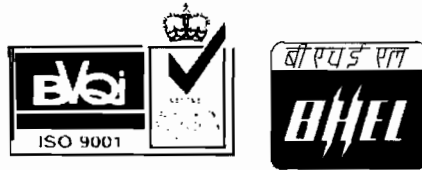


2 X 800 MW - NTPC GADARWARA STPP STAGE I .


TECHNICAL SPECIFICATION FOR CONDENSER ON LOAD TUBE CLEANING SYSTEMS (COLTCS).

Specification No. : PE-TS- 394-165-N001 (REV. 0).

VOLUME -III



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
PPEI BLDG., SEC-16A, PLOT NO. 25
NOIDA – 201301 (UP)**

	TITLE : TECHNICAL SPECIFICATION	SPEC. NO. PE-TS- 394-165-N001	
	FOR	VOLUME : III	
	CONDENSER ON LOAD TUBE CLEANING		
	SYSTEMS (COLTCS)	REV. NO. 0	DATE : 16.08.2013
	PREAMBLE	SHEET 1 OF 1	

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 - I A : This part contains instructions to bidders for making bids to BHEL.

Volume - I B : This part contains general commercial conditions of the tender and include provision that vendor shall be responsible for the quality of item supplied by their sub-vendors.

Volume - I C : This part contains special conditions of contract.

Volume - I D : This part contains commercial conditions for erection and commissioning site work, as applicable.

1.2 Volume - II TECHNICAL SPECIFICATIONS

Technical requirements are stipulated in Volume II which comprises of :

Volume - II A : General Technical Conditions

Volume - II B : Technical specification including drawings, if any

1.2.1 Volume - II B :

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 standard technical specifications of equipments complete with data sheet A, B & 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 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).

	TITLE : TECHNICAL SPECIFICATION FOR CONDENSER ON LOAD TUBE CLEANING SYSTEMS (COLTCS) PREAMBLE	SPEC. NO. PE-TS- 394-165-N001	
		VOLUME : III	
		REV. NO. 0	DATE : 16.08.2013
		SHEET 1 OF 1	

1.2.2 Volume - III TECHNICAL SCHEDULES

This volume contains technical schedules and Data Sheets - B, which are to be duly filled by the bidder and the same shall be furnished with the technical bid as per instructions given in Document No.PES-100-901 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.

	TITLE : TECHNICAL SPECIFICATION FOR CONDENSER ON LOAD TUBE CLEANING SYSTEMS (COLTCS) PREAMBLE	SPEC. NO. PE-TS- 394-165-N001	
		VOLUME : III	
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A2.	PERFORMANCE GAURANTEE SCHEDULE
A3.	TECHNICAL DEVIATION SCHEDULE
A4.	ELECTRICAL LOAD DATA
A5.	GA DRAWING OF COLTCS/DF
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B2.	SCHEDULES AS PER LIST.



TITLE :
TECHNICAL SPECIFICATION FOR
COLTCS

SPEC. NO. PE-TS- 394-165-N001

VOLUME III

SECTION

REV. NO. 0

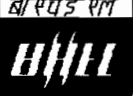
DATE 16.08.2013

SHEET 1 OF 1

SECTION A

SHALL BE FURNISHED ALONGWITH BID

- **COMPLIANCE CERTIFICATE**
- **PERFORMANCE GUARANTEE SCHEDULE**
- **TECHNICAL DEVIATION SCHEDULE**
- **ELECTRICAL LOAD DATA**
- **GA DRG OF COLTCS**
- **UNIT PRICE SCHEDULE**
- **TOTAL PRICE SCHEDULE.**


	TITLE : COMPLIANCE CERTIFICATE FOR COLTCS	SPEC. NO.	PE-TS- 394-165-N001
	PROJECT: 2 X 800 MW - NTPC GADARWARA STPP STAGE I .	DATE:	16.08.2013
		SHEET	1 OF 2

COMPLIANCE CERTIFICATE

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

- a) The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions with regard to same.
- b) There are no other deviations w.r.t. specification other than those furnished in the 'Schedule of Deviations'. Any other deviation, stated or implied, taken elsewhere in the offer stands withdrawn unless specifically brought out in the 'Schedule of Deviations'
- c) Bidder shall submit QP in the event of order based on the guidelines given in the specification & QP enclosed therein. QP will be subject to BHEL/ Customer/Customer's Consultant approval and customer hold points for inspection/ testing shall be marked in the QP at the contract stage. Inspection/ testing shall be witnessed as per same apart from review of various test certificates/ Inspection records etc. Charges for 3rd party inspection (TUV/ equivalent) for imported components wherever required shall be included by bidder in the base price itself.
- d) Any drawing/ document/ data-sheet/ calculation/ Quality plan/ Instrumentation etc. submitted along with the offer shall be considered for reference only, same shall be subject to BHEL/ Customer/Customer's Consultant approval in the event of order.
- e) The offered materials shall be either equivalent or superior to those specified in the specification. For components where materials are not specified, same shall be suitable for intended duty, all materials shall be subject to approval in the event of order.
- f) The commissioning spares including balls shall be supplied on 'As Required Basis' & prices for same included in the base price itself. Prices for special tools & tackles, if any, shall also be included in the base price. Recommended spares for 3 years shall be quoted separately with price indicated separately.
- g) Charges for Installation Checks, Commissioning of equipments, Trial runs and Performance Testing at site shall be included by bidder in the base price itself.
- h) All Instruments shall be located in the Instrument Rack to be supplied by bidder.

