











KARNATAKA POWER CORPORATION LTD

BELLARY-III T.P.S. (1 X 700 MW)

TECHNICAL SPECIFICATION
FOR
ANUBAR

VOLUME IIB & III

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It must not be used directly or indirectly in any way detrimental to the interest of the company.

JOB NO. 367	TITLE TECHNICAL SPECIFICATION FOR ANUBAR	DOC. NO. PE-TS-367-145-I003																
	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA, INDIA	<table border="1"><thead><tr><th>DEPT CODE</th><th>NAME</th><th>SIGN</th><th>DATE</th></tr></thead><tbody><tr><td>DESN</td><td>MG</td><td></td><td>05.09.12</td></tr><tr><td>CHD</td><td>MK</td><td></td><td>05.09.12</td></tr><tr><td>APPD</td><td>ABS</td><td></td><td>05.09.12</td></tr></tbody></table>	DEPT CODE	NAME	SIGN	DATE	DESN	MG		05.09.12	CHD	MK		05.09.12	APPD	ABS		05.09.12
DEPT CODE	NAME	SIGN	DATE															
DESN	MG		05.09.12															
CHD	MK		05.09.12															
APPD	ABS		05.09.12															

COMPLIANCE CERTIFICATE

For

ANUBAR

(To be Signed & Stamped by the Bidder)

Project : BELLARY-III T.P.S. (1 X 700 MW)

Specification no. : PE-TS-367-145-I 003

We shall comply with the following:-

1. All the requirements as stated in Technical Specification / Specific Technical requirement / Data sheets / BHEL quality plan etc. as enclosed in the tender, shall be fully complied **without any deviation**.
2. BHEL Quality Plan (enclosed with the specification) duly signed and stamped is submitted herewith **without any deviation**.
3. Sizing Calculations, Data sheet-C in line with Data sheet-A of specification, dimensional drawings etc. shall be submitted for BHEL/Customer review and approval, to reach BHEL within 15 days after receipt of LOI.
4. Any change in Sizing calculations, QP etc., if desired by BHEL / Customer during approval of the documents after award of contract, without major changes in process parameters as per tender Specification, shall be carried out without any commercial implication and time delay.
5. The offered Flanges, Nipples, Tee, Connectors, isolation valves as required, impulse pipe etc. are suitable for the applicable process parameters.

Signature with date	
Name	
Company seal	



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-I003

VOLUME III

REV. NO. 00


DATE: 11.04.12

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**SCHEDULE OF DRAWINGS, DATASHEETS, DOCUMENTS, CATALOGUES
SUBMITTED WITH THE BID**

PARTICULARS OF THE BIDDER / AUTHORISED REPRESENTATIVE

NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL

	BELLARY-III T.P.S. (1 X 700 MW) TECHNICAL SPECIFICATION FOR ANUBAR	SPECIFICATION NO. PE-TS-367-145-I003
		DATE: 11.04.12
		REV NO. 00
		SHEEE 1 OF 1

PREAMBLE

1.0 The tender document contains three (3) volumes. The bidder shall meet the requirements of all the 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 vendor is 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 into following sections :-

- Section-A : This section outlines the scope of enquiry.
- Section-B : This section provides "Project Information".
- Section-C : This section indicates technical requirements specific to the contract, not covered in Section-D.
- Section-D : This section comprises of technical specifications of equipments complete with data sheet A, B and C.

Data Sheet - A specifies data and other requirements pertaining to the Equipment.

Data Sheet - B Specifies data to be filled by the bidder

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

1.2.2 **Volume-III** TECHNICAL SCHEDULES

This volume contains technical schedules, which are to be duly filled by the bidder and the same shall be furnished with the technical bid as per instructions given in Volume-III.

2.0 The requirements mentioned in Section-C / Data Sheets-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.



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-I003

VOLUME -

SECTION -

REV. NO. 00

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SHEET 01

OF 01

CONTENTS

VOLUME- II B

SECTION	TITLE	NO. OF SHEET(s)
A	Scope of Enquiry	1
B	Project Information	3
C	Specific Technical Requirements	2
D	- Specification for Anubar	2
	- Data sheets A & B for Anubar	4
	- Data sheets C for Anubar	4
	- Anubar General Arrangement with Purge Air System	1
	- Quality Plan for Anubar	2
	- SCHEDULE OF SUBMISSION OF DRAWINGS / DOCUMENTS, EQUIPMENT MANUFACTURE, INSPECTION AND DESPATCH	1

VOLUME III

1.	COMPLIANCE CERTIFICATES	1
2.	Schedule of Drawings, Data sheets, Documents, Catalogues submitted with the bid	1
3.	Schedule of prices	1
4.	Schedule of unit prices	1
5.	Inspection Schedule	1
6.	Deviation Schedule	1



