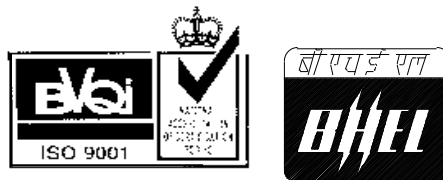


**2X660 MW ENNORE SEZ STPP  
AT ASH DYKE OF NCTPS, CHENNAI**


**VOLUME –III**

**TECHNICAL SPECIFICATION  
FOR  
DEBRIS FILTER (DF)**

**Specification No. : PE-TS- 412-165-N001 (REV. 0)**



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

	<b>TITLE : TECHNICAL SPECIFICATION</b> <b>FOR</b> <b>DEBRIS FILTER (DF)</b>	<b>SPEC. NO. PE-TS- 412-165-N001</b>	
	<b>PREAMBLE</b>	<b>VOLUME : III</b>	
		<b>REV. NO. 0</b>	<b>DATE :15.06.2015</b>
		<b>SHEET 1 OF 1</b>	

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	SPEC. NO. PE-TS- 412-165-N001	
	FOR	VOLUME : III	
	DEBRIS FILTER (DF)	REV. NO. 0	DATE :15.06.2015
	PREAMBLE	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 DEBRIS FILTER (DF)	SPEC. NO. PE-TS- 412-165-N001	
	PREAMBLE	VOLUME : III	
		REV. NO. 0	DATE :15.06.2015
		SHEET 1 OF 1	

## INDEX

SECTION	TITLE
<b>A</b>	<b>DETAILS TO BE FURNISHED ALONGWITH BID</b>
A1.	COMPLIANCE CERTIFICATE
A2.	PERFORMANCE GAURANTEE SCHEDULE
A3.	TECHNICAL DEVIATION SCHEDULE
A4.	ELECTRICAL LOAD DATA
A5.	GA DRAWING OF DF
A6.	SCHEDULE OF PRICES (AS PER NIT)
A7.	SCHEDULES OF UNIT PRICES (AS PER NIT)
<b>B</b>	<b>DOCUMENTS TO BE SUBMITTED ON PLACEMENT OF LOI</b>
B1.	DATASHEET – B
B2.	SCHEDULES AS PER LIST.



TITLE :  
TECHNICAL SPECIFICATION FOR  
DF

SPEC. NO. PE-TS- 412-165-N001

VOLUME III

SECTION

REV. NO. 0


DATE 15.06.2015

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/DF
- UNIT PRICE SCHEDULE (AS PER NIT)
- TOTAL PRICE SCHEDULE (AS PER NIT).

	<b>TITLE : COMPLIANCE CERTIFICATE FOR DF</b>	<b>SPEC. NO.</b>	<b>SPEC. NO. PE-TS- 412-165-N001</b>
	<b>Project: 2X660 MW ENNORE SEZ STPP AT ASH DYKE OF NCTPS, CHENNAI</b>	<b>DATE:</b>	15.06.2015
		<b>SHEET :</b>	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 3<sup>rd</sup> 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 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 as per the price format.
- h) All Instruments shall be located in the Instrument Rack (as applicable) to be supplied by bidder.  
  
The instrument rack shall be installed near DF with impulse piping, root valves, fittings, accessories, valve manifolds mounted on gauge racks etc. supplied by bidder accordingly.
- i) The main flanges for DF shall be suitable for the forces and moments as per the specification.
- k) Installation of Cathodic protection along with sacrificial anodes.
- l) The hydrostatic test pressure shall be 1.5 times the design pressure.
- m) All sub - vendors shall be subject to BHEL/ Customer/Customer's Consultant approval in the event of order.
- n) The Performance guarantees of equipments shall stand valid till the satisfactory completion of performance testing & its acceptance by BHEL/ Customer/Customer's Consultant.
- o) The offered DF have been supplied by bidder in the past meeting the customers qualifying criteria of its operation at two sites for minimum period of two years. Any deviation to this criteria shall be suitably highlighted in the deviation schedule.