The instrument rack shall be installed on ball recirculation pump skid for COLTCS with impulse piping, root valves, fittings, accessories, valve manifolds mounted on gauge racks etc. supplied by bidder accordingly.
- i) The main flanges for Ball separator shall be suitable for the forces and moments as per the specification.
- j) Injection nozzles – 2/4 numbers of stubs of 100 NB or size as informed by bidder shall be provided by BHEL. The injection nozzles, counterflanges for the stubs alongwith nuts, bolts and gaskets shall be supplied by the bidder.
- k) Provision for future installation of Cathodic protection with sacrificial anodes.
- l) Number of balls (Normal as well as abrasive) for COLTCS shall be as specified i.e Number of balls per charge shall be @ 10% of no. of tubes.
- m) The hydrostatic test pressure shall be 1.5 times the design pressure.

	TITLE : COMPLIANCE CERTIFICATE FOR COLTCS	SPEC. NO.	PE-TS- 394-165-N001
	PROJECT: 2 X 800 MW - NTPC GADARWARA STPP STAGE I .	DATE:	16.08.2013
		SHEET	2 OF 2

- n) All sub - vendors shall be subject to BHEL/ Customer/Customer's Consultant approval in the event of order.
- o) The orientation of piping around COLTCS shall be finalised during detailed Engg.
- p) Electrical/ C&I :
- All selected motor ratings have minimum 15 % margin over maximum continuous demand of the driven equipment including voltage and frequency variations, temperature rise and other factors.
 - Supply of electrical viz. LT power cables, instrumentation and control cables, cable glands, lugs, cable trays etc. shall be as per specification. Their erection shall be done by BHEL
 - The junction boxes for termination of DPT/ DPS/ Actuator LS/ solenoid valves/ Ball oversize monitor/ Ball recirculating monitor are included in bidders scope. The instrumentation cable and cabling from instruments/ actuators to junction boxes is also included in bidders scope.
 - Valve actuators and controls shall be provided as specified in Data Sheet-A and Project specific requirements as specified in Section C-2 & Section C-3
 - Alarms/ annunciations/ instruments shall be finalised during detailed engineering in the event of order which shall be subject to BHEL/ Customer/Customer's Consultant approval and shall be without any commercial implications to BHEL.



**TITLE : SCHEDULE OF PERFORMANCE GUARANTEES
FOR
CONDENSER ON LOAD TUBE CLEANING SYSTEM (COLTCS)**

SPEC. NO. PE-TS- 394-165-N001

VOLUME : III

Sheet 1 of 1 Date- 16.08.2013

S.NO.	DESCRIPTION	UNITS	2 X 800 MW - NTPC GADARWARA STPP STAGE I .
1.	Pressure drop across the ball collecting Strainers (i.e. between inlet & outlet nozzle) under clean condition and Normal flow condition	MWC	
2	Percentage of ball recovery	%	
3	Life of sponge rubber balls	Weeks	

PARTICULARS OF BIDDER/ AUTHORISED REPRESENTATIVE

NAME


DESIGNATION

SIGNATURE

DATE

COMPANY SEAL

FORM NO PEM 6036-1

	<p>TITLE</p> <p style="text-align: center;">* SCHEDULE OF DEVIATIONS</p> <p>() From Conditions of Contract (Volume - 1)</p> <p>() From General Technical Conditions (Volume - II A)</p> <p>() From Technical Specifications (Volume -II B)</p>	<p>SPECIFICATION NO</p> <hr/> <p>VOL III</p> <hr/> <p>SHEET..... OF.....</p>
<p>We the undersigned hereby certify that the above mentioned are the only deviations.</p>		

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



TITLE :
**PRICE SCHEDULE FOR
COLTCS
NTPC GADARWARA STPP STAGE I**

SPEC. NO. PE-TS- 394-165-N001

VOLUME III SECTION

REV. NO. 0 DATE 16.08.2013

SHEET 1 OF 1

1.0 Total price for design, manufacture, assembly, inspection, testing, packing for transportation and delivery, including final check up of installation, commissioning, trial run and PG testing of Four (4) sets of COLTCS complete in all respect including all accessories & auxiliaries as specified in technical specification and as necessary including mandatory spares (if applicable), commissioning spares of COLTCS including commissioning balls and special tools & tackles (as required) for erection & maintenance. Rs/USD/Euro (As applicable)

2.0 **Recommended spares** : Item-wise break up with item-wise price to be given as per "Schedule of Recommended Spares" enclosed under Vol. III of technical specification. Rs/USD/Euro (As applicable)

Note : Indicate all duties, taxes etc. stating whether included/ excluded in above price.



TITLE :
PRICE SCHEDULE FOR
COLTCS
2 X 800 MW GADARWARA, STAGE-I

SPEC. NO. PE-TS- 394-165-N002

VOLUME III SECTION

REV. NO. 0 DATE 16.08.2013

- 1.0 Unit price for design, manufacture, inspection and testing, packing and delivery of COLTCS for one set complete with all accessories except for clause no. 2 and 3 mentioned below. Rs/USD/Euro (As applicable)
- 1.1 **Ball separator Assembly comprising**
(i) Housing
(ii) Screens
(iii) Screen actuator with gear box
- 1.2 **Ball recirculation Skid assembly comprising**
(i) Ball collector
(ii) Recirculation pump & motor
- 1.3 **Balls monitoring system Comprising**
(i) Ball over size monitor
(ii) Ball recirculating monitor
- 1.4 **Actuator for valves (if applicable)**
- 1.5 **DP measuring system comprising**
(i) DP gauge
(ii) DP switch
(iii) DP transmitter
(iv) DP isolation valves
- 1.6 **Counter Flanges for ball separator**
- 1.7 **Interconnecting Piping & fittings**
(Total pipe length)
- 1.8 **Control Panel (Switchgear panel)**
- 1.9 **Misc. other items**
(if any with description)
- 1.10 **Total value (sum of 1.1 to 1.9)**
- 2.0 **Lump sum price for 4 sets of COLTCS** Rs/USD/Euro (As applicable)
 - Installation checks, Commissioning
 - PG test



