An ISO 9001
Company

Bharat Heavy Electricals Limited
(High Pressure Boiler Plant)
Tiruchirappalli – 620014, TAMIL NADU, INDIA
MATERIALS MANAGEMENT

TITLE	Phone: +91 431 2574091/2574046 Fax : +91 431 252 0233 / 0525 Email : mshameed@bheltry.co.in
THREE LOBE ROOTS BLOWER	

	Reference Number: MM / PCPS / BLOWER	**Enquiry Date: 05.05.2012**	**Due date for submission of quotation: 30.06.2012**
You are requested to quote the Enquiry number date and due date in all your correspondences.			

BHEL/Trichy is looking for ..... Supply of **THREE LOBE ROOTS BLOWER**

BHEL commercial terms & conditions with Price Bid formats and all annexure can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units) Bharath Heavy Electricals Limited) under reference "**MM/ PCPS / BLOWER** "

Tenders should reach us before 14:00 hours on the due date Technical bid will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present.	Yours faithfully, For **Bharath Heavy Electricals Limited** M. Shahul Hameed 25/5/12 Manager / Purchase/ PCPS

General Note: **BHARAT HEAVY ELECTRICALS LIMITED**
(A Government of India Undertaking)
HIGH PRESSURE BOILER PLANT
PURCHASE DEPARTMENT - PCPS
THIRUCHIRAPALLI - 620014
TAMILNADU (INDIA)

PHONE : 91-431-2574072
GRAMS : BHARATELEC
FAX NO: 91-431-2520233
E-mail :ssmci@bheltry.co.in
WEB : http://mm.bheltry.co.in

OFFICE COPY

Collective No.	Enquiry Date	Due Date For Quotation
5101200131	05.05.2012	30.06.2012

Please quote Enquiry No, Date and due date in all correspondences.
This is only a request for quotation and not an order

Item	Description	Unit	Quantity	Delivery Quantity	Schedule Date
10	L532014896501001 PURGE AND SEAL AIR BLOWERS ARE REQUIRED AS PER VAR 01 OF SEPCIFICATION NUMBER"PCPS:48BLO:KHNR:01:REV00".	NO	2.000	2.00	05.10.12
20	L532014896501002 ASH COOLER BLOWERS ARE REQUIRED AS PER VAR 02 OF SEPCIFICATION NUMBER"PCPS:48BLO:KHNR:01:REV00".	NO	2.000	2.00	05.10.12
30	L532014896501003 SEAL POT BLOWERS ARE REQUIRED AS PER VAR 03 OF SEPCIFICATION NUMBER"PCPS:48BLO:KHNR:01:REV00".	NO	3.000	3.00	05.10.12

General Note:

1) Complete technical details, Data sheets and relevant drawings along with point wise confirmation to specification shall accompany the offer (in triplicate).

2) Offer to be submitted on Two part bid basis (Techno-Comercial bid & Price bid) separately in two sealed covers.

Techno-commercial bid will be opened on the due date and after detailedevaluation, the Price-bid of the Techno-commercially suitable offers will be opened at a later date and shall be informed separately.

3) Incomplete offers will lead to rejection.

4) The applicable other price elements if any to be indicated very clearly

5) Prices shall be quoted with delivery terms FOB/Chennai port.

6) Our payment terms shall be 100% through irrevocable L/C against dispatch documents proof. Respective Bank charges to respective account.

7) Our LD clause 0.5% per week subject to max. of 15% shall be applicable for the delivery delay.

The offers should reach us 30 minutes before the time of opening of tenders.
The offers will be opened at 14.30 hrs on the due date of tender in the presence of tenderers who have submitted their offer and who may like to be present for the tender opening.Late and delayed offers are liable to be rejected.

Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**

23/5/12

M. SHAHUL HAMEED
MANAGER / PURCHASE
(FBC & HRSG)
Manager
Purchase / PCPS
BHEL, TRICHY - 620 014

BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)
HIGH PRESSURE BOILER PLANT
PURCHASE DEPARTMENT - PCPS
THIRUCHIRAPALLI - 620014
TAMILNADU (INDIA)

5101200131 / 05.05.2012 20441

8) We are floating this Tender as a Open Tender by hoisting in Web followed by Web Tender information in News Paper (PRESS).

Enclosures:

1) General Terms & condition
2) Spec No:PCPS:48BLO:KHNR:01:Rev00
3) Special Condition

"LD clause has to be confirmed without fail."

PR Links

The offers should reach us 30 minutes before the time of opening of tenders.
The offers will be opened at 14.30 hrs on the due date of tender in the presence of tenderers who have submitted their offer and who may like to be present for the tender opening.Late and delayed offers are liable to be rejected.

Yours faithfully,
For BHARAT HEAVY ELECTRICALS LIMITED
23/5/12
M. SHAHUL HAMEED
MANAGER (PURCHASE)
BHEL, TRICHY - 620 014.