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-I003

VOLUME II B

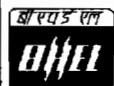
REV. NO. 00

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SHEET 01

OF 01

VOLUME IIB



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-I003

VOLUME II B

SECTION A

REV. NO. 00

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SHEET 01

OF 02

SECTION – A
SCOPE OF ENQUIRY



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-I003

VOLUME II B

SECTION A

REV. NO. 00

DATE: 11.04.12

SHEET 01

OF 02

SCOPE OF ENQUIRY

1.0 SCOPE

This specification covers the Design, Manufacture, Inspection and Testing at manufacturer's works, proper packing for transportation and delivery to site of the Anubar with accessories as mentioned in different sections of this specification for **BELLARY-III T.P.S. (1 X 700 MW)**

1.2 The quality plan enclosed, forms the minimum requirement but not limited to be adhered to by the bidder.

1.3 The enquiry shall be operated in 'COMPLIANCE MODE' means bidder to comply with the requirement of specification, quality plan, delivery schedule, quantities, start-up/commissioning spares, mandatory spares, recommended spares etc. as a token of acceptance of the same.

Following formats to be signed, stamped with company seal and submitted :

- a). Compliance Certificate
- b). Quality Plan
- c). Schedule of submission of drawings/documents, equipment manufacture inspection and dispatch.
- d). Schedule of price, unit prices, inspection schedule.

1.4 No separate technical offer, data sheets to be submitted with the bid. Any such document shall not be taken cognizance of, and document (Compliance Certificate) enclosed in Volume -III shall be final and binding. Data sheets shall be furnished by the successful bidder(vendor), only after the award of contract.

2.0 GENERAL TECHNICAL INSTRUCTIONS

2.1 It is not the intent here to specify all the details of design and manufacture. However, the equipment shall conform in all respects to high standard of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to the customer / consultant, who will interpret the meaning of drawing and specification and shall be entitled to reject any component or material which in his judgment is not in full accordance herewith.

2.2 The omission of specific reference to any component / accessory necessary for the proper performance of the equipments shall not relieve the supplier of the responsibility of providing such facilities to complete the supply within the quoted prices.

2.3 BHEL's representative shall be given access to the shop in which the equipments are being manufactured or tested and all test records shall be made available to him.

2.4 The equipment covered under this specification shall not be dispatched unless the same have been finally inspected, accepted and Material Dispatch Clearance Certificate (MDCC) is issued by BHEL.



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-I003

VOLUME II B

SECTION B

REV. NO. 00

DATE: 11.04.12


SHEET


01

OF

01

SECTION – B
PROJECT INFORMATION

	KARNATAKA POWER CORPORATION LIMITED BELLARY TPS, UNIT-3 OF 700 MW		SECTION: B VOLUME-II SHEET 1 OF 2
	TITLE PROJECT INFORMATION		
1.0	Owner	Karnataka Power Corporation Ltd Shakthi Bhavan No.82, Race Course Road Bangalore-560 001 Karnataka, India	
2.0	Project Title	1x700 MW Bellary Thermal Power Station Unit No3, Stage-3	
3.0	Location	: Kudatini Village Bellary Dist Karnataka state INDIA	
4.0	Latitude and Longitude	: 15° 11' 58" N Latitude 76° 43' 23" E Longitude	
5.0	Elevation above mean sea level	: 478 meters	
6.0	<u>Climatic Conditions</u>		
	(a) <u>Temperature</u>		
	i. <u>Monthly basis</u>		
	Mean of daily maximum temperature	: 42.5° C (in the month of April)	
	Mean of daily minimum temperature	: 19.5° C (in the month of Dec)	
	ii. <u>Monthly basis</u>		
	Mean of daily maximum	: 37.5° C	
	Mean of daily minimum	: 19.5° C	
	iii. Highest temperature recorded	: 42.5° C	
	iv. Lowest temperature recorded	: 14.6° C	
	(b) <u>Relative Humidity</u>	: Varies between 11% and 70%	
	(c) <u>Rainfall</u>		
	Annual average rain	: 492 to 846 mm most of which occurs during August to October	
	(d) <u>Wind Speed</u>		
	i. Annual mean wind speed	: 8.4 km / hr	
	ii. Maximum mean wind speed	: 19 km / hr in the month of July.	
8.0	Wind Load		
	(a) Basic wind speed of 39 m/sec as given in Fig.1 of the code.		
	(b) Factor K1 shall be taken as 1.06		
	(c) Terrain category shall be 2 and corresponding values shall be taken for K2		
	(d) Factor K3 shall be taken as 1.0		
9.0	Wind Loading for Stack		
	(a) For wind pressure as per clause 8.0 above		
	(b) For RC stacks as per IS: 4998		
10.0	Seismic data (as per IS:1893 latest issue)		
	(a) Zone	: Zone III	
	(b) Importance factor (I)	: 2.5 for electrical equipment 1.5 for others.	
11.0	Auxiliary power supply	: Auxiliary electrical equipment to be supplied against this specification shall be suitable for operation on the following supply system.	