TITLE :
PRICE SCHEDULE FOR
COLTCS
2 X 800 MW GADARWARA, STAGE-I

SPEC. NO. PE-TS- 394-165-N002

VOLUME III

SECTION

REV. NO. 0

DATE 16.08.2013

3.0 Mandatory spares (as applicable) Rs/USD/Euro (As applicable)

- Lump sum price (as applicable)

Notes:-

- Total price of Unit prices given above at sl. No. 1 plus sl no. 2 should tally with total price given in Sl. No. (1) of "Schedule of Prices"
- Unit price quoted by bidder, as above, shall be binding for any quantity variation, which is at discretion of purchaser.
- Price of commissioning & erection spares and other accessories not listed above shall be included in price of equipment & shall be supplied with the equipment.
- Indicate all taxes, duties etc. stating whether included/ excluded in above prices.
- Price break up for items not asked are deemed to be included in 1.0.
- Recommended spares item wise breakup with item wise price to be given as per "Schedule of Recommended spares" enclosed under vol-III of technical specification.
Recommended spares are only for reference purpose and not to be combined for evaluation and ordering purpose.
- Bidder to indicate the unit price as per above breakup for each item.



TITLE :
**TECHNICAL SPECIFICATION FOR
COLTCS**

SPEC. NO. PE-TS- 394-165-N001

VOLUME III

SECTION

REV. NO. 0

DATE 16.08.2013

SHEET 1 OF 1

SECTION B

SHALL BE FURNISHED ON PLACEMENT OF LOI

- **DATASHEET B**
- **LIST OF SCHEDULES**



TITLE :
TECHNICAL SPECIFICATION FOR
COLTCS

SPEC. NO. PE-TS- 394-165-N001

VOLUME III

SECTION

REV. NO. 0

DATE 16.08.2013

SHEET 1 OF 1

SECTION B1
DATASHEET B



Title
DATA SHEET - B
CONDENSER ON LOAD TUBE
CLEANING SYSTEM
(SPONGE RUBBER BALL TYPE)

SPECIFICATION NO.
PE-TS-999-165-N001

VOLUME	III	PART	A
SHEET	I	OF	13

INSTRUCTION TO BIDDER

- This data sheet shall be read in conjunction with Specification No. PES-179-01 Section - D, Volume - IIB.
- Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	ITEM	UNIT
1.0	General :	
1.1	Number of Tube Cleaning System sets being supplied.	Nos.
1.2	Type	
1.3	Liquid handled	
1.4	Manufacturer	
1.5	Country of origin	
2.0	Design :	
2.1	Design Pressure	Bar (g)
	a) Ball Separator	
	b) Ball Recirculating Pump	
	c) Ball Collector	
	d) Piping	
	e) Valves	
	f) Distributors	
	g) Injection Nozzles	
2.2	Design Temperature	°C
2.3	Operating pressure at condenser inlet	Bar (g)
2.4	Design differential pressure	Bar (g)
2.5	Flow rate through ball separator	M ³ /hr
	a) Normal	
	b) Maximum allowable	
2.6	Flow rate through ball collector	M ³ /hr
	a) Normal	
	b) Maximum allowable	

Name of Bidder/ Vendor					
Revision Number	0	1	2	3	4
Signature of Bidder/ Vendor Authorised Representative					
Date					



Title
DATA SHEET - B
CONDENSER ON LOAD TUBE
CLEANING SYSTEM
(SPONGE RUBBER BALL TYPE)

SPECIFICATION NO.
PE-TS-999-165-N001


VOLUME	III	PART	A
SHEET	2	OF	13

INSTRUCTION TO BIDDER

- This data sheet shall be read in conjunction with Specification No. PES-179-01 Section - D, Volume - IIB.
- Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	ITEM	UNIT
3.0	Guaranteed Performance	
3.1	Whether condenser back pressure/ overall heat transfer coefficient is guaranteed that it will be permanently maintained as long as the tube cleaning system is in operation.	YES/NO
3.2	Pressure drop across the ball separator (i.e., between inlet and outlet connections): a) Normal flow condition b) Maximum allowable flow condition	
3.3	Power consumption by ball recirculating pump during: a) Normal operation b) Ball collection operation c) Ball sorting operation	KW
3.4	Quantity of cleaning balls required per set for an operating period of one year	Nos.
4.0	Operation: Whether tube cleaning system is designed for the following operation modes:	
4.1	Automatic start-up initiated by push button.	YES/NO
4.2	Automatic shut-down with ball collection effected by: a) Push button b) Adjustable timer Ball monitoring system	YES/NO YES/NO YES/NO

Name of Bidder/ Vendor					
Revision Number	0	1	2	3	4
Signature of Bidder/ Vendor Authorised Representative					

	Title DATA SHEET - B CONDENSER ON LOAD TUBE CLEANING SYSTEM (SPONGE RUBBER BALL TYPE)		SPECIFICATION NO. PE-TS-999-165-N001			
			VOLUME III	PART A		
			SHEET 3	OF 13		
INSTRUCTION TO BIDDER		1. This data sheet shall be read in conjunction with Specification No. PES-179-01. Section - D, Volume - NB. 2. Items which deviate from Specification shall be marked with an asterisk (*)				
SL.NO.	PARTICULARS	ITEM	UNIT			
4.3	Automatic backwashing of ball separator with ball collection effected by :					
	a) Differential pressure measuring system		YES/ NO			
	b) Adjustable timer		YES/ NO			
	c) Push button		YES/ NO			
4.4	Automatic emergency backwashing of ball separator effected by differential pressure measuring system.		YES/ NO			
4.5	Automatic flushing of differential pressure measuring system.		YES/NO			
4.6	Automatic ball sorting initiated by push button.		YES/NO			
4.7	Whether provision for manual operation of the complete tube cleaning system is made in case of control system failure.		YES/NO			
5.0	Ball Separator :					
5.1	Make					
5.2	Nos. provided per set	Nos.				
5.3	Code/ Standard					
5.4	Body outer diameter	mm				
5.5	Body thickness	mm				
5.6	Manhole type & size	mm				
5.7	Whether sight glass is provided					
5.8	No. of screens/ strainers provided per each ball separator	Nos.				
5.9	Type of arrangement provided to prevent lodging of the debris at the entrance of ball extraction pipes.					
Name of Bidder/ Vendor						
Revision Number		0	1	2	3	4
Signature of Bidder/ Vendor						
Authorised Representative						
Date						