BHARAT HEAVY ELECTRICALS LIMITED
HIGH PRESSURE BOILER PLANT
TRICHIRAPPALLI – 620 014

PROCESS AND CAPTIVE POWER SYSTEM
NON PRESSURE PARTS

SPEC NO.PCPS:48BLO:KHNR : 01:Rev00

SPECIFICATION
FOR
POSITIVE DISPLACEMENT TYPE THREE LOBE ROOTS BLOWER

REV . No	PAGE	REVISION HISTORY	DATE	Prepared	Reviewed	Approved
0		Fresh Release	21.04.2012	CHL	VR	SP

SPECIFICATION OF POSITIVE DISPLACEMENT TYPE THREE LOBE ROOTS BLOWER

COVER SHEET

CONTENTS

	NAME	SIGNATURE	DATE
PREPARED	CHL		21.04.2012
CHECKED	VR		21.04.2012
APPROVED	SP		21.04.2012

SPECIFICATION OF POSITIVE DISPLACEMENT TYPE THREE LOBE ROOTS BLOWER

In this specification, general details of blowers, their parameters, drive requirements are covered with variants. Under "Project related information" specific details related to the project will be given with the Indent.

Eligibility criteria :

A) Vendor should have designed, manufactured and supplied blowers for the capacity mentioned in project related information or higher capacity than that.

B) The above blowers should have been in trouble free operation continuously for a period of not less than two years.

Vendor to submit supportive documents for (A) and (B) above along with offer. Offer should not be submitted if above points (A) and (B) are not fulfilled by the vendor.

Responsibility:

The extent of supply stated herein is not necessarily exhaustive and shall not relieve the supplier from the responsibilities to provide goods & services necessary to satisfy the purchaser's performance criteria & required life, to be complete for installation & to be fit for purpose, safe, reliable, easily maintained and efficient in operation.

S.no	Details	Vendor Comments
1. SCOPE:		
1.1	Design, manufacture, inspection, testing, painting, packing and supply of positive displacement type three-lobed roots blower along with the following accessories:	
1.1.1	Common base frame for blower and motor.	
1.1.2	Suction and discharge silencer	
1.1.3	Non-return flap at blower outlet	
1.1.4	Pressure relief valve.	
1.1.5	Foundation bolt.	
1.1.6	Pulleys for both drive and driven side.	
1.1.7	Pulley belts with safety hood.	
1.1.8	Vibration isolation pad.	
1.1.9	Air intake filter with differential pressure switch.	
1.1.10	Proximity type zero speed switch for blower (One no)	
1.1.11	Proximity type zero speed switch for pressure relief valve (One no)	
1.1.12	Controllers for the above two proximity switches housed in a junction box.	
1.1.13	Vacuum indicator for suction side (One no).	
1.1.14	Pressure transmitter for delivery side (One no)	
1.1.15	First fill of lubricant in separate container.	
1.1.16	Local bearing temperature gauges (If required in design)	
1.1.17	Flexible connections at inlet & outlet of blower.	
1.1.18	Special tools for erection & maintenance.	
1.1.19	Start up / Commissioning spares, mandatory spares, waranty spares for two years are to be specified.	
1.1.20	In case of trouble shooting of the equipment, the supervision (including visits to site) till establishing the performance (approval by BHEL site office) of blower shall be free of charge.	
1.1.21	Any other requirements needed by supplier.	

1.1.22	Pressure transmitters and other measurement gauges shall be large enough to view the measurement and easily accessible.	
1.1.23	Expansion joint details (at inlet & outlet of blowers) like size ,specification and vendor details shall be given in the offer itself.	
1.1.24	In the project related information Inlet &outlet pipe sizes of blowers given by BHEL shall be confirmed by Vendor, if any changes same may be informed to BHEL in the offer itself.	
1.1.25	Cooling water requirement for the blowers (If required) shall be informed in the offer itself.	
1.2.	Supply of recommended spares. (Optional)	
1.3.	Erection and commissioning supervision at site. (Optional)	
1.4.	**While designing, if the capacity of drive motors are 160 kW and above, they are HT motors and in the scope of BHEL. Whereas, if the capacity of drive motors are below 200 kW, they are LT motors and in the scope of blower supplier. Also, vendor to give two separate offers for (1) blowers with LT motors and (2) blowers without motor.** HT motor details like, GA drawing, weight and shaft dimensions will be indicated to blower supplier, during engineering stage of the blower. i.e. after ordering the motor, based on the blower inputs indicated (in 1.4.2) below. The motor details like LT / HT, frequency, speed, insulation class etc.., is to be given separately.	
1.4.1.	Vendor should provide common base frame for Blower and motor. The applicable / maximum frame size, overall dimension / terminal box location / orientation of the motor which can be accommodated in the respective blowers / frame without any price implications to be indicated by the vendors. The following details for motor selection are to be clearly furnished by the vendors in the offer itself.	
1.4.2.	Speed-Torque characteristic of the blower applicable with full back pressure during start up, Motor shaft power, recommended motor K.W rating (with minimum 15 % reserve over the shaft power), Motor frame size, both blower & motor Pulley details, dimensions, weight, number of belts & type, center to center distance between pulleys, profile of pulley, Dynamic force (both radial & axial) acting on motor shaft, Full load torque of motor, speed of Blower & motor etc.	
2. APPLICATION:		
	The blowers are intended for supplying air to CFBC boiler at the required capacity and pressure as mentioned in Project related information.	
3. DESIGN CONSIDERATION:		
3.1.	The temperature of the blower components should not increase more than 135°C during operation.	
3.2.	The blower should contain nameplate containing all essential performance data.	
3.3.	The driving shaft should be sealed with a radial seal ring.	
3.4.	The contamination level of the intake filter should be read from a maintenance indicator installed at the front side.	
3.5.	Between blower and pneumatically operated KEGV (in customer's scope) valve there are no shut-off valves.	