KPCL/BTPS/03/EPC	KARNATAKA POWER CORPORATION LIMITED		SECTION - B
	BELLARY TPS, UNIT-3 OF 700 MW		VOLUME-II
	TITLE		SHEET 2 OF 2
PROJECT INFORMATION			
(a)	For motors rated above 175 kW	: 11000V, 3 phase, 3 wire, 50Hz medium earthed AC 3300V, 3 phase, 3 wire, 50Hz medium earthed AC	
(b)	For motor control centre	: 415V, 3 phase, 3 wire solidly earthed AC	
(c)	For motor rated 175 kW and below	: 415, 3 phase, 3 wire solidly earthed AC	
(d)	DC, motor starters, DC solenoids, DC alarm, control and protections	: 220 V DC, 2 wire, unearthed DC	
(e)	AC control & protective devices	: 110 V 1 phase, 50Hz, 2 wire AC supply. The single-phase 110V AC supply shall be derived by Contractor by providing 415V/110V control transformers of adequate rating with MCCB /MCB on both the primary and secondary sides.	
(f)	Uninterrupted power supply	: 110 V, 1 phase, 50Hz, 2 wire AC supply from UPS system for I&C (including indicator recorders) and UCMS only	
(g)	AC solenoids, indicators/recorders, space heaters (for motors rated 30KW and above)	: 240V 1 phase, 2 wire, 50Hz AC system with effectively earthed neutral. The power supply shall be derived by Contractor by providing 415V/ 240V transformer of adequate rating with MCCB/MCB on primary/secondary sides.	
(h)	Winding heating of motors below 30kW	: 24 V 1 phase, 50Hz, AC with one point earthed. This shall be derived by Contractor by providing 415V 3 phase, 3 wire, AC supply through an adequately rated step-down transformer of adequate rating with MCCB / MCB on primary/secondary sides.	
(i)	Solid state controls (including solenoid valves)	: 24 V DC, 2 wire, supply from Battery chargers for instrumentation system only.	
(j)	Lighting fixtures	: 240 V, 1 phase, 2 wire, 50Hz system.	
(k)	Lighting fixtures and space heaters in panels	: 240 V, 1 phase, 2 wire, 50Hz system.	
(l)	Construction supply	: 415 V, 3 phase, 4 wire, 50 Hz AC supply with neutral lead solidly earthed.	
(m)	The above voltages may vary as follows: All devices shall be suitable for continuous operation over the entire range of voltage and frequency indicated below without any change in their performance.		
	i. AC supply	: Voltage variation $\pm 10\%$ Frequency variation $\pm 5\%$ Combined voltage & frequency variation $\pm 10\%$	
	DC supply	: Voltage variation $+10\%$ -20%	
	ii.		



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-I003

VOLUME II B

SECTION C

REV. NO. 00

DATE: 11.04.12

SHEET 01

OF 01

SECTION – C

**SPECIFIC TECHNICAL
REQUIREMENTS**



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-I003

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SECTION C

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SPECIFIC TECHNICAL REQUIREMENTS

The technical requirements in this section are specific for this project and shall override the specification under Section-D in case of any contradiction.

- 1.0 Bidder to note that duly filled up Data sheet-B, Quality Plan, Format "Schedule of submission of Drawings / Documents, Equipment Manufacture, Inspection and Dispatch" enclosed in Section-D of Volume IIB, to be signed and stamped and submitted with the bid. COMPLIANCE CERTIFICATE enclosed in Volume-III should be furnished duly signed and stamped.
- 2.0 Each Anubar shall be supplied with two sets of gaskets for each Tag as start-up / commissioning spares.
- 3.0 The Data sheets enclosed is for Unit #1 only. The same shall be applicable for Unit #2 as well.
- 4.0 **DOCUMENTATION:**
 - (A) **Along with the bids:** 4 sets of the following documents to be enclosed with the bids:
 - a) Compliance Certificate
 - b) Quality plan duly signed and stamped.
 - c) All relevant catalogues for the models of the Anubar offered.
 - d) Schedule of prices and unit prices
 - e) Schedule of submission of drawings/documents, equipment manufacture, inspection and dispatch.
 - (B) **After the award of contract:** 6 sets of the following documents to be enclosed along with the contract documents for approval:
 - a) Datasheet C completely filled-up.
 - b) Quality plan duly signed and stamped.
 - c) All Differential pressure vs Flow graphs.
 - d) Anubar assembly dimensional drawings.
 - e) GA Drawing.



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

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SECTION C

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(C) Final documentation: The documentation as listed below shall be submitted as a part of final documentation.