	<b>TITLE : COMPLIANCE CERTIFICATE FOR DF</b>	<b>SPEC. NO.</b>	<b>SPEC. NO. PE-TS- 412-165-N001</b>
	<b>Project: 2X660 MW ENNORE SEZ STPP AT ASH DYKE OF NCTPS, CHENNAI</b>	<b>DATE:</b>	15.06.2015
		<b>SHEET :</b>	2 OF 2

p) The orientation of piping around DF shall be finalised during detailed Engg.

q) 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.
- Switch gear panel should have suitable arrangement like bus coupler for providing redundancy to incoming supply feeder.



TITLE : **SCHEDULE OF PERFORMANCE GUARANTEES  
FOR  
DEBRIS FILTER (DF)**


SPEC. NO. PE-TS- 412-165-N001

VOLUME : III

Sheet 1 of 1 Date- 15.06.2015

S.NO.	DESCRIPTION	UNITS	2X660 MW ENNORE SEZ STTP AT ASH DYKE OF NCTPS, CHENNAI
1.	Pressure drop across the Debris Filter (i.e. between inlet & outlet nozzle) under clean condition and Normal flow condition	MWC	

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

	<p><b>TITLE</b></p> <p style="text-align: center;"><b>* SCHEDULE OF DEVIATIONS</b></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 :  
TECHNICAL SPECIFICATION FOR  
DF

SPEC. NO. PE-TS- 412-165-N001

VOLUME III

SECTION

REV. NO. 0

DATE 15.06.2015

SHEET 1 OF 1

## SECTION B

SHALL BE FURNISHED ON PLACEMENT OF LOI

- DATASHEET B
- LIST OF SCHEDULES



TITLE :  
TECHNICAL SPECIFICATION FOR  
DF

SPEC. NO. PE-TS- 412-165-N001

VOLUME III

SECTION

REV. NO. 0

DATE 15.06.2015

SHEET 1 OF 1

**SECTION B1**

**DATASHEET B**



**Title**            **DATA SHEET - B**  
**DEBRIS FILTER**  
**(BACKWASH TYPE)**

**PECIFICATION NO.** PE-TS-999-165-N003  
**VOLUME**    III        **PART**    A  
**SHEET**      I        **OF**      9

**INSTRUCTION TO BIDDER**    1 This data sheet shall be read in conjunction with Specification No. PE-TS-999-165-N003 Section - D, Volume - IIB.  
 2. Items which deviate from Specification shall be marked with an asterisk (\*)

SL.NO.	ITEM	UNIT	PARTICULARS
1.0	General :		
1.1	Number of Debris Filter being supplied.	Nos.	
1.2	Type & Model (on-line/off-line)		
1.3	Manufacturer		
1.4	Country of origin		
1.5	Capacity, each	M <sup>3</sup> /hr	
1.6	Size		
	a) Inlet connection	mm	
	b) Outlet connection	mm	
1.7	Liquid to be filtered		
2.0	Design :		
2.1	Design Pressure	Bar (g)	
2.2	Design Temperature	°C	
2.3	Flow rate through the Filter :	M <sup>3</sup> /hr	
	a) Normal		
	b) Maximum allowable		
	c) Minimum		
2.4	Design differential pressure for filter section/ screen	bar (g)	
3.0	Guaranteed Performance		
3.1	Pressure drop across the Filter (i.e., between inlet and outlet connections) at normal flow rate.	Bar	
	a) Clean condition		
	b) 50% choked condition		
	c) During flushing operation		
	d) After flushing operation		
3.2	Debris discharge flow during flushing operation.	M <sup>3</sup> /hr	
3.3	Flushing period	Minutes	