	The discharge safety valve should protect the blower from over load.	
3.6.	Blower shall be designed suitable to function in a common blower room.	
3.7.	All the flanged joints should be machined and it should be leak tight.	
3.8.	Blower shall be designed for 24 hours on 365 days operation.	
3.9.	Should be capable of meeting all requirements as specified in this specification.	
3.10.	All materials used shall be of tested quality.	
3.11.	Type of lubrication to be indicated (pressure/splash)	
3.12.	The noise level of individual blower should be as minimum as possible.	
4. INSPECTION & TESING:		
4.1.	The blower is to be inspected as per the BHEL approved quality plan at vendor's works.	
4.2.	One number in each type of blower is to be tested for rated pressure and capacity.	
4.3.	The blower should be test run at vendor's work as well as at site for a continuous duration of 72Hrs. each.	
5. SPARES		
5.1	Start up / Commissioning spares, mandatory spares, waranty spares for two years are to be specified.	
5.2	Recommended spares for 2 years trouble free operation and separate commercial offer with unit price in sealed cover.	
6. DOCUMENTS TO BE SUBMITTED ALONG WITH THE OFFER		
6.1.	Point wise confirmation to the Specification. Filled in Annexure – A and C.	
6.2.	General arrangement of blowers with major dimensional details and with sufficient views for clear understanding of the blower indicating the floor space requirement. Cross-sectional detail of rotor to be shown in GA drawing.	
6.3.	The drawing showing the supporting arrangement on floor including static & dynamic loading details at each support to be submitted for purchaser's information.	
6.4.	Approximate weight of the blower.	
6.5.	Noise spectrum of individual blower.	
6.6.	Cumulative noise spectrum of all blowers.	
6.7.	Heat generated by individual blower during operation at design parameters and at ambient temperature.	
6.8.	Design calculation for	
6.8.1.	Capacity of the blower.	
6.8.2.	Selection of drive system (drive motor, coupling and rotor)	
6.8.3.	No-load and full-load power calculation considering the minimum and maximum operating conditions.	
6.9.	Typical quality Plan as per BHEL format (format enclosed) including material, fabrication, assembly, bought out items, no-load test, etc.	
6.10.	Document submission schedule.	
6.11.	Filled in data sheets as per Annexure-A.	
6.12.	Experience list of vendor relevant for the application intended and capacity of the blower supplied shall be submitted.	
6.13.	List of start up / Commissioning spares, mandatory spares, waranty spares for two years are to be specified.	