- | | |
|---|--------------------------|
| 1. Approved final drawings/data sheets, | – 10 sets with 2 CD-ROMS |
| 2. All Test certificates | – 10 sets. |
| 3. Operation & Maintenance Manuals for Anubar | – 10 sets |
| 4. Assembly drawings and QP for approval | – 10 sets. |
| 5. "As built" drawings | – 10 sets. |

- 5.0** In case during erection/commissioning of the Anubar, any spares are required which have not been specified in the Start-up/commissioning spares list, the same will have to be supplied by the vendor free of cost.



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-I003

VOLUME II B

SECTION D

REV. NO. 00

DATE: 11.04.12

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OF 01

SECTION – D

**EQUIPMENT SPECIFICATION
DATA SHEET / DRGS / CALCULATION
QUALITY PLAN**



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-I003

VOLUME II B

SECTION D


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EQUIPMENT SPECIFICATIONS

	BELLARY-III T.P.S. (1 X 700 MW) TECHNICAL SPECIFICATION FOR ANUBAR	SPECIFICATION NO.: PE-TS-367-145-I003	
		VOLUME	II B
		SECTION	D
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<p>1.0 SCOPE</p> <p>This specification covers the Design, Manufacture, Inspection and Testing at the manufacturer's works, proper packing for transportation and delivery to site of Anubar for use in BELLARY-III T.P.S. (1 X 700 MW)</p> <p>2.0 CODES AND STANDARDS</p> <p>2.1 All the equipments specified herein shall comply with the requirements of the latest issue of the relevant National and International standards.</p> <p>2.2 The Design and Materials used for the components shall also comply with the relevant National and International standards.</p> <p>3.0 TECHNICAL REQUIREMENT</p> <p>The anubar and the accessories shall be suitable for sea water application and continuous operation under an ambient temperature of 0-55°C and Relative Humidity of 0-95% unless specified otherwise in volume IIB Section-B or Section-C.</p> <p>3.1 DP flow measurement</p> <p>The flow devices producing a differential pressure signal, or DP having a high accuracy & reliability with rigid structure & shall be suitable for larger diameter pipe. The sensor comprises of a signal outer tube & an inner tube. The inner tube conveys the high-pressure signal & outer conveys the low press signal. The sensor can also be provided with dual averaging chambers with circular / pear shaped profile, which will convey the high pressure & low-pressure signal. This shall be suitable for online mounting.</p> <p>3.2 Element / Probe</p> <p>This shall be constructed of stainless steel, SS-316L.</p> <p>3.3 Assembly</p> <p>Flow devices shall be complete with stub, flanged end, isolating valve with counter flanges, nipple, elbow, packing, etc. and shall be terminated with root valves for remote measurement. Each device shall also be provided with SS nameplate with tag number.</p> <p>4.0 GUARANTEE AND PERFORMANCE</p> <p>The guarantee of flow measuring assembly shall be 18 months from the date of dispatch or 12 months from commissioning whichever is earlier.</p> <p>5.0 TEST & INSPECTION</p> <p>5.1 The bidder shall adopt suitable quality assurance plan to ensure that the equipments offered will meet the specification requirements in full.</p> <p>5.2 The Quality Plan shall be discussed and finalized with the technically accepted bidders before opening the price bid. The purchaser in the Quality Plan before approval would indicate the stages where the purchaser would like to be associated for witnessing or verification.</p> <p>5.3 Quality Plan/Quality Assurance programme shall be submitted for owner approval. The following tests are to be included & test certificate/report shall be furnished.</p> <ol style="list-style-type: none"> 1. Material Test Certificate 2. Hydro Test 3. Visual/Dimensional inspection report. <p>5.4 BHEL and/or their authorized representatives as per the agreed inspection schedule will conduct inspection. The bidder for BHEL's approval at contract stage will submit the inspection schedule. The cost of all tests and inspections will be deemed to have been included in the bid. For all the type tests "Type Test Certificates" as per agreed Quality Plan shall be furnished. In the absence of the same, such Type Tests shall be arranged at the Vendor's works in the presence of BHEL and/or their authorized representatives or in independent Test House/Laboratory approved by BHEL.</p>
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**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-1003

VOLUME II B

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6.0 SPARES AND CONSUMABLES**6.1 Commissioning Spares and consumables**

As part of the main equipment supply, the bidder shall supply all commissioning spares and consumables required during Start-up,

6.2 Recommended Spares

The bidder shall furnish a list of Recommended Spares along with the normal service expectancy period and frequency of replacement; quantities recommended for 3 years operation along with unit rate against each item to enable BHEL/BHEL's Customer to place a separate order later, if required.

6.3 Special Tools & Tackles

The bidder shall furnish a list of Special Tools & Tackles included in the bid.

7.0 DRAWINGS & DOCUMENTS

As mentioned in Section C of Volume IIB.