**Name of Bidder/ Vendor**

<b>Revision Number</b>	0	1	2	3	4
<b>Signature of Bidder/ Vendor Authorised Representative</b>					
<b>Date</b>					



Title **DATA SHEET - B  
DEBRIS FILTER  
(BACKWASH TYPE)**

PECIFICATION NO PE-TS-999-165-N003

VOLUME III PART A

SHEET 2 OF 9

**INSTRUCTION TO BIDDER**

1. This data sheet shall be read in conjunction with Specification No. PE-TS-999-165-N003 Section - D, Volume - IIB.
2. Items which deviate from Specification shall be marked with an asterisk (\*)

SL.NO.	ITEM	UNIT	PARTICULARS
3.4	Minimum pressure differential to cause flushing/ backwashing		
3.5	Maximum size of Particle/ debris which can be safely handled by the filter.		
3.6	Power consumption during flushing	<del>kW</del>	
	a) Flushing Valves(s)		
	b) Debris Discharge Valve		
	c) Debris Extractor		
	d) Water Injector Pump (if any)		
	e) Any other		
	f) Total		
4.0	Operation :		
4.1	Whether automatic flushing/ back-washing operation effected by the following		
	a) Differential pressure		YES/NO
	b) Adjustable timer		YES/NO
	c) Push button		YES/ NO
	d) Any other		YES/NO
4.2	Whether provision for manual flushing / backwashing operation is made in the event of control system failure.		YES/ NO
5.0	<b>Filter Housing Body :</b>		
5.1	Code/ Standard		
5.2	Outer diameter	mm	
5.3	Thickness	mm	
5.4	Materials		
	Housing/ Body		
	Internal Hardware		

Name of Bidder/ Vendor

Revision Number

0

1

2

3

4

Signature of Bidder/ Vendor  
Authorised Representative



**Title** DATA SHEET - B  
DEBRIS FILTER  
(BACKWASH TYPE)

PECIFICATION NO. PE-TS-999-165-N003  
VOLUME III PART A  
SHEET 3 OF 9

**INSTRUCTION TO BIDDER**

1. This data sheet shall be read in conjunction with Specification No. PE-TS-999-165-N003 Section - D, Volume - IIB.
2. Items which deviate from Specification shall be marked with an asterisk (\*)

SL.NO.	ITEM	UNIT	PARTICULARS
5.5	External hardware Lining materail (if applicable) and thickness		
5.6	Inspection Hole :		
	a) Type		
	b) Size	mm	
5.7	Whether sight glass is provided		YES/NO
6.0	Filter Section/ Screen Assembly :		
6.1	Perforation/ mesh size	mm	
6.2	Free filter surface area	m <sup>2</sup>	
6.2	Total surface area	M <sup>2</sup>	
6.4	Thickness	mm	
6.5	Materails :		
	a) Filter section/ scree		
	b) Supporting cage		
	c) Hardware for fixing the filter section/ screen		
7.0	Flushing/ Backwashing Unit :		
7.1	Type		
7.2	Flushing Valves (if applicable)		
	a) Nos. provided	Nos.	
	b) Type		
	c) Materials		
	• Body		
	• Disc/ Flap		
	• Shaft		
	d) Tag Number		

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



Title **DATA SHEET - B  
DEBRIS FILTER  
(BACKWASH TYPE)**

PECIFICATION NO. PE-TS-999-165-N003  
VOLUME III PART A  
SHEET 4 OF 9

**INSTRUCTION TO BIDDER** 1 This data sheet shall be read in conjunction with Specification No. PE-TS-999-165-N003 Section - D, Volume - IIB.  
2 Items which deviate from Specification shall be marked with an asterisk (\*)