6.14.	List of and recommended spares for 2 years trouble free operation and separate commercial offer with unit price in sealed cover.	
6.15.	Schedule of deviations.	
6.16.	Checklist.	
6.17.	Typical O&M manual.	
6.18.	Data required for motor selection :	
6.18. 1	GD^2 value of Blower,	
6.18. 2	Moment of Inertia of Blower,	
6.18. 3	Absorbed Power at Blower Shaft,	
6.18. 4	Speed Vs Torque Characteristic Curve,	
6.18. 5	Dynamic force acting on motor shaft,	
6.18. 6	Recommended kW rating of Motor.	
	All documents submitted under this heading should be submitted in 2 sets unless otherwise noted.	
7. DOCUMENTS TO BE FURNISHED AFTER AWARD OF CONTRACT		
7.1.	Detailed dimensional general arrangement drawing of the total system with cross sectional details, bill of materials and weight of individual parts for purchaser's approval.	
7.2.	Torque requirement of blower and selection of drive rating.	
7.3.	The drawing showing the supporting arrangement on floor including static & dynamic loading details at each support to be submitted for purchaser's approval.	
7.4	Sound spectrum of individual blower.	
7.5	Cumulative Sound spectrum of all blowers.	
7.6	Heat dissipated by individual blower.	
7.7.	Specifications for bought out items.	
7.8.	Erection & commissioning procedures indicating the sequence, dos and don'ts and checklist.	
7.9.	Operation & Maintenance manual.	
7.9.1.	Number of copies required is 2 hard copies in addition to 0 & M in CD.	
7.9.2.	Manual (Hard copy) should be in printed form only.	
7.9.3.	The size of manuals should be in correct A4 size with drawings in A3/ A4 size.	
7.9.4.	Drawings shall be of printed or laser printed only.	
7.9.5.	Spiral or comb bound copies shall be totally avoided.	
7.9.6.	O & M manuals shall be submitted to BHEL Trichy, prior to dispatch of equipment.	
7.10.	Manuals generally should contain the following as minimum.	
7.10.1.	Datasheet.	
7.10.2.	Important instructions (do's and don'ts).	
7.10.3.	System description.	
7.10.4.	Installation and storage.	
7.10.5.	Operation.	
7.10.6.	List of illustrations.	
7.10.7.	Maintenance (including lubrication, where necessary) and service	
7.10.8.	Recommended spares.	
7.10.9.	Trouble shooting procedure.	

7.7.10.	Assembly drawings with part list, bill of materials, dimensional drawings and other applicable details.	
7.7.11.	Recommended lubrication schedule & scheme.	
7.7.12.	Short term and long term storage instruction manual.	
7.8.	Manuals should pertain only to the types or model supplied for the Particular contract.	
7.9.	Packing / shipping list as per BHEL format. GA drawing should have co-relation with the packing list.	
7.10.	Quality Plan for purchaser's approval.	
7.11.	Packing/shipping arrangement drawing for review.	
All documents submitted under this heading should be submitted in CD unless noted otherwise.		
8. PAINTING:		
8.1	Surface preparation & surface profile : SSPC-SP3 / Power Tool Cleaning	
8.2	Primer coat : Red oxide zinc phosphate (Alkyd Base) to IS12744 DFT=30 µm per coat.	
8.3	Number of coats : 2	
8.4	Finish coat : Syn. Enamel paint (Long oil Alkyd) to IS2932 DFT =20 µm per coat.	
8.5	Number of coats : 2 (one coat at manufacturing centre and second coat at site)	
8.6	Shade : Smoke Gray, shade number 692 of IS5.	
9. PACKING / SHIPPING:		
	All components of the blower should be packed in such a way that it should not get damaged during transport.	
10. GUARANTEE:		
	Performance (rated flow, head at design point) and power consumption at MCR, noise level at any 1m from the blower shall be guaranteed by the vendor.	
11. EXCLUSION & DEVIATIONS:		
	Supplier has to indicate clearly the exclusions and deviations in the offer stage itself with specific reasons. Deviation / exclusion will not be entertained after the award of contract.	
12. GENERAL:		
12.1	All drawings shall be prepared using AutoCAD 2010 and submitted in Compact Disk. O & M manual shall be prepared using Microsoft WORD and submitted in pdf format in a Compact Disk. Running Serial Number shall be given for each of the documents submitted and it should be indexed with a cover sheet.	
12.2	The extent of scope stated in S.no 1 of this specification is not necessarily exhaustive and it shall not relieve the vendor from his responsibility to provide goods and services necessary to satisfy the performance criteria and guarantee specified.	
13. OFFER:		
	Offer is to be submitted for the following:	
	Offer 1: Blowers without motor.	
	Offer 2: Blowers with LT motors.HT motors are not in blower supplier scope.	
	Note: 160KW & above are of HT motor. Below 160KW it is LT motor.	

