Gist of Pulse Jet Bag House (PJBH) project at Bokajan Cement Factory

Pulse Jet Bag House (PJBH) – Bokajan Cement Factory

Kiln 1 & 2 (Combined Capacity: 600 TPD, each 300 TPD)

Project Scope

Installation of a Pulse Jet Bag House (PJBH) system designed to handle 161,000 m^3/hr of gas at ~240°C and 350 mmWC pressure.

Ensures outlet emissions <30 mg/Nm^3 in compliance with MOEF&CC norms.

Integrated with the existing ESP (Electrostatic Precipitator), which will serve as a standby system.

Dust collected from the bag filter conveyed to the ESP screw conveyor via a new screw conveyor system.

System Components

Bag Filter

Filter Bags: 660 nos., fiberglass woven/PTFE treated, size 160 mm dia × 8100 mm length.

Air-to-Cloth Ratio: 0.99 m^3/min/m^2.Cleaning System: Automatic online compressed air pulse jet, PLC-controlled.

Compressed Air Requirement: ~224 m^3/hr at 6 bar.

Modules: 2 modules, each with 330 bags and 22 pulse valves.

Dust Handling: Separate hoppers with rotary air valves and slide gates, connected to screw conveyor.

ID Fan

Type: SISW centrifugal, backward curved impeller.

Capacity: 161,000 m^3/hr at 240°C.Static Pressure: 350 mmWC.

Motor: 250 kW, 6-pole, 50 Hz.

Efficiency: ~81%.Power Consumption: ~122 kW at 200°C operating temperature.

Equipped with dampers, expansion joints, and RTDs for bearing temperature monitoring.

Air Compressor

Capacity: 264 m^3/hr at 6 bar Motor Rating: 30 kW.

Units: 2 (1 working + 1 standby).Includes air receiver and dryer for stable compressed air supply.

Screw Conveyor

Capacity: 10 t/hr Length: ~21 m. Diameter: 250 mm. Motor: 2.2 kW geared motor.

Dust Load Handled: ~9.66 t/hr.

Performance & Consumption

Gas Handling Capacity: 161,000 m^3/hr.

Daily Power Consumption: ~3714 kWh (Fan, Compressor, Screw Conveyor, Rotary Air Locks).

Emission Control: Guaranteed outlet dust concentration <30 mg/Nm^3.

Temperature Tolerance: Bags withstand up to 260°C (short-term).

Technical Highlights

Modular design with service platforms and staircases for maintenance.

Automatic PLC-based cleaning cycle with adjustable pulse duration and frequency.

Flexible joints at inlet/outlet for thermal expansion.

Provision for canopy/shed to protect equipment from rainwater.

Designed for continuous duty with robust mechanical and thermal tolerances.

Commissioning Trials Observations

Fan handled 136,000 m^3/hr at full 980 rpm (VFD at 50 Hz).At 1 kiln operation: No dust or puffing in GCT circuit.