SL.NO.	ITEM	UNIT	PARTICULARS
7.3	Debris Extractor (if applicable) a) Type b) Materials		
7.4	Debris discharge/ backwash outlet valves a) Type b) Size c) Materials ♦ Body ♦ Disc/ Trim ♦ Shaft d) Tag Number	mm	
7.5	Size of Debris discharge/ backwash outlet valves is greater than pipe line size		YES/NO
7.6	Any water injection is required		YES/ NO
7.7	Whether Pump, valves and piping for water injection is included in the offer.		YES/ NO.
7.8	Debris discharge/ backwash outlet pipe a) Material b) O.D. and thickness	mm	
8.0	<b>Differential Pressure Measuring System:</b>		
8.1	Differential Pressure Switch/ Transmitter a) Type b) Make and Model c) Range d) Accuracy		

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



**Title**  
**DATA SHEET - B**  
**DEBRIS FILTER**  
**(BACKWASH TYPE)**

PECIFICATION NO. PE-TS-999-165-N003

VOLUME III PART A

SHEET 5 OF 9

**INSTRUCTION TO BIDDER** 1 This data sheet shall be read in conjunction with Specification No. PE-TS-999-165-N003 Section - D, Volume - IIB.  
 2 Items which deviate from Specification shall be marked with an asterisk (\*)

SL.NO.	ITEM	UNIT	PARTICULARS
	c) Material of sensing element f) No. of contacts g) Contact rating h) Enclosure i) Type of Mounting	Nos.	
8.2	Whether differential Pressure gauge is provided for manual observation.		YES/NO
8.3	Differential Pressure Gauge :		
	a) Type b) Make and Model c) Range d) Accuracy e) Material of sensing element f) No. of contacts g) Dial size h) Enclosure i) Mounting	Nos. mm	
8.4	Whether built in flushing arrangement complete with flushing pump, valves, and associated piping, is provided.		YES/NO
8.5	Whether remote seal type D.P. Transmitter		YES/NO
9.0	<b>Timer for Flushing Operation</b>		
9.1	Timer make		
9.2	Range of duration setting		
10.0	<b>Actuators :</b>		
10.1	Actuators for flushing valves :		

Name of Bidder/ Vendor

Revision Number

0


1

2

3

4

Signature of Bidder/ Vendor  
 Authorised Representative

	<b>Title</b> <b>DATA SHEET - B</b> <b>DEBRIS FILTER</b> <b>(BACKWASH TYPE)</b>	<b>PECIFICATION NO.</b> PE-TS-999-165-N003
		<b>VOLUME</b> III <b>PART</b> A
		<b>SHEET</b> 6 OF 9

**INSTRUCTION TO BIDDER**

1. This data sheet shall be read in conjunction with Specification No. PE-TS-999-165-N003 Section - D, Volume - IIB.

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

SL.NO.	ITEM	UNIT	PARTICULARS
10.2	a) Type and make		
	b) Nos. provided		
	c) Motor rating	KW	
1.03	Actuators for debris discharge/ backwash outlet valves		
	a) Type and make		
	b) Motor rating	KW	
10.4	Actuator for Debris Extractor	KW	
	Type & make		
	Nos. provided		
11.0	Motor rating	KW	
	Any other		
	<b>Electric Drive Motors</b>		
11.1	Drive motor for water injection pump (if applicable)		
	a) Type and make		
	b) Rating	KW	
11.2	Drive motor for debris extractor		
	a) Type and make		
	b) Rating	KW	
11.3	Drive motor for differential pressure measure, measuring system flushing pump (if applicable).		
	a) Type and make		
	b) Motor rating	KW	

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

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**Title** DATA SHEET - B  
DEBRIS FILTER  
(BACKWASH TYPE)


PECIFICATION NO. PE-TS-999-165-N003  
VOLUME III PART A  
SHEET 7 OF 9

**INSTRUCTION TO BIDDER** 1 This data sheet shall be read in conjunction with Specification No. PE-TS-999-165-N003 Section - D, Volume - IIB.  
2 Items which deviate from Specification shall be marked with an asterisk (\*)