Title
DATA SHEET - B
CONDENSER ON LOAD TUBE
CLEANING SYSTEM
(SPONGE RUBBER BALL TYPE)

SPECIFICATION NO.
PE-TS-999-165-N001

VOLUME	III	PART	A
SHEET	4	OF	13

INSTRUCTION TO BIDDER 1. This data sheet shall be read in conjunction with Specification No. PES-179-01 Section - D, Volume - IIB.
 2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	PARTICULARS	ITEM	UNIT
5.10	Clearance between screen/ strainer bars.		mm
5.11	Materials : a) Body/ Housing b) screen/ Strainer section c) Screen/ Strainer shaft d) Hardware for fixing the screen/ Strainer e) Other internal hardware f) External hardware		
5.12.	Lining material (if applicable)		
6.0	Ball Recirculating Pump :		
6.1	Make		
6.2	Nos. provided per set		Mos.
6.2	Design discharge flow		M ³ /hr
6.4	Design discharge pressure.		Bar
6.5	Design pump Speed		RPM
6.6	Design pump efficiency		%
6.7	Seal for the pump		
6.8	Materials : a) Casing b) Impeller c) Shaft		
7.0	Ball Collector :		
7.1	Nos. provided per set		Nos.

Name of Bidder/ Vendor				
Revision Number	0	1	2	3
Signature of Bidder/ Vendor				
Authorised Representative				



Title **DATA SHEET - B**
CONDENSER ON LOAD TUBE
CLEANING SYSTEM
(SPONGE RUBBER BALL TYPE)

SPECIFICATION NO. **PE-TS-999-165-N001**

VOLUME III PART A
 SHEET 5 OF 13

INSTRUCTION TO BIDDER 1. This data sheet shall be read in conjunction with Specification No. PES-179-01 Section - D, Volume - IIB.
 2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO. PARTICULARS	ITEM	UNIT
7.2	Code/ Standard	
7.3	Whether inspection window/ sight glass is provided.	YES/ NO
7.4	Materials : a) Shell/ Body b) Internals	
7.5	Lining material (if applicable)	
7.6	Whether provision for separating and collecting the undersized balls, is made	YES/ NO.
8.0	Differential Pressure Measuring System:	
8.1	Differential Pressure Switch/ Transmitter a) Type b) Make and Model c) Range d) Accuracy e) Material of sensing element f) No. of contacts g) Contact rating h) Enclosure i) Mounting	Nos.
8.2	Whether differential Pressure gauge is provided for manual observation.	
8.3	Differential Pressure Gauge : a) Type b) Make and Model c) Range	

Name of Bidder/ Vendor					
Revision Number	0	1	2	3	4
Signature of Bidder/ Vendor Authorised Representative					



Title
DATA SHEET - B
CONDENSER ON LOAD TUBE
CLEANING SYSTEM
(SPONGE RUBBER BALL TYPE)

SPECIFICATION NO.
PE-TS-999-165-N001

VOLUME	III	PART	A
SHEET	6	OF	13

INSTRUCTION TO BIDDER

- This data sheet shall be read in conjunction with Specification No. PES-179-01 Section - D, Volume - IIB.
- Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	ITEM	UNIT
	<ul style="list-style-type: none"> d) Accuracy e) Material of sensing element f) No. of contacts g) Dial size h) Enclosure i) Mounting 	<p>Nos.</p> <p>mm</p>
8.4	Whether the contacts for differential pressure gauge and switch/ transmitter are independent.	YES/NO
9.0	Timer for Backwashing	
9.1	Timer make	
9.2	Range of duration setting	
9.3	Range of frequency	
10.0	Ball Monitoring System :	
10.1	Type	
10.2	Maake & Model	
10.3	Whether ball monitoring system is designed to perform the following functions :	YES/NO
	<ul style="list-style-type: none"> a) Continuously counting the balls in circulation and giving an alarm calling for investigation of ball losses, when the number of circulating balls falls below a set value b) Continuously measuring the size of the balls in circulation and initiating the shut-down of the tube cleaning system with alarm calling for replacement of balls, when the number of oversized balls falls below a set value. 	

Name of Bidder/ Vendor _____

Revision Number	0	1	2	3	4
Signature of Bidder/ Vendor Authorised Representative					

Date _____



Title **DATA SHEET - B**
CONDENSER ON LOAD TUBE
CLEANING SYSTEM
(SPONGE RUBBER BALL TYPE)

SPECIFICATION NO.
PE-TS-999-165-N001

VOLUME III PART A
 SHEET 7 OF 13

INSTRUCTION TO BIDDER 1. This data sheet shall be read in conjunction with Specification No. PES-179-01 Section - D, Volume - IIB.
 2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	ITEM	UNIT
10.4	Whether electronic processor of the ball monitoring system is provided with the following: a) Indicators for ♦ Required basic ball charge ♦ Recirculating Ball quantity ♦ Oversized ball quantity b) Time counters for ♦ Total cleaning system operating hours ♦ Cleaning system operating hours with sufficient number of oversized balls c) Recorder for ball consumption	YES/NO YES/NO YES/NO YES/NO YES/NO YES/NO
10.5	Whether provision for Self-testing and Self Calibration are made	YES/NO
11.0	Cleaning Balls :	
11.1	Type	
11.2	Size	mm
11.3	Specific gravity	
11.4	Material	
11.5	Hardness	
11.6	Total Ball recirculation quantity per set	Nos.
11.7	abrasive coated ball recirculation quantity per set - (if any)	No.s
12.0	Piping :	
12.1	Ball Extraction Piping	