8.0 FOR INFORMATION**8.1 Storage and Commissioning Instruction****8.2 O&M are to be supplied as specified.****9.0 PACKING & MARKING****9.1 Each item shall be properly packed with adequate protection against friction, stresses, vibration & shock during transportation. Each packing box shall have marking as per Purchase Order.****9.2 Each assembly shall be identified with the following information.**

- Tag No.
- Service.
- Line size & thickness.
- Direction of flow.

10.0 APPLICABLE DATA SHEETS

This document shall be read in conjunction with following data sheets.

1. Data Sheet - A & B
2. Data Sheet - C.

**1 x 700 MW BELLARY TPS, UNIT-III
DATA SHEET FOR ANUBAR**

SPECIFICATION NO.:PE-TS-367-145-I003

VOLUME IIB


SECTION D


REV. NO. 01

DATE : 05.09.12

SHEET 1 OF 3

**DATA SHEETS A&B
FOR
ANUBAR**

	1 x 700 MW BELLARY TPS, UNIT-III DATA SHEET FOR ANUBAR		SPECIFICATION NO.: PE-TS-367-145-I003	
			VOLUME IIB	
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SHEET 2 OF 3				
Tag No. PAB10BP001				
DATA SHEET – A & B				
DATA SHEET – A (TO BE FILLED BY PURCHASER)			DATA SHEET – B (TO BE FILLED UP BY BIDDER)	
GENERAL	PROJECT	1X700 MW BELLARY TPS, UNIT-III	.....
	OFFER REFERENCE	Bidder to indicate	.....
	TAG NO. : QUANTITY	PAB10BP001 | ONE	.....|.....
	SERVICE	CONDENSER COOLING WATER	.....
	MAKE : MODEL	Bidder to indicate	.....|.....
ELEMENT	TYPE	DELTA TUBE (AVERAGING PITOT TUBE)	.....
	PITOT ASSEMBLY	Bidder to indicate FLG SIZE & RATING	.....
	PROBE DIAMETER & SHAPE	Bidder to indicate	.....
	MATERIAL	SS 316 L	.....
	ACCURACY	± 1% OF ACTUAL VALUE	.....
	REPEATABILITY	± 0.1% OF ACTUAL VALUE	.....
	No. OF TAP	ONE	.....
PROCESS DATA	FLUID	HIGH CHLORIDE CONTENT WATER	.....
	RATE OF FLOW (m ³ /hr)	NORMAL : 77100 m ³ /hr	.....
	UPSTREAM WORKING PRESS (Kg/cm ² g)	DESIGN : 105560 m ³ /hr	.....
	DESIGN PRESS (Kg/cm ² g)	2.1 Approx.	.....
	MAX. ALLOWABLE PRESS LOSS	5.0	.....
	DIFF. PRESS AT MAX FLOW	0.05 MWC at DESIGN FLOW	.....
	NORMAL TEMP (Deg C)	Bidder to indicate	.....
	MAXIMUM TEMP (Deg C)	32	.....
		60	.....
PIPE LINE DATA	PIPE SIZE (OD x THK) mm	3500 X 22	.....
	PIPE MATERIAL	CARBON STEEL (IS 2062) AS PER 3589	.....
		PU COATED INTERNALLY WITH MIN 2 MM	.....
		DFT AS PER AWWA-C-222.	.....
	AVAILABLE PIPE STRAIGHT LENGTH	UPSTREAM : 10D	.....
		DOWNSTREAM : 5D	.....
	RESTRICTION	UPSTREAM : NIL	.....
		DOWNSTREAM : NIL	.....
	LINE ORIENTATION	HORIZONTAL	.....

	1 x 700 MW BELLARY TPS, UNIT-III DATA SHEET FOR ANUBAR			SPECIFICATION NO.: PE-TS-367-145-I003	
				VOLUME IIB	
				SECTION D	
				REV. NO. 01	DATE : 05.09.12
			SHEET 3 OF 3		
Tag No. PAB10BP001 DATA SHEET – A & B					
DATA SHEET – A (TO BE FILLED BY PURCHASER)				DATA SHEET – B (TO BE FILLED UP BY BIDDER)	
END CONNECTION	STUB / NIPPLE	SIZE : RATING : (Bidder to indicate) MATERIAL : SS 316L			
	SPOOL PIECE WITH FLANGE	SIZE : RATING : (Bidder to indicate) MATERIAL : PU COATED CARBON STEEL/ DUPLEX STEEL			
	ROOT VALVES	SIZE : 1/2 " | RATING : Class 800 MATERIAL : SS 316L END CONNECTION : SW | QTY. : 02 nos.			
BIDDER TO SPECIFY IN HOLE SIZE TO BE DRILLED ON PROCESS PIPE FOR MOUNTING ANUBAR					
NAME SIGN DATE	PRPED BY	CHKD BY	APPD BY	COMPANY SEAL NAME SIGN DATE	
NOTE : 1. INTERNAL BOTTOM SUPPORT OF SS316L MATERIAL SHALL BE PROVIDED IN PROCESS PIPE. 2. ALL WETTED PARTS SHALL BE SS316L OR SUPERIOR MATERIAL (DUPLEX STEEL). 3. FLUSHING ARRANGEMENT SHALL BE PROVIDED.					