SL.NO.	ITEM	UNIT	PARTICULARS
11.4	Any other		
12.0	Counter Flanges for inlet & outlet :		
12.1	Nos. provided	Nos.	YES/NO
12.2	Type		
12.3	Size		
12.4	Rating		
12.5	Materials		
	a) Flanges		
	b) Bolts and Nuts		
	c) Gaskets		
12.6.	Code/ Standard		
12.7	Counter flanges for all other terminal points are provided.		YES/NO
13.0	Control Panel		
13.1	Type		
18.2	Model & Manufacturer		
13.3	Operating Voltage/ frequency	V/ Hz	
13.4	Control Voltage/ frequency	V/ Hz	
13.5	Materials of housing and door		
13.6	Protections/ interlocks provided for :		
13.7	Alarms/ Annunciations provided for :		
13.8	Indicators provided for :		

Name of Bidder/ Vendor

Revision Number	0	1	2	3	4
Signature of Bidder/ Vendor Authorised Representative					
Date :	- 49 -				

	<b>Title</b> <b>DATA SHEET - B</b> <b>DEBRIS FILTER</b> <b>(BACKWASH TYPE)</b>	<b>PECIFICATION NO.</b> PE-TS-999-165-N003			
		<b>VOLUME</b> III		<b>PART</b> A	
		<b>SHEET</b> 8 OF 9			

**INSTRUCTION TO BIDDER**


1. This data sheet shall be read in conjunction with Specification No. PE-TS-999-165-N003 Section - D, Volume - IIB.

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

SL.NO.	ITEM	UNIT	PARTICULARS
13.9	Whether counter to register number of flushing operations, is provided.		YES/ NO
13.10	Whether interconnecting control and power cabling between the control panel and filter is included in the offer.		YES/ NO
14.0	Whether lifting lugs are provided.		YES/ NO.
15.0	Whether supports complete with foundation plates, bolts, nuts, etc. are included in the offer (wherever required).		YES/ NO
16.0	<b>Shop Inspection and Tests</b>		
16.1	Whether all the tests and inspections as detailed in the specification/ quality plan are carried out.		YES/ NO
16.2	<b>Hydorstatic Test :</b>		
	a) Test Pressure	Bar (g)	
	b) Test duration	Minutes	
17.0	<b>Painting :</b>		
17.1	<b>External Surfaces :</b>		
	a) Surface Preparation		
	b) Primer		
	c) Finish		
17.2	<b>Internal Surfaces :</b>		
	a) Surface Preparation		
	b) Primer		
	c) Finish		
18.0	<b>Weights :</b>		

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

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	<b>Title</b> <b>DATA SHEET - B</b> <b>DEBRIS FILTER</b> <b>(BACKWASH TYPE)</b>	<b>PECIFICATION NO.</b> PE-TS-999-165-N003	
		<b>VOLUME</b> III	<b>PART</b> A
		<b>SHEET</b> 9 OF 9	


**INSTRUCTION TO BIDDER**

- This data sheet shall be read in conjunction with Specification No. PE-TS-999-165-N003 Section - D, Volume - IIB.
- Items which deviate from Specification shall be marked with an asterisk (\*)

SL.NO.	ITEM	UNIT	PARTICULARS
18.1	Empty Weight	Kg.	
18.2	Operating	kg	
19.0	Overall Dimensions		
	a) Debris Filter		
	b) Flushing skid		
	c) D.P. measuring system skid		
20.0	Weight of heaviest unit/ component to be handled.		
21.0	Space required for removal.		
22.0	Headroom required during installation at site.		
23.0	Other information (if any)		
	G:\MSEVASHDS-DF.RTF		


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

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	TITLE	SPECIFICATION NO.
	<b>MOTOR DATA SHEET - C</b>	VOLUME II B
		SECTION D
		REV NO. 00 DATE 29/08/2005
		SHEET 1 OF 2

S. No.	Description	Data to be filled by successful bidder
<b>A.</b>	<b>General</b>	
1	Manufacturer & country of origin	
2	Motor type	
3	Type of starting	
4	Name of the equipment driven by motor & Quantity	
5	Maximum Power requirement of driven equipment	
6	Rated speed of Driven Equipment	
7	Design ambient temperature	
<b>B.</b>	<b>Design and Performance Data</b>	
1	Frame size & type designation	
2	Type of duty	
3	Rated Voltage	
4	Permissible variation for	
5	a) Voltage	
6	b) Frequency	
7	c) Combined voltage & frequency	
8	Rated output at design ambient temp (by resistance method)	
9	Synchronous speed & Rated slip	
10	Minimum permissible starting voltage	
11	Starting time in sec with mechanism coupled	
12	a) At rated voltage	
13	b) At min starting voltage	
14	Locked rotor current as percentage of FLC (including IS tolerance)	
15	Torque	
	a) Starting	
	b) Maximum	
16	Permissible temp rise at rated output over ambient temp & method	
17	Noise level at 1.0 m (dB)	
18	Amplitude of vibration	
19	Efficiency & P.F. at rated voltage & frequency	
	a) At 100% load	
	c) At 75% load	

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

	TITLE	SPECIFICATION NO.	
	<b>MOTOR</b>  <b>DATA SHEET - C</b>	VOLUME	II B
		SECTION	D
		REV NO. 00	DATE 29/08/2005
		SHEET	2 OF 2

S. No.	Description	Data to be filled by successful bidder
	c) At starting	
<b>C.</b>	<b>Constructional Features</b>	
1	Method of connection of motor driven equipment	
2	Applicable Standard	
3	DOP of Enclosure	
4	Method of cooling	
5	Class of insulation	
6	Main terminal box	
	a) Type	
	b) Power Cable details (Conductor, size, armour/unarmour)	
	c) Cable Gland & lugs details (Size, type & material)	
	d) Permissible Fault level ( kArms & duration in sec)	
7	Space heater details (Voltage & watts)	
8	Flame proof motor details (if applicable)	
	a) Enclosure	
	b) suitability for hazardous area	
	i Zone	O / I / II
	ii Group	IIA / IIB / IIC
9	No. of Stator winding	
10	Winding connection	
11	Kind of rotor winding	
12	Kind of bearings	
13	Direction of rotation when viewed from NDE	
14	Paint Shade & type	
15	Net weight of motor	
16	Outline mounting drawing No (To be enclosed as annexure)	
<b>D.</b>	<b>Characteristic curves/ drawings</b> (To be enclosed for motors of rating $\geq 55KW$ )	
	a) Torque speed characteristic	
	b) Thermal withstand characteristic	
	c) Current vs time	
	d) Speed vs time	

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			



TITLE :  
TECHNICAL SPECIFICATION FOR  
DF

SPEC. NO. PE-TS- 412-165-N001

VOLUME III

SECTION

REV. NO. 0

DATE 15.06.2015

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 Occurance 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 Occurance 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-6056	Schedule of Bidder's Man-power for Supervision of E & C and their Charges.	✓
23	PEM-6057	Schedule of Daily & Overtime Rates	
24	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.			



SCHEDULE OF DRAWINGS /  
CATALOGUES SUBMITTED WITH BID

PE-70-214 230 232 233 234-  
165-N001  
PART - A  
SHEET - 1

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 AUTHORIZED REPRESENTATIVE



**SCHEDULE OF  
WEIGHTS & DIMENSIONS**

PE-TS-214/230 232 233/234-  
165-N001

VOLUME III PART - A

SHEET OF

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

Description of Package(s)	Dimensions (in meters)	Weight (in tonnes)

PARTICULARS OF BIDDER AUTHORIZED REPRESENTATIVE

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

PROJECT NO. PE-TC-014/030 000/000 004-  
165-N001

VOLUME: PART - A

SHEET OF

Equipment Major Bought-out Items	Time for Manufacture Procurement from Date of Issue of Letter of Intent (Weeks)	Time for Test, Dismantling Packing & Ready for Despatch (Weeks)	Time required for 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 above time schedule in weeks for manufacture, despatch and shipment of each equipment and procurement of major boughtout items as listed above

PARTICULARS OF BIDDER AUTHORIZED REPRESENTATIVE



# INSPECTION SCHEDULE

SECTION PE-TS-214/230/232/233/234 165-N00

P.O.  
NUMBER

VOLUME - PART-A

SHEET OF

S. No.	ITEM/COMPONENT	PLACE & ADDRESS OF TEST / INSPECTION	Scheduled Date of Inspection	Duration of Test / Inspection (in days)

This schedule shall be in line with specification and quality plan requirements. The information in this form shall be furnished after receipt of LOI / PO

PARTICULARS OF VENDOR'S AUTHORIZED REPRESENTATIVE

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SPEC NO PE-15-214-25  
233/234-165-1061

SPECIFICATION FOR  
COLLECTOR'S DE

SECTION VOLUME III

PROJECT TITLE

QUALITY PLAN NUMBER

ITEM

CUSTOMER

BIDDER / VENDOR

SYSTEM

# QUALITY PLAN

SHEET OF

COMPONENT / OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE / METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
								P	W	V	
2	3	4	5	6	7	8	9	10			11

BIDDER / VENDOR

PARTICULARS

NAME

SIGNATURE

DATE

BIDDER'S / VENDOR'S COMPANY SEAL

**INSTRUCTIONS FOR FILLING QUALITY PLAN**  
(Form No. PEM-6042-0)

The Quality Plan shall include all the Quality Control Measures and Checks adopted by the Vendor to ensure that the material component/assembly/services supplied by him meet/will meet the requirements as per specifications and good practices. They shall include all stages of operation such as materials, processes, manufacture, assembly, packing and despatch. The following guide lines may be noted

- Column 1- Serial Number
- Column 2- Component/Operation- The component and/or operation being checked shall be given here.
- Column 3- Characteristics check- The characteristics being checked shall be given here, e.g., chemical composition, mechanical properties, leak tightness, surface defects etc.
- Column 4- Category - 'CR' stands for critical characteristic - affecting safety of equipment and personnel  
'MA' stands for major Characteristic - affecting safety of equipment and personnel  
'MI' stands for minor characteristic - affecting appearance etc
- Column 5- Type/Method of check e.g chemical analysis tensile testing, hydraulic test, visual examination radiography etc
- Column 6- Extent of check, such as, 100, 10, 1 per heat etc.
- Column 7- Reference Documents - Documents, such as technical specification, drawings, standard specifications (IS, BS ETC.) procedure, etc. according to which check is done.
- Column 8- Acceptance Norms - Standards etc. according to which acceptability or otherwise of the characteristics being checked is decided.
- Column 9- Format of Record - Formats, log sheets, reports, etc. in which the observations are recorded. Standard log sheets, reports, formats etc. of the Vendors shall be numbered and such reference numbers shall be included here.
- Column 10- Agency - The agency which performs the test/instruction shall be written in sub-column 'W'  
The agency which verifies test certificates/inspection records and carries out audit check of the components/operation shall be written in sub-column 'V'  
The agencies are codified '1' stands for (BHEL)  
as 1,2 & 3 '1\*' means the operation shall be cleared by BHEL before the start of the next operation.  
'2' Stands for Vendor  
'3' stands for sub-Vendor of the Vendor and so on.