Name of Bidder/ Vendor

Revision Number

0

1

2

3

4

Signature of Bidder/ Vendor
 Authorised Representative



Title
DATA SHEET - B
CONDENSER ON LOAD TUBE
CLEANING SYSTEM
(SPONGE RUBBER BALL TYPE)

SPECIFICATION NO.
PE-TS-990-165-N001

VOLUME III PART A
SHEET 8 OF 13

INSTRUCTION TO BIDDER
 1. This data sheet shall be read in conjunction with Specification No. PES-179-01 Section - D, Volume - II B.
 2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	PARTICULARS	ITEM	UNIT
	a) OD x thicknes	mm x mm	
	b) Material		
	c) Length of piping being supplied	M	
12.2	Ball Transport Piping		
	a) OD x thicknes	mm x mm	
	b) Material		
	c) Length of piping being supplied	M	
12.3	Differential pressure measuring system flushing piping.		
	a) OD x thicknes	mm x mm	
	b) Material		
	c) Length of piping being supplied	M	
12.4	Any other		
13.0	Valves (Indicate Type of Valves)		
13.1	Sizes	: mm	
13.2	Nos. provided per set	Nos.	
13.3	Materials		
	a) Body		
	b) Disc/ Trim		
	c) Shaft		
14.0	Distributors		
14.1	Nos. provided per set	Nos.	
14.2	Materials :		
	a) Body		
	b) Sight glass		
	c) Sight glass flanges		
	d) Internal parts		

Name of Bidder/ Vendor

Division Number	0	1	2	3	4
Signature of Bidder/ Vendor					
Authorised Representative					



Title
DATA SHEET - B
CONDENSER ON LOAD TUBE
CLEANING SYSTEM
(SPONGE RUBBER BALL TYPE)

SPECIFICATION NO.
PE-TS-999-165-N001

VOLUME III **PART** A
SHEET 9 **OF** 13

INSTRUCTION TO BIDDER

1. This data sheet shall be read in conjunction with Specification No. PES-179-01 Section - D, Volume - IIB.
2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	PARTICULARS	ITEM	UNIT
14.3	Lining material (if applicable)		
15.0	Injection Nozzles :		
15.1	Nos. provided per each CW inlet pipe	Nos.	
15.2	Size of the stubs to be provided in CW inlet pipe for installing the injection nozzles.	mm	
15.3	Material		
15.4	Lining material (if applicable)		
16.0	Actuators :		
16.1	Actuators for ball separator :		
	a) Nos. provided per ball separator	No.s	
	b) Type & make		
	c) Motor rating	KW	
16.2	Actuators for ball collector		
	a) Nos. provided per ball collector.	No.s	
	b) Type & make		
	c) Motor rating	KW	
16.3	Actuators for Valves:		
	a) Nos. provided per set	No.s	
	b) Type & motor		
	c) Motor rating	KW	
16.4	Any other		

Name of Bidder/ Vendor

Revision Number

0

1

2

3

4

Signature of Bidder/ Vendor
 Authorised Representative

Date



Title
DATA SHEET - B
CONDENSER ON LOAD TUBE
CLEANING SYSTEM
(SPONGE RUBBER BALL TYPE)

SPECIFICATION NO.
PE-TS-999-165-N001

VOLUME III PART A

SHEET 10 OF 13

INSTRUCTION TO BIDDER

1. This data sheet shall be read in conjunction with Specification No. PES-179-0: Section - D, Volume - IIB.

2. Items which deviate from Specification shall be marked with an asterisk (*)


SL.NO.	PARTICULARS	ITEM	UNIT
17.0	Electric Drive Motors		
17.1	Drive motor for recirculating pump :		
	a) Type and make		
	b) Rating	KW	
17.2	Drive motor for differential pressure measuring system flushing pump (if applicable)		
	a) Type and make		
	b) Rating	KW	
17.3	Any other.		
18.0	Control Panel		
18.1	Type		
18.2	Model & Manufacturer		
18.3	Operating Voltage/ frequency	V/ Hz	
18.4	Control Voltage/ frequency	V/ Hz	
18.5	Materials of housing and door		
18.6	Protections/ interlocks provided for :		
18.7	Class of Protection		
18.8	Control Hardware		
18.8	Alarms/ Annunciations provided for :		
18.9	Indicators provided for :		
18.10	Whether interconnecting control and power cabling between the control panel and various drive is included in the offer.		
19.0	Pressure gauges :		
19.1	Manufacturer & Type, Model		

Name of Bidder/ Vendor

Revision Number

0	1	2	3	4
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Signature of Bidder/ Vendor
 Authorised Representative