Annexure-A

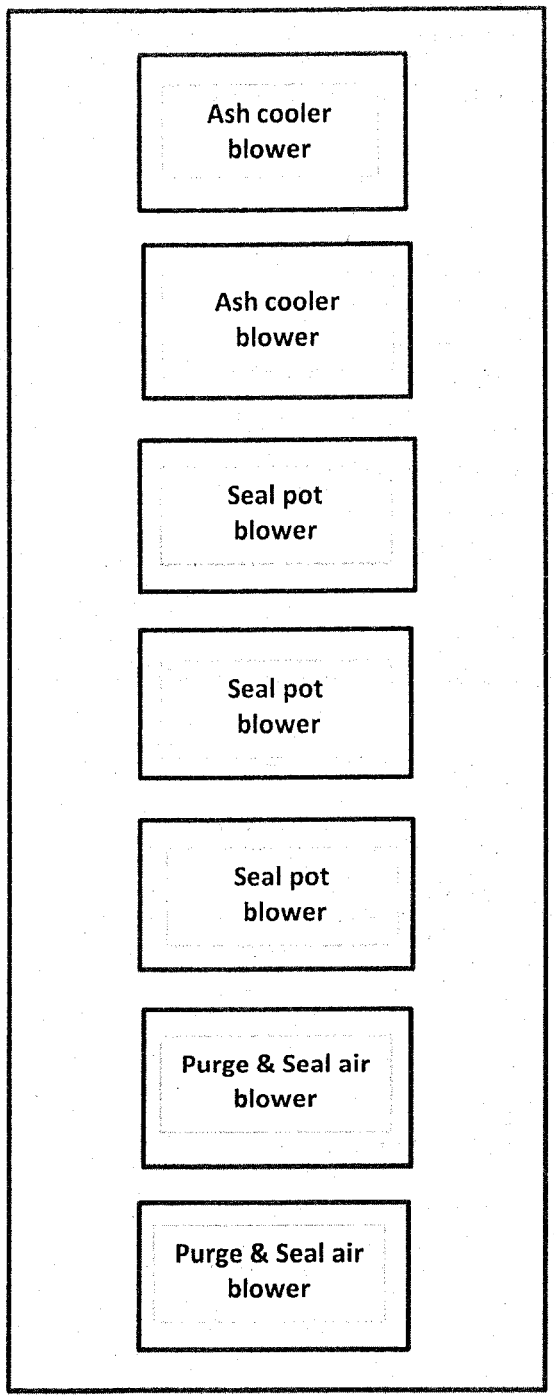
Design data

To be filled and submitted by the vendor along with the offer

No	DESCRIPTION		Unit	VAR 01	VAR 02	VAR 03	VAR 04
1.	Name			PURGE & SEAL AIR Blowers	Ash Cooler Blowers	SEAL POT Blowers	~~FBHE Blowers~~
2.	Medium to be handled						NA
3.	Volume per blower		Nm^3/hr				
4.	Differential Pressure	Normal	mbar				
		Maximum	mbar				
5.	Pressure at Inlet		mbar				
6.	Pressure at Outlet		mbar				
7.	Temp. at inlet	Normal	°C				
		Maximum					
8.	Temp. at outlet approx.		°C				
9.	Quantity		No.				
10.	Speed		rpm				
11.	Noise Level		dB(A)				
12.	Heat Load		In kW inside the blower room				
13.	Inlet Pipe Size		mm				
14.	Outlet Pipe Size		mm				
15.	Motor Rating		kW				
16.	Power consumption		kW				
17.	Cumulative noise level of all the blowers running at the same time						

Annexure - B

TYPICAL ARRANGEMENT OF BLOWERS IN ACOUSTIC INSULATED HALL



ANNEXURE-C

CHECKLIST

(To be filled and submitted by the vendor along with the offer.)

The following documents should be checked and signed by the authorized signatory. Offers not containing any of the documents will be liable for rejection without any further intimation. Vendor in his judgment may add further information, if required.

S.NO	DESCRIPTION	STATUS
1.	Point wise confirmation on the specification	
2.	General arrangement of blower with major dimensional details	
3.	The drawing showing the supporting arrangement	
4.	Approximate weight of the blower	
5.	Design calculation	
6.	Selection of drive system	
7.	Capacity of the blower calculation	
8.	No load and full load power calculation	
9.	Typical quality plan as per BHEL format	
10.	Document submission schedule	
11.	Filled in data sheets as per Annexure-B	
12.	Experience list of vendor	
13.	Typical erection and commissioning procedure	
14.	List of start up / commissioning spares, mandatory spares, waranty spares	
15.	List of recommended spares	
16.	Typical O& M manual	
17.	Schedule of deviations	
18.	Checklist in the form of Annexure-C	
19.	Two sets of above documents	

Signature of authorized signatory with office seal.

Annexure-D
Technical data
Project related information

SL No	DESCRIPTION	Unit	VAR 01	VAR 02	VAR 03	VAR 04
1	Name		PURGE AND SEAL AIR BLOWER	ASH COOLER BLOWER	SEAL POT BLOWER	~~FBHE BLOWER~~
2	Medium to be handled		Atmospheric Air			
3	Volume per blower	Nm^3/h	2400	7000	1600	**NA**
	Design					
	MCR	Nm^3/h	2400	7000	1600	
	Min	Nm^3/h	2400	7000	1600	
4	Total head developed	mbar(g)	900	500	500	
	Design					
	MCR	mbar(g)	900	350	400	
	Min	mbar(g)	900	350	400	
5	Suction pressure	mbar(a)	973	973	973	
	Design					
	MCR	mbar(a)	993	993	993	
	Min	mbar(a)	993	993	993	
6	Discharge pressure	mbar(a)	1873	1473	1473	
	Design					
	MCR	mbar(a)	1893	1343	1393	
	Min	mbar(a)	1893	1343	1393	
7	Temperature of medium	°C	50	50	50	
	Design					
	MCR	°C	30	30	30	
	Min	°C	8	8	8	
8	Density	kg/m^3	1.035	1.035	1.035	
	Design					
	MCR	kg/m^3	1.126	1.126	1.126	
	Min	kg/m^3	1.214	1.214	1.214	
9	Inlet pipe size(ODxt)	mm	D 219.1 x 6.35	D 406.4 x 6.4	D 219.1 X 6.35	
10	Discharge pipe size(ODxt)	mm	D 219.1 x 6.35	D 406.4 x 6.4	D 219.1 X 6.35	
11	Quantity	No.	2	2	3	

