inside Condition	24 ⁰ C±1 ⁰ C	
	50%±5% RH	

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Illumination Heat load	2	Watt per sq. ft
Occupancy	3	people
Fresh Air requirement	1.5	ACPH
Safety margins	10%	Sensible
	10%	Latent

Control Philosophy

Air conditioning system shall run round the clock.

Heating through duct mounted strip heaters, which shall be operated by humidistat and thermostat.

Safety thermostat to be provided with strip heater for Protection. Thermostat to cut off strip heater if temperature is high. High temperature and "no flow cut out" protection to be provided with strip heaters.


Electrical strip heaters are to be as required for humidity control and temperature control during winter season.

3.0.0 SCOPE

3.1.0 SCOPE OF SUPPLY

3.1.0.1 Complete supplies for Electrical Strip Heater (As per clause no 2.0.0 above.)

Sl. No.	Item Description	Unit	Qty.
1	ELECTRICAL STRIP HEATER SET (3 KW SIZE EACH) - Complete with necessary mounting arrangement.	Nos.	06

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3.1.2 SCOPE OF SERVICES :

NIL

3.2.0 Exclusions :

- i. **Any Erection, Testing & Commissioning (ETC) requirements**
- ii. **Any Civil Works**
- iii. Supply of Cable trays for laying cables. Installation wherever required is in contractor scope.
- iv. Supply of power and control cables.
- v. Supply & installation of false ceiling and openings in false ceiling for diffusers as required.


3.3.0 Utilities Available :

Construction water and 415 V power shall be available at one point each at the site.

3.4.0 ENGINEERING DRAWING / DOCUMENT SUBMISSION :

The successful bidder will start detail engineering immediately after placement of purchase order. The engineering drawing/ document submission schedule is as follows:

SL. NO.	ACTIVITY	ACTIVITY TIME IN WEEKS	CUMULATIVE TIME IN WEEKS FROM LOI/PO DATE	REMARKS IF ANY
1.	Submission of Drawings/ Documents as per list furnished in section-4.	6	6	
2.	Approval of documents from BHEL/Customer	4	10	

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3.5.0 OPERATION & MAINTENANCE (O&M) MANUAL :

Operation and Maintenance manuals shall be specifically complied for the project by the bidders. The draft O&M manual shall be submitted within 20 weeks after award of contract. The O&M manual shall contain the following information:

- a. Description of the system and equipment with design particulars.
- b. Instruction for erection.
- c. Instruction for operation, maintenance and repair.
- d. Recommended inspection practices and inspection schedule.
- e. Ordering information for all replaceable parts.
- f. Recommendation for type of lubricants and frequency of lubrication.

4.0 Inspection & Testing

All the equipments shall be inspected prior to dispatch in line with relevant IS, approved GTP/ drawing and technical specification, BHEL/ customer approved QAP.

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SECTION-2 EQUIPMENT SPECIFICATION

1.0.0 General Design and Constructional Requirements :

- i. All the equipment shall be capable of withstanding the stresses, which may be experienced during normal operation and test.
- ii. All the equipment shall be designed to permit inter-changeability of parts and ease of access during inspection, maintenance, installation and repair of various parts.
- iii. All parts subject to substantial temperature changes shall be designed and supported such as permit free expansion or contraction without resulting in leakage, harmful distortion, misalignment or play.

2.0.0 Equipment Specification :

2.1.0 Electrical Strip Heaters :

- i) Electrical strip heaters as required for humidity control and temperature control during winter season.

SECTION – 3
PROJECT DETAILS AND GENERAL SPECIFICATIONS

SL.NO.	DESCRIPTION	
1.	PROJECT INFORMATION	
	a) Customer	APGENCO
	b) Consultant	Desein Consulting Engineers, New Delhi
	b) Projects	1x600MW RayalseemaTPP, Stage-IV, Unit#6-400/220kV Switchyard
	c) Project locations	The project site is located in VV Reddy nagar, Karamala, about 30KM west-south of Proddatur & 20KM from Yerraguntla. Nearest Rail head is Muddanur, which is approx. 10 kM from Site. Site is approximately 480KM from Hyderabad and 350KM from Chennai.

Equipment to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions :

2.	SITE CONDITIONS	
i.	Maximum Ambient air temp. (max.)	40.3 °C
ii.	Minimum Ambient air temp. (max.) °C	19.1 °C
iii.	Design ambient temperature	50 °C
iv.	Altitude above MSL	Less Than 1000m
v.	Basic wind speed	39m/s
vi.	Seismic acceleration	Zone-III As per IS-1893
vii.	Average Rainfall	742.8 mm
viii.	Humidity	Max: 49-74%, Min: 35-60%

3. Auxiliary Supply

Normal Voltage	Variation in Voltage	Frequency in Hz	Phase/Wire	Neutral Connection
415 Volts	± 10%	50 ± 5%	3 phsae/4 wire	Solidly earthed
240 Volts	± 10%	50 ± 5%	1 phase/2 wire	Solidly earthed
220 Volts	190V to 240V	DC	---	Isolated 2 wire system (ungrounded)

Combined variation of voltage and frequency shall be limited to ± 10%.

5. DOCUMENTS TO BE SUBMITTED ALONGWITH OFFER

- 1) Drawings.
- 2) Guaranteed Technical Particulars
- 3) Type Test Reports
- 4) Manufacturing Quality Plan

6. DOCUMENTATION SCHEDULE AT CONTRACT STAGE

A : For & After Approval	Soft copies as per clause no. 5 in 1 set
B : For Approval	Hard copies as per clause no. 5 in 12 sets
B : After Approval	Bound sets of Approved Hard copies and Installation, Operation & Maintenance manual and all as built drawings in 20 sets
	3 Set of Computer CD-ROMs (with unbreakable CD Covers) containing all as-built drawings in Auto-Cad version 2006 or later with 2D and 3D drawings, Instruction Manual and GTP.

7. Title block: Title block shall be forwarded to successful bidder after placement of order.

8. All outdoor enclosures shall provide a degree of protection of not less than IP 55 as per IS-13947 & colour shade of RAL 7032 and one enclosures of each type shall be tested for the same or evidence of testing shall be furnished in lieu of type testing.

9. Quality plan:

BHEL or APGENCO approved QP shall be followed.


10. Type Test reports:

Bidder shall submit valid type test reports (as per relevant IEC/IS Standard) of the tests carried out within last five years from the date of bid opening.. The report should have been conducted on identical or similar equipment/ components to those offered. In case type test reports are more than 5 years old OR the reports of type tests are found to be technically unacceptable, the type test shall be conducted without cost and delivery implication to BHEL/APGENCO.

11. INSPECTION, TESTING AND INSPECTION CERTIFICATE

Inspection testing shall be done as per customer specification and inspection plan.

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SECTION 4
LIST OF DOCUMENTS & DATASHEETS

GUARANTEED TECHNICAL PARTICULARS

The GTP for Electrical Strip Heaters required is Annexed herewith.

The list furnished here is tentative and additional documents may be required during detailed engineering.

List of Data Sheets		
S.No.	Item Description	BHEL's doc. no.
01.	TDS for Electrical Strip Heater	TB-DS-344-553-033
List of Other documents		
02.	Catalogue, if any.	

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Electrical Strip Heaters		
GUARANTEED TECHNICAL PARTICULARS		
Sl. No.	Description / Details	Vendor Confirmation
1	Make	
2	Type	Strip Heater
3	Operating Voltage	220V AC, 50 Hz
4	Rating	3 kW
5	Quantity	6 Nos.
6	Casing	GI
7	Resistance Wire Material	Nickel Chromium 80/20

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SECTION- 5 ENCLOSURES TO SPECIFICATION

SCHEDULES TO BE FILLED UP BY THE BIDDER

Schedule 1 **Schedule of Deviations**

Schedule 2 **Details of contact persons (technical & commercial)**

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SCHEDULE-1

SCHEDULE OF TECHNICAL DEVIATION

The following are the deviations / variations / exceptions from the specification:

Section	Clause No./ Page No.	Statement of deviation/ Variations/Exceptions
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- 1) In case, this schedule is not submitted, it will be presumed that the equipment /material to be supplied under this contract is deemed to be in compliance with the specification.
- 2) If there is NIL deviation, even then the format to be filled as **NIL DEVIATION**
- 3) Continuation sheets of like size and format may be used as per the Bidder's Requirement and shall be annexed to this schedule.

Place

Signature of the authorized representative of Bidder

Name -----

Date

Designation-----

Company seal-----

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SCHEDULE-2

DETAILS OF CONTACT PERSON BOTH TECHNICAL AND COMMERCIAL

Name

Address for correspondence

Phone No.

Fax No.

Email

Place

Signature of the authorized representative of Bidder

Date

Name-----

Designation-----

Company seal -----

Note:

Continuation sheets of like size and format may be used as per the Bidder's Requirement and shall be annexed to this schedule.