		Title DATA SHEET - B CONDENSER ON LOAD TUBE CLEANING SYSTEM (SPONGE RUBBER BALL TYPE)		SPECIFICATION NO. PE-TS-999-165-N001	
		VOLUME III PART A			
		SHEET 11 OF 13			
INSTRUCTION TO BIDDER		1. This data sheet shall be read in conjunction with Specification No. PES-179-01 Section - D, Volume - IIB. 2. Items which deviate from Specification shall be marked with an asterisk (*)			
SL.NO.	PARTICULARS	ITEM	UNIT		
19.2	Nos. provided per set		Nos.		
19.3	Location				
19.4	Dial size		mm		
19.5	Range & Accuracy				
19.6	Materials of construction :				
	a) Sensing element				
	b) Movement				
	c) Casing				
19.7	Enclosure				
19.8	Mounting				
20.0	Counter Flanges :				
20.1	Whether counter flanges complete with gaskets, bolts and nuts etc. for all terminal points are included in the offer.			YES/ NO	
20.2	Type				
20.3	Rating				
20.4	Materials				
	a) Flanges				
	b) Bolts and Nuts				
	c) Gaskets				
20.5	Code/ Standard				
21.0	Whether lifting arrangement is provided for various equipments.			YES/ NO.	
22.0	Whether ball recirculating pump, ball collector with interconnecting piping and valves are mounted on a single frame.			YES/ NO	
23.0	Whether supports (wherever necessary) complete with foundation plates, bolts, nuts, inserts etc. are included in the offer.			YES/ NO	
Name of Bidder/ Vendor					
Revision Number		0	1	2	3
Signature of Bidder/ Vendor Authorized Representative					
Date					



Title **DATA SHEET - B**
CONDENSER ON LOAD TUBE
CLEANING SYSTEM
(SPONGE RUBBER BALL TYPE)

SPECIFICATION NO. **PE-TS-999-165-N001**
 VOLUME III PART A
 SHEET 12 OF 13

INSTRUCTION TO BIDDER 1. This data sheet shall be read in conjunction with Specification No PES-179-01 Section - D, Volume - IIB.
 2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	PARTICULARS	ITEM	UNIT
24.0	Shop Inspection and Tests		
24.1	Whether all the tests and inspections as detailed in the specification/ quality plan are carried out.		YES/NO
24.2	Hydrostatic Test :		
	a) Test Pressure	Bar (g)	
	<ul style="list-style-type: none"> • Ball Separator • Recirculating Pump • Ball Collector • Distributors • Injection nozzles • Piping & Valves 		
	a) Test duration	Minutes	
24.3	Leakage Test :		
	a) Test Pressure	Bar (g)	
	b) Test duration	Minutes	
25.0	Painting :		
25.1	External Surfaces :		
	a) Surface Preparation		
	b) Primer		
	a) Finish		
25.2	Internal Surfaces :		
	a) Surface Preparation		
	b) Primer		
	a) Finish		
26.0	Weights :		
26.1	Empty Weight	Kg.	
	a) Ball Separator		

Name of Bidder/ Vendor					
Revision Number	0	1	2	3	4
Signature of Bidder/ Vendor					
Authorised Representative					
Date					

	Title	DATA SHEET - B	SPECIFICATION NO.
		CONDENSER ON LOAD TUBE	PE-TS-999-165-N001
		CLEANING SYSTEM	VOLUME III PART A
		(SPONGE RUBBER BALL TYPE)	SHEET 13 OF 13

INSTRUCTION TO BIDDER 1. This data sheet shall be read in conjunction with Specification No. PES-179-01 Section - D, Volume - HB.

2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	PARTICULARS	ITEM	UNIT
	b) Recirculating pump c) Ball collector d) recirculating unit		
26.2	Operating weight		kg
	a) Ball Separator b) Recirculating pump c) Ball collector d) recirculating unit		
26.3	Weight of the heaviest equipment/ assembly to be handled.		kg.
27.0	Overall Dimensions		
27.1	Ball Separator		
27.2	Recirculating Unit		
28.0	Other information (if any)		
	G:\MSE\ASHDS-COTCS.RTF		

Name of Bidder/ Vendor					
Revision Number	0	1	2	3	4
Signature of Bidder/ Vendor Authorised Representative					

Clause No.	MOTORS		
 (Bidder's Name)		
	11. Maximum continuous load demand of driven equipment in KW 12. Rated Voltage (volts) 13. Permissible variation of : a. Voltage (Volts) b. Frequency (Hz) c. Combined voltage and frequency 14. Rated speed at rated voltage and frequency(RPM) 15. At rated Voltage and frequency: a. Full load current b. No load current 16. Power Factor at a. 100% load b. NO load c. Starting. 17. Efficiency at rated voltage and frequency, a. 100% load b. 75% load c. 50% load 18. Starting current (amps) at a. 100% voltage b. 85% voltage		
NAME OF THE PROJECT..... STEAM GENERATOR PACKAGE	TECHNICAL DATA SHEET SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9506-102-2	PART-F CHAPTER-I SUB-SECTION:DE1 (ELECTRICAL)	PAGE 11 OF 16

30 29

Clause No.	MOTORS		
	<p style="text-align: right;">..... (Bidder's Name)</p> <p>c. 80% voltage</p> <p>19. Minimum permissible starting Voltage (Volts)</p> <p>20. Starting time with minimum permissible voltage</p> <p>a. Without driven equipment coupled</p> <p>b. With driven equipment coupled</p> <p>21. Safe stall time with 100% and 110% of rated voltage</p> <p>a. From hot condition</p> <p>b. From cold condition</p> <p>22. Torques :</p> <p>a. Starting torque at min. permissible voltage(kg-mtr.)</p> <p>b. Pull up torque at rated voltage.</p> <p>c. Pull out torque</p> <p>d. Min accelerating torque (kg.m) available</p> <p>e. Rated torque (kg.m)</p> <p>23. Stator winding resistance per phase (ohms at 20 Deg.C.)</p> <p>24. GD² value of motors</p> <p>25. No of permissible successive starts when motor is in hot condition</p>		
NAME OF THE PROJECT..... STEAM GENERATOR PACKAGE	TECHNICAL DATA SHEET SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102-2	PART-F CHAPTER-I SUB-SECTION:DE1 (ELECTRICAL)	PAGE 12 OF 16