Note:

- POWER CONSUMPTION IS TO BE GUARANTEED AT M.C.R.

- THE INLET & OUTLET PIPE SIZES MENTIONED HAVE BEEN SELECTED BY BHEL AND VENDOR TO CONFIRM THE SAME,IF ANY CHANGE IN THE PIPE SIZES SHALL BE INFORMED IN THE OFFER ITSELF BY VENDOR.

BHEL -TRICHY
PCPS
ELECTRICALS, CONTROLS & INSTRUMENTATION

E,C&I SPECIFICATION FOR BLOWER

A. ELECTRICAL:

1. The Blower specifications shall be as below:
   a. LT motor specification. TDC:TCI:140
   b. Quality plan no: QA:CI:STD:QP:24
   c. Packing procedure: QA:CI:STD:PR:03
   d. Annexure to Specification of
      LT motors (AC) (Non-Flameproof): PCPS: CI: 140: 5320 Rev 00 (2 pages)

2. Make of motor: KIRLOSKAR ELECTRIC CO/ CROMPTON GREAVES/ BHARAT BIJLEE.
3. Vendor shall submit the filled up data sheets along with the offer itself.
4. **Documents after placement of order:**
   Motor terminal details, Catalogue, Final motor data sheet completely filled in all columns.

B. CONTROLS AND INSTRUMENTATION

1. Vendor should provided one no. Proximity type zero speed switch to detect the blower not running and limit switch for safety valve position for process interlock purpose. The Controllers/Barriers for the above shall be 24V DC rating and rail mounted with 1NO+1NC potential free contact output. The controller should be housed in a junction box and Terminal Block (TB) to be provided in the junction box (JB) for terminating input/output external cables with required double compression nickel plated cable glands.

2. Make of the proximity switch shall be TRUCK/ P&F/ E&H.

3. All JBs shall be Galvanised. Wall/column mounted junction boxes having 20% spare terminals and cable entry only at the bottom and sealed with fire proof compound; Screwed terminal type; Separate terminal blocks shall be used for analog and digital signal and also for signals with different voltages. Removable gland plate shall be supplied. JB shall have single lockable door with gasket, able to open sideways, with common keys. Painting inside shall be glossy white & outside - IS-5 shade 631. Shield bus for screw connection shall be provided. Terminal size shall be suitable for 0.5 sq.mm to 2.5sq.mm wire. Terminal blocks shall be vertical. JB shall have provision to add 10% additional terminals. Vendor has to supply Double compression nickel plated cable glands for incoming and outgoing cables. Junction Boxes & Terminal Boxes shall be IP65.Accessories like metal tag (SS), clamps, fixtures, bolts (SS), nuts (SS), gaskets (neoprene), lock & key, fire proof compound for sealing, etc. shall be supplied. The doors shall not have screwed type of locking, but turnable hinge based.

   The JBs are subject to approval prior to manufacturing All JBs shall be provided with individual canopies to avoid ingress of water.

   All the TBs used shall be 6.6polymide to withstand corrosion and the metallic portion shall be coated against rust / corrosion.

4. Vendor should provide one no pressure gauge in suction side and one no. pressure transmitter in the delivery side as per the following specification.

Pressure Gauge: Direct reading, pipe mounted Pressure gauges of Stainless Steel with 6 inch phenolic dial (white dial with black numerals), 316 SS Bourdon tube, AISI 304 movements and micrometer type adjustable aluminium pointer an accuracy of +/-0.5% of span including accessories like siphons for steam services, snubbers for pump discharge applications and chemical diaphragm for corrosive and oil services and name plate, etc. Material of accessories shall be SS. IP65 or equivalent degree of protection for enclosure. Over range protection shall be 50% above maximum pressure. Armoured capillary of 15 M shall be provided as required.

Pressure Transmitter: Microprocessor based True Smart Type with 2-way communication facility. No Retrofit models acceptable. Working principal of Capacitance / Piezoelectric / Silicon resonance. It shall have the output of 4 - 20 mA DC, 2 wire & Digital output for communication. Output indicator is Integral to the Transmitter at local. Range in Engg. unit with Digital indication. 24V DC from DCS power supply. 600 ohms at 24V DC load resistance. Continuously adjustable using the field configurator shall have easy accessible for span & zero adjustment. Over range protection for pressure transmitters to be about 1.5 times the max. Span as a minimum.