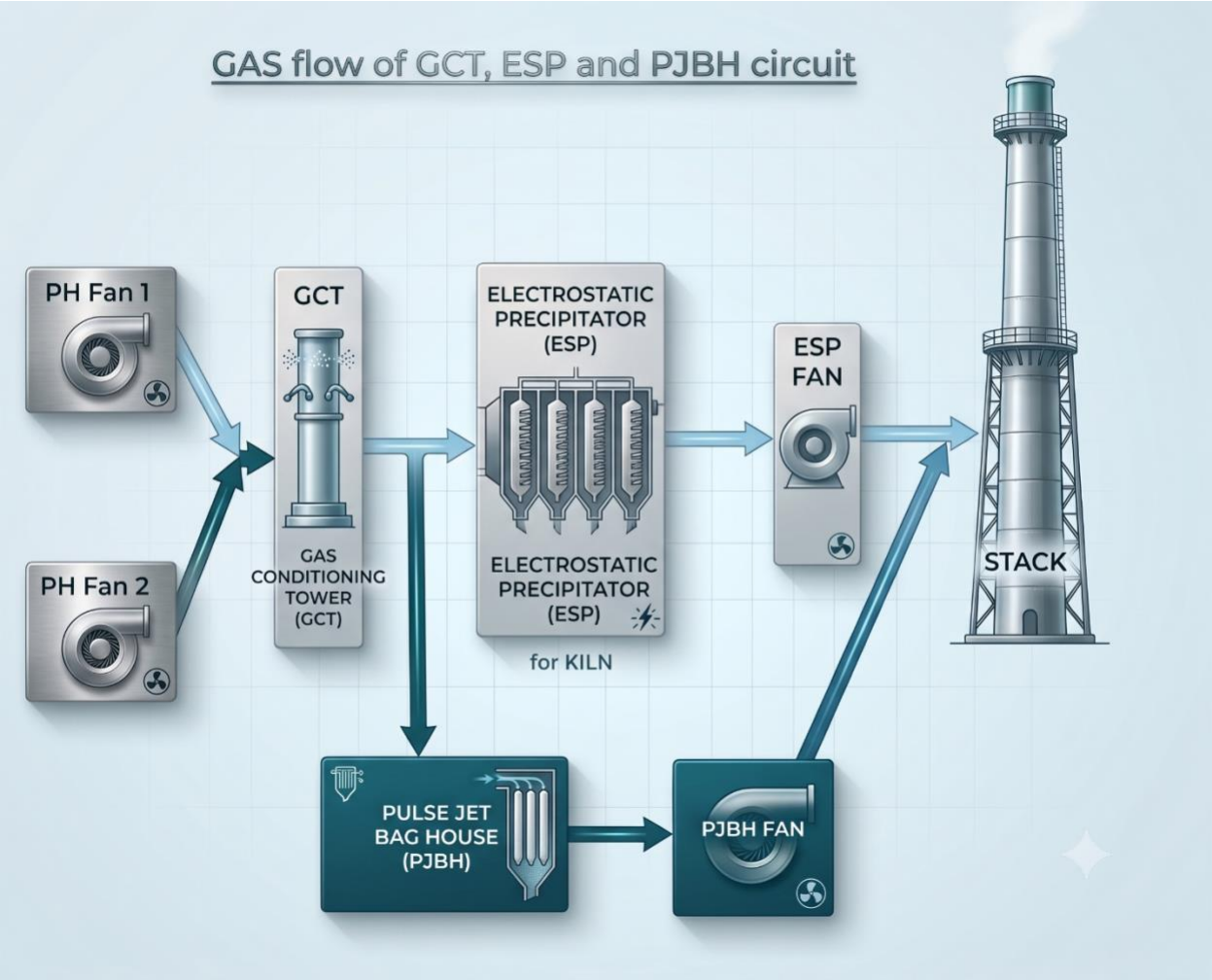
At 2 kiln operation: Dust puffing observed in GCT circuit.

- Frequent tripping of PJBH fan due to:
- High bearing temperature.
- VFD panel fault.
- Problem in DE bearing.

Data collection not considered as maximum continuous running hours negligible (system trips frequently).

VFD panel cooling insufficient for IGBT/VFD panel, leading to overheating and frequent trips.

No interlocking between Baghouse Pressure Transmitter and PLC to control DP vs flow.



Offer is invited as per details given below: -

NIT No.	Name of the work	Activity
BKO/MECH/PJBH/KL/2021-22	DESIGN, ENGINEERING, MANUFACTURE, SUPPLY, CIVIL/STRUCTURAL DESIGN, CONSTRUCTION, ERECTION and COMMISSIONING OF PULSE JET BAG HOUSE (PJBH) FOR KILN 1 & 2 (COMBINED) TO MEET LATEST POLLUTION NORMS FOR CEMENT PLANTS AND HOOK UP WITH EXISTING SYSTEM ON TURNKEY BASIS.	Design , Engineering, Civil Works, Manufacture & supply, Erection of machineries Commissioning of machineries & PG Test Recommended Spares for two years operation

1) Only those tenders will be considered who fulfill the terms & conditions mentioned in the tender documents.
2) Only those tenders shall be considered who deposit the earnest money, tender cost and transaction fee by due date.
3) The price- bid should be only as per CCI's price - bid format otherwise the tender is liable for rejection.