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-I044

VOLUME IIB

SECTION D

REV. NO. 00

DATE : 11.04.12

SHEET 1 OF 3

DATA SHEETS C



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367 145-1044

VOLUME IIB

SECTION D

REV. NO. 00

DATE : 11.04.12


SHEET 2 OF 3

Tag No. PAB10BP001

DATA SHEET – C

DATA SHEET – C FOR ANUBAR (DELTA TUBE)
(TO BE FILLED BY THE CONTRACTOR AFTER AWARD OF CONTRACT)

GENERAL	PROJECT TAG NO. : QUANTITY SERVICE MAKE : MODEL	
ELEMENT	TYPE PITOT ASSEMBLY PROBE DIAMETER & SHAPE MATERIAL ACCURACY REPEATABILITY No. OF TAP	
PROCESS DATA	FLUID RATE OF FLOW (T/HR) UPSTREAM WORKING PRESS (Kg/cm ² g) DESIGN PRESS (Kg/cm ² g) MAX. ALLOWABLE PRESS LOSS DIFF. PRESS AT MAX FLOW NORMAL TEMP (Deg C) MAXIMUM TEMP (Deg C)	
PIPE LINE DATA	PIPE SIZE (OD x THK) mm PIPE MATERIAL AVAILABLE PIPE STRAIGHT LENGTH RESTRICTION	

	BELLARY-III T.P.S. (1 X 700 MW) TECHNICAL SPECIFICATION FOR ANUBAR		SPECIFICATION NO.: PE-TS-367-145-1044	
			VOLUME IIB	
			SECTION D	
			REV. NO. 00	DATE : 11.04.12
		SHEET 3 OF 3		
• Tag No. PAB10BP001 DATA SHEET – C				
DATA SHEET – C FOR ANUBAR (DELTA TUBE) (TO BE FILLED BY THE CONTRACTOR AFTER AWARD OF CONTRACT)				
END CONNECTION	STUB / NIPPLE	SIZE : RATING : MATERIAL :		
	SPOOL PIECE WITH FLANGE	SIZE : RATING : MATERIAL :		
	ROOT VALVES	SIZE : | RATING : MATERIAL : END CONNECTION : | QTY. :		
	BIDDER TO SPECIFY IN HOLE SIZE TO BE DRILLED ON PROCESS PIPE FOR MOUNTING ANUBAR			
NAME	<div style="text-align: right;">COMPANY SEAL</div>			
SIGN				
DATE				



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-I003

VOLUME II B

SECTION D

REV. NO. 00


DATE: 11.04.12

SHEET 01

OF 01

QUALITY PLAN

QUALITY PLAN FOR ANUBAR

JOB NO.		367																					
STATUS		CONTRACT																					
DISTRIBUTION																							
TO																							
NO. OF																							
REV. DATE																							
ALTD		CHD																					
APPD																							
<div style="display: flex; justify-content: space-between;"> <div>  </div> <div> <p>KARNATAKA POWER CORPORATION LTD BELLARY-III T.P.S. (1 X 700 MW)</p> </div> </div>																							
<p>QUALITY PLAN FOR ANUBAR</p>																							
TITLE		<p>BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA</p>																					
DEPT. SCALE		<p>DEPT. CODE</p> <table border="1"> <thead> <tr> <th>DRN</th> <th>SJ</th> <th>NAME</th> <th>SIGN</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>DESN</td> <td>SJ</td> <td></td> <td></td> <td>11.04.12</td> </tr> <tr> <td>CHD</td> <td>MK/ATV</td> <td></td> <td></td> <td>11.04.12</td> </tr> <tr> <td>APPD</td> <td>SHB</td> <td></td> <td></td> <td>11.04.12</td> </tr> </tbody> </table>		DRN	SJ	NAME	SIGN	DATE	DESN	SJ			11.04.12	CHD	MK/ATV			11.04.12	APPD	SHB			11.04.12
DRN	SJ	NAME	SIGN	DATE																			
DESN	SJ			11.04.12																			
CHD	MK/ATV			11.04.12																			
APPD	SHB			11.04.12																			
SIGN		DATE																					
DATE																							
DRAWING NO.		PE-QP-367-145-0044																					
SHEET 00 OF 02		REV. 00																					



PEM: C&I

QUALITY PLAN
FOR
ANNUBAR
BELLARY-III T.P.S. (1 X 700 MM)