Accuracy in % for calibrated range (Accuracy including Linearity, Hysteresis & Repeatability) is 0.075%. Stability for six months with 0.1% of span. Ambient temperature effect per Deg C (Combined zero & span effect) is Minimum 0.01%. Range ability 100:1. Diaphragm shall be designed to withstand a minimum static pressure of 1.5times the maximum span without damage or permanent deformation. Proof Pressure shall be 200% of maximum static process pressure. Body Material shall be SS 316 & Rating is 2000 psi minimum. Casing is Die Cast aluminium. Sensing Element Type shall be Diaphragm & Material is SS 316. Internal parts & Flanges shall be SS 316. Packing/ 'O 'ring is Teflon. Filling fluid is Silicone. Shall have Weather proof Protection of NEMA4 (IP 65). Electrical connection shall be 1/2'' NPT (F) conduit.

5. Vendor should provide one no DP switch across suction filter as per the following specification.

DP switch: Bellows or diaphragm operated indicating field mounted type; aluminium casing (epoxy coated); 316 SS pressure element nylon movement; an accuracy of +/-1% of span within adjustable contact including accessories like snubbers for vibration services, chemical diaphragm with 15 m capillary for each limb for all corrosive and oil services and 5 way manifold, name plate & mounting brackets, etc. Material of accessories shall be SS. Auto reset micro switch with tamper proof external adjustable set values with 2 SPDT contacts rated for 0.2 A at 220 V DC. IP 65 or equivalent degree of protection over range protection 50% above maximum pressure. Repeatability shall be +/- 0.5% FSR. Local indication shall be available.

6. Vendor should submit the following documents:

a. Documents along with offer

(i) Technical leaflet for proximity switch, barrier/controller, pressure gauge DP Switches

(ii) PID of the system offered indicating draft gauges, DP switch, safety relief valve proximity sensor, temperature sensor etc.

b. Documents required after placement of order

(i) PID of the system.

(ii) HOOKUP circuit diagram/wiring diagram indicating safety relief valve proximity sensors, zero speed sensor, controller/amplifier up to terminal box (Junction Box)

HT Motors for blower are not in the blower vendor's scope.

C. Blower supplier has to confirm/provide the following along with offer:

1. Speed-Torque characteristic of the blower indicating back pressure during start up, Motor shaft power, recommended motor **K.W** rating, both blower & Motor pulley details, dimensions, weight, no of belts & type, center to center distance between pulleys, profile of pulley, Dynamic force (both radial & axial) acting on shaft, Full load torque of motor, Blower/motor speed.

2. Frame size of the motor will be indicated to blower supplier after ordering the motor, during engg of the blower, based on inputs indicated (1) above.

3. Blower supplier should provide common base frame for blower & motor to suit the selected motor frame size, Dimensions, terminal box location/orientation without any price.

Note:-
Vendor shall indicate any protection requirement to be taken care by Purchaser to protect the motor/equipment.

	Name	Signature	Date
Prepared	S.VANITHA		02.02.2012
Checked	D.JAYANTHEE		02.02.2012
Approved	S.JAYAPRAKASH		02.02.2012

DT. 12.01.2012

Annexure to Specification for LT motors(AC) (Non - Flameproof)

REF: TDC:TCI:140
In case of conflict, the order of priority shall be as below
PRIORITY: 1 This Annexure
PRIORITY: 2 TDC:TCI:140

1. Motors of rating upto 160KW shall be rated for 415V ± 10% & 50HZ ± 5%. Fault level is 50KA at 415V for 1 sec. Earthing provision shall conform to relevant IS OISD guide lines & IE rules.

2. Motor shall be suitable for an Ambient temperature of: 50 Deg.C.

3. The Motor data shall be furnished in the specification TDC:TCI:140 pages 05 & 06. All outdoor motors to be provided with canopy made of 16 gauge sheet steel enamel painted and bolted to motor base plate. All motors shall be suitable for outdoor application with IP55 degree of protection & locked rotor withstand time min. 8 sec. All equipment shall also be withstanding the maximum short circuit fault current at the point of installation for a time greater than the maximum fault clearing time. The product of Power factor & full load efficiency shall be as per IS 8789 and Frame size shall be strictly as per IS 1231 / IEC. Non standard rating of motors & non standard frame sizes shall not be acceptable.

4. All motors will be of squirrel cage, induction type, continuously rated for Duty Type S1.

5. All motors shall be suitable for direct-on-line start with discharge valve open condition. Motor shall be self-ventilated type totally enclosed, fan cooled type. Sleeve or anti friction type bearings shall have thrust bearing suitable for the load imposed by the driven machinery. For heavy duty drives such as fans high starting torque motor (minimum 150% of rated torque) shall be provided.