Note-

1. **The details of Pre-Bid meeting is mentioned at Clause -1A of Part III(Annexure –B).**
2. **Guidelines of Reverse Auction is mentioned at Clause -1B of Part III(Annexure –B).**
3. **Tenderer must visit CCI website www.cciltd.in for part-I & II and submit the same along with the Annxure-9, part -1 & II and their annexure are part of this tender, tenderer must sign and upload online along with techno-commercial bid of the tender. Part-I & II is available in English as well in Hindi in website for better understanding, however, in case of any contradiction in Hindi & English version, English version shall prevail.**

HOD(MECH)

List of Annexure

The tender documents comprise of following:-

Annexure-A	Important Instructions to Bidders for E-Procurement.
Annexure-1	Covering letter which must be submitted by tenderer duly filled in.
Available in CCI website	General terms and conditions part-1 & Part-II with Annexure 2 to 9
Annexure-B	Part-III- Special terms & conditions
Annexure C	Part- IV : Technical specifications Annexure C-1,C-2, C-3, C-4, C-5, C-6, C-7 & Sheet 1,2,3
Annexure-D	Input tax credit
Annexure-E	Price Bid (Price schedule) to be submitted duly filled in on-line as Part-B. Cost break up rates quoted may also be furnished.

Important instructions for E-Procurement

This is an E-Procurement event of CEMENT CORPORATION OF INDIA. The e-procurement service provider is Antares Systems Ltd., No.24, 1st Floor, Sudha Complex, 3rd Stage, 4th Block, Basaveshwara Nagar, and Bangalore 560079.

You are requested to read the terms & conditions of this tender before submitting your online tender. Tenderers who do not comply with the conditions with documentary proof (wherever required) will not qualify in the Tender for opening of price bid.

1	**Process of E-tender :** **Registration:** The process involves vendor's registration with tender wizard e-procurement portal. Only after registration, the vendor(s) can submit his/their bids electronically. Electronic Bidding for submission of Techno-Commercial Bid as well as Price Bid over the internet will be done. The Vendor should possess Class III signing type digital certificate. Vendors are to make their own arrangement for bidding from a P.C. connected with Internet. Antares systems ltd is not responsible for making such arrangement. (Bids will not be recorded without Digital Signature). SPECIAL NOTE: THE PRICE BID AND THE COMMERCIAL BID HAS TO BE SUBMITTED ON-LINE AT www.cci-etender.com 1).Vendors are required to register themselves online with www.cci-etender.com Register as Vendor Filling up details and creating own user id and password→ Submit. 2).Vendors will receive a system generated mail confirming their registration in their email which has been provided during filling the registration form. In case of any clarification, please contact CCI/Antares Systems Ltd, (before the scheduled time of the e- tender). Contact person (Cement Corporation of India): 1. HOD (Mech), CCI, Bokajan Cement Factory, Bokajan, Dist: Karbi Anglong Assam-782490 Contact No.: 9864545123 E-mail : ccibcfmech@gmail.com

	A) Help Desk (Antares Systems Ltd): ➢ 033 4604 6611 ➢ 080 4935 2000 **B) System Requirement:** ➢ Windows 8, 10 Professional Operating System, Internet Browser-9, 10 & 11 Signing type Class 3 digital signature Java JRE 6 and above. **THE VENDORS ARE ADVISED TO GO THROUGH THE *Help Manual* LINK AT www.cci-etender.com FOR GENERAL GUIDANCE ABOUT TENDER PROCESS.**
2	(A) Part A Techno-Commercial bid will be opened electronically on specified date and time as given in the NIT. Bidder(s) can witness electronic opening of bid. (B) Part B Price bid will be opened electronically of only those bidder(s) whose Part I Techno-Commercial Bid is found to be Techno-Commercially acceptable by CCI. Such bidder(s) will be intimated date of opening of Part II Price bid, through valid email confirmed by them. **Note:** The tenderers are advised to offer their best possible rates. There would generally be no negotiations hence please submit your most competitive prices while submitting the price bid. However in case the lowest rate appears to be reasonable taking into account the prevailing market conditions, the order may be awarded to the lowest bidder and if the rate is still considered high, action as per prevailing instruction/guideline shall be taken.
3	All entries in the tender should be entered in online Technical & Commercial Formats without any ambiguity.
4	In case of failure to access the payment towards cost of tender document & EMD for any reason, the vender, in term, will not have the access to on line e-tender and no correspondence in this respect will be entertained and CCI will not be responsible for any such lapses on this account. Bidder(s) are advised to make remittance of tender fee and EMD through Online well in advance and verify completion of transaction in respect of tender fee and EMD. Vendors are instructed to upload documents in document library. Multiple documents