QUALITY PLAN NO.: PE-QP-367-145-044
VOLUME IIB
SECTION D
REV. NO. 01 DATE: 11.04.12
SHEET 1 OF 2

Sl. No.	Component/operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency *			Remarks
									M	C	N	
A1	RAW MATERIAL											
1	Sensor	Chemical Properties	MA	Lab Analysis	1/batch	ANSI-316	ANSI-316	Test Certificate	V	V	V	Relevant compliance certificate shall be verified by BHEL
2	Sensor Tube	Chemical Properties	MA	-do-	-do-	ANSI-316	ANSI-316	-do-	V	V	V	
3	Sensor Flange	Chemical Properties	MA	-do-	-do-	ANSI-316	ANSI-316	-do-	V	V	V	
4	Interpolating Tube	Chemical Properties	MA	-do-	-do-	ANSI-316	ANSI-316	-do-	V	V	V	
5	Mounting Hardware	Chemical Properties	MA	-do-	-do-	ANSI-316	ANSI-316	-do-	V	V	V	
B1	IN PROCESS INSPECTION											
1 to 5	Sensor, Sensor Tube, Interpolating	Dimensions	CR	Measurement	100%	Apprd drgs/ spec.	Apprd drgs/ spec.	Inspection Report	P	W	V	
6	Welding	Die Penetration Test	CR	Visual	100%	ASTM-E-165	ASTM-E-165	-do-	P	W	V	
7		Pressure Test	CR	Hydraulic Pressure Test	100%	Apprd drgs/ Spec.	Apprd drgs/ Spec.	-do-	P	W	V	

LEGEND: * CR - Critical characteristics
MA - Major characteristics
MI - Minor characteristics

P - Agency Performing the Test.
W - Agency Witnessing the Test.
V - Agency Verifying the Test.

M - Manufacturer
C - BHEL nominated inspection agency
N - CUSTOMER



PEM: C&I

**QUALITY PLAN
FOR
ANNUBAR
BELLARY-II T.P.S. (1 X 700 MW)**


QUALITY PLAN NO.: PE-QP-367-145-044
VOLUME IIB
SECTION D
REV. NO. 01 DATE: 11.04.12
SHEET 2 OF 2

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency ‡			Remarks
									M	C	N	
8	Finished Products	Dimensions Finish	CR	Measurement	100%	Apprd drgs	Apprd drgs	Inspection Report	P	V	V	
			CR	Visual	100%	Apprd drgs/ Spec.	Apprd drgs/ Spec.	-do-	P	V	V	
			MA	-do-	100%	BHEL Spec.	BHEL Spec.	Log Book	P	V	-	
9	Packing	Soundness of Packing										

LEGEND: * CR - Critical characteristics
MA - Major characteristics
MI - Minor characteristics

‡ P - Agency Performing the Test.
W - Agency Witnessing the Test.
V - Agency Verifying the Test.

M - Manufacturer
C - BHEL nominated inspection agency
N - CUSTOMER

	BELLARY-III T.P.S. (1 X 700 MW) TECHNICAL SPECIFICATION FOR ANUBAR		SPECIFICATION NO.: PE-TS-367-145-I003	
			VOLUME II B	
			SECTION D	
			REV. NO. 00	DATE: 11.04.12
			SHEET 01	OF 01

SCHEDULE OF SUBMISSION OF DRAWINGS / DOCUMENTS, EQUIPMENT MANUFACTURE INSPECTION AND DESPATCH

- | | | |
|----|---|------------------------------|
| 1. | Zero Date | Date of LOI / FOI / TOI |
| 2. | Submission of Data Sheets / documents / catalogues / Valve sizing calculations / Noise calculations for approval. | 1 Weeks from the Zero date. |
| 3. | Technical finalization, freezing of inputs of manufacture by way of vetting of documents and technical discussions and resubmissions of documents (if required) | 4 Weeks from the Zero date. |
| 4. | Inspection of Equipment as per Approved (Category-I) drawings / documents. | 16 Weeks from the Zero date. |
| 5. | Release of MDCC by BHEL | 18 Weeks from the Zero date. |
| 6. | Dispatch (Packaging & Dispatch) | 18 Weeks from the Zero date. |
| 7. | Final documents submission as per Contract | 18 Weeks from the Zero date. |

NOTE: Delays due to non-fulfillment of the requirements of approved Quality Plan and approved Data sheets; Drawings, Catalogues and Sizing Calculations observed during inspection shall be to the Vendor's account.

Delays due to INCOMPLETE (Partly) submission of Data sheets, Drawings, Catalogues and Sizing Calculations also be considered as '**DOCUMENTS NOT SUBMITTED**'.

(Signature and Stamp of the Bidder)



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-I003


VOLUME III

REV. NO. 00

DATE: 11.04.12

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VOLUME-III

	BELLARY-III T.P.S. (1 X 700 MW) TECHNICAL SPECIFICATION FOR ANUBAR	SPECIFICATION NO.: PE-TS-367-145-I003	
		VOLUME III	
		REV. NO. 00	DATE: 11.04.12
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SCHEDULE OF PRICES

[A] COMPLETE ANUBAR ASSEMBLY including Purge Air System and CALIBRATION. Charges as per specification & GA drawing.