**Example :**

- Entry '3' in column 'P' means test/inspection to be performed by sub-Vendor's QC
- Entry '2' in column 'W' means test/inspection to be witnessed by Vendor's QC
- Entry '1' in column 'V' means verification shall be done by BHEL and next stage to be started only after the hold point is cleared by BHEL
- Column 11- Remarks - Any special remarks shall be given here

**NOTES**

- 1 In absence of correlation with the test certificate(s) (e.g. material identification) samples shall be drawn by BHEL and all tests as per relevant specifications shall be carried out in their presence or in recognized Government Laboratory.
- 2 When materials and components are initially identified and stamped by BHEL QS engineer, the identification marks shall be preserved till despatch. Wherever this is not possible, the identification mark shall be transferred to the components in the presence of BHEL QS Engineer unless otherwise agreed
- 3 For castings and forgings integral test specimens shall be provided. When this is not possible for casting, they shall be poured in the presence of BHEL QS Engineer unless otherwise, if witnessing of test by BHEL, is called for
- 4 When welders qualified by reputed inspection agencies or statutory bodies are not available, qualification tests shall be conducted in the presence of BHEL QS Engineer
- 5 This Quality Plan is liable to be modified as per the requirements of approved drawings and changes in technical specifications drawings. If there are contradictions in respect of column 7 & 8 between this Quality Plan and the approved drawings specifications the latter shall prevail
- 6 Wherever inspection by BHEL's Purchaser Third Party Statutory authorities are mandatory this shall be complied with
- 7 Inspection reports log sheets test reports certificate etc shall be furnished to BHEL of the appropriate stage or at the time of final inspection as required
- 8 The Quality Plan is also applicable to spares of the under scope of supply of Vendor



# INSPECTION SCHEDULE

PE-TS-214-230-232-233-234-165-NCC

P.O.  
NUMBER

VOLUME (PART) A

SHEET OF

S. No.	ITEM/COMPONENT	PLACE & ADDRESS OF TEST / INSPECTION	Scheduled Date of Inspection	Duration of Test / Inspection (in days)

This schedule shall be in line with specification and quality plan requirements. The information in this form shall be furnished after receipt of LOI - PO

INSPECTORS OF VENDOR AUTHORIZED REPRESENTATIVE

COMPANY SEAL

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**\* SCHEDULE OF DECLARATION**

PE-TS-214/230 232 233/234-  
165-N001

TITLE SHEET PART - A

SHEET OF

**DECLARATION**

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

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

Bidders Company Name .....

Authorised representative's Signature .....

Name .....

Bidder's Intent The bidder hereby agrees to fully comply with the requirements and intent of this specifications for the price indicated.

PERCEI APS OF BIDDER AUTHORIZED REPRESENTATIVE



**\* SCHEDULE OF PRICES FOR  
COMMISSIONING AND MANDATORY  
SPARES**

REVISIONS TO BE INDICATED BY THE BIDDER

VOLUME III

SHEET OF

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.

Type	Manufacturer's Drawing No. / Part of spare	Description	Material	Quantity per Unit of Equipment	Quantity Required	If set. Nos. Per set	Delivery period (Weeks)	Unit Price (Rs)	Total Price (Rs)
Erection and Commissioning									
Mandatory Spares									
Mandatory Erection / Commissioning									

PARTICULARS OF BIDDER AUTHORIZED REPRESENTATIVE -





FORM No. P/EM-0050-0



**SCHEDULE OF BIDDER'S MAN POWER  
FOR SUPERVISION OF E & C  
AND THEIR CHARGES**

PROJECT NO. \_\_\_\_\_  
 VOLUME \_\_\_\_\_  
 SHEET \_\_\_\_\_ OF \_\_\_\_\_

The bidder shall indicate below, designation-wise, the personnel required for supervision of erection and commissioning and their charges.

**SUPERVISION OF ERECTION**

Sl. No.	Designation	Normal rate per day of 8 hours	Overtime rate per hour

**SUPERVISION OF COMMISSIONING**

Sl. No.	Designation	Normal rate per day of 8 hours	Overtime rate per hour

DETAILS OF BIDDER AUTHORIZED REPRESENTATIVE


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