Clause No.	MOTORS		
 (Bidder's Name)		
26.	Locked Rotor KVA Input		
27.	Locked Rotor KVA/KW		
28.	Vibration limit :Velocity (mm/s)		
29.	Noise level limit (dBA)		
C.	CONSTRUCTIONAL FEATURES		
1.	Stator winding insulation		
a.	Class & Type		
b.	Winding Insulation Process		
c.	Tropicalised (Yes/No)		
d.	Temperature rise over specified maximum ambient temperature of 50 deg C		
e.	Method of temperature measurement		
f.	Stator winding connection		
2.	Main Terminal Box		
a.	Type		
b.	Location (viewed from NDE side)		
c.	Entry of cables(bottom/side)		
d.	Recommended cable size (To be matched with cable size envisaged by owner)		
e.	Fault level (MVA), Fault level duration (sec)		
f.	Cable glands & lugs details (shall be suitable for power cable)		
NAME OF THE PROJECT.....	TECHNICAL DATA SHEET SECTION-VI	PART-F CHAPTER-I	PAGE 13 OF 16
STEAM GENERATOR PACKAGE	BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102-2	SUB-SECTION:DE1 (ELECTRICAL)	

Clause No.	MOTORS		
 (Bidder's Name)		
	<ol style="list-style-type: none"> 3. Type of DE/NDE Bearing 4. Motor Paint shade 5. Weight of <ol style="list-style-type: none"> a. Motor stator (KG) b. Motor Rotor (KG) c. Total weight (KG) D. List of accessories. <ol style="list-style-type: none"> 1. Space Heaters (Applicable for 30 KW & above motor) (Nos./Power in watts/supply voltage) 2. Terminal Box for Space Heater (Yes/No) 3. Speed switch (Yes/No) No of contacts and contact ratings of speed switch 4. Insulation of bearing (Yes/No) 5. Noise reducer(Yes/No) 6. Grounding pads <ol style="list-style-type: none"> i) No and size on motor body ii) Nos on terminal Box 7. Vibration pads <ol style="list-style-type: none"> i) Nos and size ii) Location 8. Any other fitments 		
NAME OF THE PROJECT..... STEAMGENERATORPACKAGE	TECHNICAL DATA SHEET SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102-2	PART-F CHAPTER-J SUB-SECTION:DE1 (ELECTRICAL)	PAGE 14 OF 16

Clause No.	MOTORS		
 (Bidder's Name)		
	<p>E. List of curves.</p> <ol style="list-style-type: none"> 1. Torque speed characteristic of the motor 2. Thermal withstand characteristic 3. Starting current Vs. Time 4. Starting current Vs speed 5. P.F. and Effi. Vs Load <p>F. Additional Data to be filled for each rating of DC Motor</p> <ol style="list-style-type: none"> 1. Rated armature voltage (Volt) 2. Rated field excitation (Amp) 3. Permissible % variation in voltage 4. Minimum Permissible Starting voltage (volt) 5. At rated voltage <ol style="list-style-type: none"> i) Full load Armature current.(Amp) ii) Full load Field current (Amp) iii) No load Armature current (Amp) 6. Full load Field current (Amp) 7. No load Aramature current (Amp) 8. Minimum permissible field current(Amp) to avoid overspeeding at <ol style="list-style-type: none"> i) Maximum permissible voltage 		
NAME OF THE PROJECT..... STEAM GENERATOR PACKAGE	TECHNICAL DATA SHEET SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102-2	PART-F CHAPTER-I SUB-SECTION:DE1 (ELECTRICAL)	PAGE 15 OF 16

Clause No.	MOTORS		
 (Bidder's Name)		
	<ul style="list-style-type: none"> <li data-bbox="544 595 751 618">ii) Rated voltage <li data-bbox="544 651 911 674">iii) Minimum Permissible Voltage 		
	9. Resistance (indicative Values) in ohm		
	<ul style="list-style-type: none"> <li data-bbox="544 786 815 864">i) Armature winding (Arm + IP + Series) at 25 deg.C <li data-bbox="544 887 879 909">ii) Field Winding at 25 deg. C 		
	10. Inductance (indicative values)		
	<ul style="list-style-type: none"> <li data-bbox="544 999 791 1021">i) Armature winding <li data-bbox="544 1043 751 1066">ii) Field winding 		
	11. Value of trimmer resistance (ohm) to be connected in series with the shunt field to obtain rated speed at		
	<ul style="list-style-type: none"> <li data-bbox="544 1245 719 1267">i) 220 V DC <li data-bbox="544 1290 719 1312">ii) 250 V DC <li data-bbox="544 1335 719 1357">iii) 187 V DC 		
	12. Value of the external resistance (ohm) required to be connected in series with armature during starting only		
	13. Technical data sheet for external resistance box		
	14. GA drawing of motor		
	15. Starting time calculation		
	16. Starter resistance design calculation		
	17. Electrical connection diagram of motor		
NAME OF THE PROJECT..... STEAMGENERATORPACKAGE	TECHNICAL DATA SHEET SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102-2	PART-F CHAPTER-I SUB-SECTION:DE1 (ELECTRICAL)	PAGE 16 OF 16