S. No.	ITEM DESCRIPTION	QTY FOR 1 UNITS	UNIT PRICE (Rs)	TOTAL PRICE (Rs)
1	Anubar assembly along with accessories (i.e. Flanges, Spool piece, gaskets, fasteners, nuts, bolts, etc.)	1 no.		
2	Connector (Swage lock Double Compression Type), Stainless Steel (SS-316L), ½" NPT (M) x to suit 15 Nb size impulse pipe at other end.	2 nos.		
3	½" SS-316L impulse pipe	2 meter		
4	TEE, SS-316L, straight end socket weld x 90 Deg. end ¼" NPT (F)	2 nos.		
5	Globe isolation valve, ½" size, SS-316L, Socket weld along with suitable connectors.	2 nos.		
6	Connector (Swage lock double compression type), Stainless steel (SS-316L), ¼" NPT (M) x to suit ¼" size SS-316L tube at other end.	9 nos.		
7	Globe isolation valve, ¼" size, SS-316L, screwed end.	2 nos.		
8	¼" OD Annealed SS-316L Tube	20 meter		
9	Stainless steel (SS-316L) TEE, ¼" NPT (F)	1 nos.		
10	Connector (Swage lock double compression type), SS-316L to suit ½" isolation valve female thread as per IS 554 x to suit ¼" OD Stainless steel tube at other end.	1 nos.		
11	Service air isolation valve (SS-316)	1 nos.		
[B] START-UP/COMMISSIONING SPARES (2 SETS OF GASKET FOR EACH TAG)		2 sets		
TOTAL (Rs)				

[C] RECOMMENDED SPARES
FOR THREE (3) YEARS OF OPERATION (ITEM WISE BREAK-UP TO BE ATTACHED BY THE BIDDER)

PARTICULARS OF THE BIDDER / AUTHORISED REPRESENTATIVE				
NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL

	BELLARY-III T.P.S. (1 X 700 MW) TECHNICAL SPECIFICATION FOR ANUBAR	SPECIFICATION NO.: PE-TS-367-145-1003	
		VOLUME III	
		REV. NO. 00	DATE: 11.04.12
		Page 5 of 7	

SCHEDULE OF UNIT PRICES

[A] COMPLETE ANUBAR ASSEMBLY including Purge Air System and CALIBRATION. Charges as per specification & GA drawing.

S. No.	ITEM DESCRIPTION	UNIT PRICE (Rs)
1	Anubar assembly along with accessories (i.e. Flanges, Spool piece, gaskets, fasteners, nuts, bolts, etc.)	
2	Connector (Swage lock Double Compression Type), Stainless Steel (SS-316L), ½" NPT (M) x to suit 15 Nb size impulse pipe at other end.	
3	½" SS-316L impulse pipe	
4	TEE, SS-316L, straight end socket weld x 90 Deg. end ¼" NPT (F)	
5	Globe isolation valve, ½" size, SS-316L, Socket weld along with suitable connectors.	
6	Connector (Swage lock double compression type), Stainless steel (SS-316L), ¼" NPT (M) x to suit ¼" size SS-316L tube at other end.	
7	Globe isolation valve, ¼" size, SS-316L, screwed end.	
8	¼" OD Annealed SS-316L Tube	
9	Stainless steel (SS-316L) TEE, ¼" NPT (F)	
10	Connector (Swage lock double compression type), SS-316L to suit ½" isolation valve female thread as per IS 554 x to suit ¼" OD Stainless steel tube at other end.	
11	Service air isolation valve (SS-316)	
12	Price change due to change of length of Spool piece per 6" over and above specified length.	
[B] START-UP/COMMISSIONING SPARES (1 SET OF GASKET OF EACH TYPE)		
TOTAL (Rs)		

[C] RECOMMENDED SPARES
FOR THREE (3) YEARS OF OPERATION (ITEM WISE BREAK-UP TO BE ATTACHED BY THE BIDDER)

PARTICULARS OF THE BIDDER / AUTHORISED REPRESENTATIVE

NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL



**BELLARY-III T.P.S. (1 X 700 MW)
TECHNICAL SPECIFICATION
FOR
ANUBAR**

SPECIFICATION NO.: PE-TS-367-145-1003

VOLUME III

REV. NO. 00

DATE: 11.04.12

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INSPECTION SCHEDULE

(PLACE & ADDRESS OF TESTING/ INSPECTION AND ITS SCHEDULE DATE & DURATION IN
NUMBER OF DAYS ITEM/COMPONENTWISE TO BE LISTED)

PARTICULARS OF THE BIDDER / AUTHORISED REPRESENTATIVE

NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL