




भारत हेवी इलेक्ट्रिकल्स लिमिटेड
BHARAT HEAVY ELECTRICALS LIMITED

पारेषण व्यापार अभियांत्रिकी प्रबंधन

TRANSMISSION BUSINESS ENGINEERING MANAGEMENT

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PAN HUMIDIFIER & HUMIDISTAT FOR AIR- CONDITIONING & VENTILATION SYSTEM				दिनांक/ DATE	16.10.14	16.10.14	16.10.14	
				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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SECTION -1

INTENT, QUALIFYING REQUIREMENT, AIR CONDITIONING REQUIREMENTS AND SCOPE

1.1.0 INTENT OF SPECIFICATION

- 1.1.1 This specification covers the design, manufacture, inspection and testing at bidder's and/ or his sub-vendor's work(s), proper packing, transportation, delivery at site of **PAN HUMIDIFIER AND HUMIDISTAT 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 600 MW, Stage-IV, Unit-6 TPS at Rayalseema** of APGENCO.
- 1.1.2 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.
- 1.1.3 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.
- 1.1.4 The bidder shall be deemed to have understood completely all the tender drawings and documents and quoted accordingly.
- 1.1.5 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.
- 1.1.6 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

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any other form including clarifications / assumptions / etc will not be considered and it will be construed that the bid conforms strictly to the specification.

- 1.1.7 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.
- 1.1.8 The Purchaser, Consultant and Owner in this specification stand for **BHEL, DESEIN** and **APGENCO** respectively. The successful bidder shall be referred to as Contractor.

1.2.0 QUALIFYING REQUIREMENT

"The bidder should have supplied similar equipment of same or higher capacity to Electricity Boards, Power Utilities, installations such as power plants, substations, refineries, fertilizer plants or other industrial or commercial installations in India in any one year during the last five years, as on date of technical bid opening."


1.3.0 HVAC REQUIREMENTS FOR VARIOUS AREAS :

Air-conditioning shall be provided on continuous basis to maintain the specified inside conditions for the various rooms in the control building. One number common PAN HUMIDIFIER with necessary mounting arrangement shall be provided in the system for maintaining Humidity.

11 TR air cooled package units having scroll compressor are envisaged on 3 X 50% basis (two (02) working and one (01) standby) to cater the air conditioning load.

Following major parameters have been 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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One Number PAN TYPE HUMIDIFIER shall be kept in the AHU room and shall be connected to the common plenum for maintaining the required humidity level in the control building.

Control Philosophy

Air conditioning system shall run round the clock.

Relative Humidity of room shall be maintained by following means :

- Humidification through PAN HUMIDIFIER, which shall be operated by HUMIDISTAT.

Detail specifications of instruments are mentioned in section-2.

PAN HUMIDIFIER shall provide indication of local alarm and annunciation in annunciation panel for "Water level low in Pan Humidifier".

Protections & Interlocks


Following Provisions for protections & Intelocks shall be provided in the PAN HUMIDIFIER :

- THERMOSTAT to cut off PAN HUMIDIFIER Heater if temperature is high.
- Low Water Level interlock for PAN HUMIDIFIER.
- PAN HUMIDIFIER heater to cut in only when water level in the humidifier tank is sufficient.

1.4.0 SCOPE

1.4.1 SCOPE OF SUPPLY

- 1.4.1.1 Complete supplies for PAN HUMIDIFIER & HUMIDISTAT for Air-conditioning System (As per clause no 1.3.0 above.)

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Sl. No.	Item Description	Unit	Qty.
1	PAN HUMIDIFIER - 1.5 KW Capacity, for humidification in supply air path complete with float / level switch, level indicator, valves, other control instruments, overflow line and all other accessories as required for Controls & Interlocks.	SET	01
2	HUMIDISTAT	Nos.	01

1.4.1.2 SCOPE OF SERVICES :

NIL


1.4.2 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. Laying & termination of power and control cables.

1.4.3 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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1.4.4 OPERATION & MAINTENANCE (O&M) MANUAL :

Operation and Maintenance manuals shall be specifically compiled for the project by the bidders. The draft O&M manual shall be submitted within 10 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.

1.5. 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

2.1 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.


2.2 Equipment Specification :

2.2.1 PAN HUMIDIFIER :

Humidifying Unit shall be PAN type as per manufacturer's standard. The unit shall be complete for ON-OFF operation of the section.

Whenever the humidity of the conditioned space reaches the minimum allowable percentage of humidity, the humidifier shall be energized to restore the relative humidity. The Humidifier shall be such controlled that it shall not exceed the maximum allowable limit of relative humidity in the conditioned space. The Humidifier shall be sized and designed accordingly.

The pan humidifier shall have three immersion type electric heaters each of adequate capacity. The water tank shall be hot dip galvanized with float operated valve for maintaining sufficient water level. The Humidifier tank shall be fitted with low level switch for putting off the electric heaters in case of low level of water. Visual alarm shall also be provided for low level of water. The tank will be provided with a drain connection & overflow connection. 3-Phase / Single Phase supply for the immersion heaters should be energized from the signal generated from the Space Humidistat.

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All accessories such as heavy duty guard cover, adapter plate etc. shall be included in the offer. The unit shall be of reputed make and subject to the approval of the owner.

2.2.2 HUMIDISTAT :

The space Humidistat unit shall be of wall-mounted type complete with a suitable enclosure. Unit shall include an electronic temperature sensor, a blind type of controller and a converter (if required). The unit shall be designed to achieve design conditions mentioned in section 1. The unit shall be complete with wiring encased in conduits, terminating in suitable terminal box.

The case size shall be at least 100mm dia. The unit shall be suitable for operation at 1 phase, 240V AC 50Hz supply. 2 NO + 2NC contacts rated for 5 amps at 240V AC shall be provided for each humidistat.

All accessories such as heavy duty guard cover, adapter plate etc. shall be included in the offer. The unit shall be of reputed make and subject to the approval of the owner.

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 Format of GTP for **Pan Humidifier** & Humidistat required is Annexed herewith.

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

List of Data Sheets		
Sl. No.	Item Description	BHEL's doc. no.
01.	TDS & GA for PAN HUMIDIFIER	TB-DS-344-553-040
02.	TDS for Humidistat	TB-DS-344-553-041
List of Other documents		
03.	Catalogue , if any.	

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Pan Humidifier		
GUARANTEED TECHNICAL PARTICULARS		
Sl. No.	Description /Details	Vendor Confirmation
1	Make	
2	Type	
3	Rating	1.5 kW
4	Operating Voltage	
5	Heating Element Type	
6	Construction	
7	Thickness	
8	Controls	
9	Insulation	
10	Drain, Fill up & overflow pipe connections	
11	Steam outlet pipe size	

Humidistat		
GUARANTEED TECHNICAL PARTICULARS		
Sl. No.	Description / Details	Vendor Confirmation
1	Make	
2	Model	
3	Type	
4	Switching	
5	Sensor range	
6	Electrical connection	
7	Fixed Differential	
8	Mounting	
9	Application	

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SECTION- 5 ENCLOSURES TO SPECIFICATION

SCHEDULES TO BE FILLED UP BY THE BIDDER

- Schedule 1 **FORMAT of Schedule of Deviations**
- Schedule 2 **FORMAT of 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.