TITLE :
**TECHNICAL SPECIFICATION FOR
COLTCS**

SPEC. NO. PE-TS- 394-165-N001

VOLUME III

SECTION

REV. NO. 0

DATE 16.08.2013

SHEET 1 OF 1


SECTION B2
LIST OF SCHEDULES

CHECKLIST - LIST OF SCHEDULES

Sl. No.	Form No.	Description	Tick Applicable Forms
1.	PEM-6024	Schedule of Drawings/Catalogues submitted with Bid.	✓
2.	PEM-6025@	Schedule of Occurrence of Key Events of Delivery, Erection & Commissioning	
3.	PEM-6026	Schedule of Equipment Manufacture. Despatch and Shipment to Site.	✓
4.	PEM-6027	Schedule of Weights & Dimensions.	
5.	PEM-6028@	Schedule of Performance Guarantee	
6.	PEM-6030	Inspection Schedule	✓
7.	PEM-6031	Schedule of Cement and Steel and Quarterly Cement Requirement.	
8.	PEM-6032	Schedule of Quarterly Requirement of Reinforcing Bars and Structural Steel.	
9.	PEM-6033@	Bill of Quantities (Civil Works)	
10.	PEM-6035	Schedule of Bidder's Proposed Construction/ Site Fabrication Facilities.	
11.	PEM-6036	Schedule of Deviations.	✓
12.	PEM-6040	Schedule of Declaration	✓
13.	PEM-6041	Quality Plan	✓
14.	PEM-6042	Vendor's Drawings/ Documents Schedule	✓
15.	PEM-6043@	Schedule of Occurrence of Key Events for Civil/Structural Works	
16.	PEM-6046	Inspection Request.	✓
17.	PEM-6051@	Schedule of Prices.	✓
18.	PEM-6052@	Schedule of Unit prices	✓
19.	PEM-6053	Schedule of Prices for Commissioning & Mandatory Spares.	✓
20.	PEM-6054	Schedule of Prices for Recommended Spares.	✓
21.	PEM-6055	Schedule Prices for Erection and Maintenance Tools & Tackles.	✓
22.	PEM-6057	Schedule of Daily & Overtime Rates.	
23.	PEM-6058	Schedule of Hire charges for Construction/ Site Fabrication Facilities.	

For Forms marked with @ certain information to be filled by DEs before issuing to bidder.

FORM NO PEM 6024-1

	<h3>SCHEDULE OF DRAWINGS/CATALOGUES SUBMITTED WITH BID</h3>	SPECIFICATION NO: VOL III SHEET..... OF.....
Section C/D enclosed with the specification indicate the drawings / catalogues to be furnished with the bid. The bidder in addition to furnishing the same, can also include any other drawings / catalogues which he may desire to submit with the bid. This schedule duly lists out such drawings as enclosed by the bidder with the bid.		
DRAWING/ CATALOGUE NUMBER	DESCRIPTION	NUMBER OF SHEETS

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

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FORM NO PEM 6026-1



**SCHEDULE OF EQUIPMENT,
MANUFACTURE, DESPATCH AND
SHIPMENT TO SITE**

SPECIFICATION NO:

VOL III

SHEET OF.....

Equipment/Major Bought-out items	Time for Manufacture/ Procurement from Date of issues of Letter of intent (Weeks)	Time for Test Dismantling Packing & Ready for Despatch (Weeks)	Time required fro Shipment to Site (Weeks)	Total Time from Date of Issue of Letter of intent to Shipment to Site (Weeks)

We, the undersigned hereby undertake to meet the schedule in weeks from manufacture, dispatch and shipment of each equipment and procurement of major boughtout items as listed above.

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

FORM NO PEM 6027-1



SCHEDULE OF WEIGHTS & DIMENSIONS

SPECIFICATION NO:

VOL III


SHEET..... OF.....

The bidder shall state below the weights and dimensions of various packages for shipment covering the complete scope.


Description of Package(S)	Dimension (in meters)	Weight (in tones)

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

FORM NO PEM 6030-1

		<h2 style="margin: 0;">INSPECTION SCHEDULE</h2>		SPECIFICATION NO	
				VOL III	
				SHEET OF	
S No.	ITEM/COMPONENT	PLACE & ADDRESS OF TEST / INSPECTION	SCHEDULE D DATE OF INSPECTION	DURATION OF TEST / INSPECTION (IN DAYS)	
<p>This schedule shall be in the line with specification and quality plan requirements. The information in this form shall be furnished after receipt of LOI/PO.</p>					

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

	TITLE * SCHEDULE OF DECLARATIONS	SPECIFICATION NO
		VOL III
		SHEET..... OF.....

* Bidder shall include this schedule both in technical and Price offers

DECLARATION

Icertify that all the technical data and information pertaining to this specification are correct and are true representation of the equipment/system covered by our format proposal number Dated and there is no deviation to the specification.

I hereby certify that I am duly authorized representative of the Bidder's company whose name appears above my signature.

Biders Company Name

Authorised representative's Signature

Name

Bider's Name The bidder hereby agrees to fully comply with the requirements and intent of this specification for the price indicated


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



QUALITY PLAN

S. No.	COMPONENT / OPERATION	SHEET OF		CAT	CUSTOMER		REFERENCE DOCUMENT	EXTENT OF CHECK	ACCEPTANCE NORM	FORMAT OF RECORD	SPECIFICATION NUMBER						
		CHARACTERISTIC CHECK	OF		BIDDER/ VENDOR	SYSTEM					PROJECT TITLE	QUALITY PLAN NUMBER	SPECIFICATION TITLE	SECTION	AGENCY		REMARKS
															P	W	
1	2	3	4	5	6	7	8	9	10	11							
BHEL												BIDDER / VENDOR					
NAME																	
SIGNATURE																	
DATE												BIDDER/VENDOR COMPANY SEAL					

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		*SCHEDULE OF PRICES FOR COMMISSIONING AND MANDATORY SPARES				SPECIFICATION NO			
						VOL III			
						SHEET..... OF.....			
<p>*Unpriced schedule shall also be furnished along with Part A- Schedule in technical bid The bidder shall indicate here the quantity required for erection / commissioning and mandatory spares for equipment as listed in Section C / Section – D. If the listed spares are not adequate then the bidder shall indicate those and additional spares considered necessary by him.</p>									
Type	Manufacturer's Drawing No / Part of spare	Description	Material	Quantity per Unit / Equipment	Quantity Recommended	If Set, Nos. Per Set	Delivery Period (Weeks)	Unit Price (Rs.)	Total Price (Rs.)
Erection & Commissioning									
Mandatory Spares									
Additional Spares Mandatory Erection / Commissioning									

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