6. Motors rated above 30KW and above shall be provided with anti condensation heaters and a separate terminal box shall be provided for the same.

7. The motor will be tropicalised and will be suitable for satisfactory continuous operation in humid, saliferous and corrosion atmosphere encountered in the existing steel plant.

8. Motor shall have Class F insulation with temperature rise restricted to Class B level.

9. All winding insulation will be non-hygroscopic, oil resistant and of materials resistant to flame propagation.

10. The motor frames, terminal box, and bearings and shields will be constructed of steel.

11. The motors of different -ratings will have following performance characteristics.

- All motors after achieving full operating temperature will be capable of withstanding 60% overload for 10 seconds.
- All motors will be suitable for operation at 75% voltage at rated frequency for 5 minutes without injurious heating.
- All the motors will be suitable for restarting against full out of phase residual voltage in the motor winding during motor run down.

12. As a minimum all motors will be suitable for following minimum number of starts.

Annexure to Specification for LT motors(AC) (Non - Flameproof)

- No. Of starts starting from ambient temperature (cold): 3 consecutive plus 1 after every 30 minutes.
- No. Of starts starting from operating temperature (hot): 2 consecutive plus 1 after 30 minutes.

13. Noise level of all motors will comply with BS 4999/IEC.

14. The locked rotor withstand time under hot condition at 110% rated voltage shall be more than motor starting time by at least 2.5 seconds for motors with 20 secs. starting time and by 5 secs. for motor with more than 20 secs. starting time. Starting time shall be at the minimum permissible voltage of 80% rated voltage.

15. Name plate:
Motor name plate material shall be stainless steel. In addition to the information normally provided, the following shall also be provided in the name plate.

a) The description and code no of motor.
b) Degree of protection of enclosure.
c) Temp. rise of winding under running conditions.
d) Drive and Non-Drive end Bearing type and number.
e) Recommended type of lubricant and interval of lubrication.

16. RTDs (if used) in motor shall be PT-100 at 0 Deg.C, 3 wire type.

17. Double Compression Type Nickel plated brass Cable Glands shall be provided.

18. Certificate shall be furnished for IP55 construction. Copy of Test certificates shall accompany good reaching site.

	PREPARED	CHECKED	APPROVED
NAME	S.VANITHA	D.JAYANTHEE	S.JAYAPRAKASH
SIGN			

BHARAT HEAVY ELECTRICALS LIMITED

PCPS/PURCHASE

Ref: MM/PCPS

SPECIAL CONDITIONS

1. This tender is for the supply as per the enclosed Enquiry and Specification.

2. The vendor shall have adequate experience in manufacturing of this item.

3. The tender is in TWO parts. One part consisting of Technical Bid with Commercial terms & conditions along with Quality plan for the supply in-line with our requirements and another part containing Price Bid. Techno-Commercial bid and Price Bids are to be submitted in separate sealed covers. In addition to technical and commercial conditions, vendors who are not registered vendors of BHEL, Trichy have to submit the filled in "Supplier Registration Forms" (available in www.bhel.com website) along with the technical bid. Based on this and other conditions, as well as capacity and capability and approval by customer, vendor will be shortlisted. Both these covers are to be put in a single cover duly super scribing the Enquiry Number. The technical bid with commercial terms & conditions will be opened on the due date and based on the acceptance of techno-commercial bid and vendor evaluation, the price bid of the qualified vendors will be opened on a suitable date with due intimation.

   Following will be the criteria for short-listing the vendors

   - Evaluation of dully filled Supplier Registration Forms.
   - Availability of minimum manufacturing, handling, testing and measuring facilities as detailed in the Supplier Registration Form.
   - BHEL will have the right for spot assessment of the facilities.
   - Meeting our techno-commercial requirements of the enquiry.
   - Customer approval for the vendors before ordering.
   - Accepting & entering in to Integrity Pact (IP).

4. BHEL reserves the right to Negotiate with the L1 vendor.

5. BHEL reserves the right to re-float the tender opened, if L1 price is not the lowest applicable price to them inter-alia other reasons.

6. The materials are to be despached to Kohinoor site Jharkhand state with normal packing, in case of indigenous vendors and the materials are to be despatched to **CFR/Chennai** port basis, in case of Import vendors. Price comparison and ranking of vendors will be done based on landed cost, in Indian rupees.

7. For the delayed delivery, LD is applicable at 0.5% per week, subject to a max. of 15% on undelivered portion.

8. Indigenous vendors shall quote for FOR/site (Kohinoor/ Jharkhand).

9. Foreign vendors shall quote for CFR/Chennai port basis.

10. Applicable commercial terms & conditions shall be clearly spelt out in the offer.

27/4/12

Manager/Purchase/PCPS