	can be uploaded. Maximum size of single document for upload is 5 MB. Once documents are uploaded in the library, vendors can attach documents through *Attach Document* link against the particular tender. For further assistance please follow instructions of Vendor Help Manual.
5	All notices and correspondence to the bidder(s) shall be sent by email only during the process till finalization of tender by CCI. Hence the bidders are required to ensure that their corporate email I.D. provided is valid and updated at the stage of registration of vendor with Tender wizard (i.e. Service Provider). Bidders are also requested to ensure validity of their DSC (Digital Signature Certificate).
6	The responsibility of downloading the related corrigenda, if any, will be that of the responsibilities of the parties.
7	E-tender cannot be accessed after the due date and time mentioned in NIT.
8	Bidding in e-tender & Reverse auction: (a). Bidder(s) need to submit necessary EMD and Tender fees (If ANY) to be eligible to bid online in the e-tender. Tender fees are non-refundable. No interest will be paid on EMD. EMD of the unsuccessful bidder(s) will be refunded by CCI. (b). The process involves Electronic Bidding for submission of Techno Commercial Bid as well as Price Bid is explained in Help Manual. a. In all cases, bidder should use their own ID and Password along with Digital Signature at the time of submission of their bid. b. During the entire e-tender process, the bidders will remain completely anonymous to one another and also to everybody else. (c). The e-tender floor shall remain open from the pre-announced date & time and for as much duration as mentioned above. (d). All electronic bids submitted during the e-tender process shall be legally binding on the bidder. Any bid will be considered as the valid bid offered by that bidder and acceptance of the same by the Buyer will form a binding contract between Buyer and the Bidder for execution of supply. Such successful tenderer shall be called hereafter SUPPLIER. (e). It is mandatory that all the bids are submitted with digital signature certificate otherwise the same will not be accepted by the system. (f). Buyer reserves the right to cancel or reject or accept or withdraw or extend the

	tender in full or part as the case may be without assigning any reason thereof. (g). No deviation of the terms and conditions of the tender document is acceptable. Submission of bid in the e-tender floor by any bidder confirms his acceptance of terms & conditions for the tender. (h). Unit of Measure (UOM) is indicated in the e-tender Floor. Rate to be quoted should be in Indian Rupee as per UOM indicated in the e-tender floor/tender document.
09	Any order resulting from this open e-tender shall be governed by the terms and conditions mentioned therein.
10	No deviation to the technical and commercial terms & conditions are allowed.
11	After submitting online bid, the bidder cannot access the tender, once it has been submitted with digital signature.
12	CCI has the right to cancel this e-tender or extend the due date of receipt of bid(s) without assigning any reason thereof.
13	The online tender should be submitted strictly as per the terms and conditions and procedures laid down in the website www.cci-etender.com of Antares Systems Ltd.
14	The bidders must upload all the documents required as per terms of NIT. Any other document uploaded which is not required as per the terms of the NIT shall not be considered.
15	The bid will be evaluated based on the filled-in technical & commercial formats.
16	The documents uploaded by bidder(s) will be scrutinized. In case any of the information furnished by the bidder is found to be false during scrutiny, EMD of defaulting bidder(s) will be forfeited. Punitive action including suspension and banning of business can also be taken against defaulting bidders.
17	Bidders are requested to read the vendor Help Manual in the home page www.cci-etender.com to familiarize themselves with the system before bidding.

For and on behalf of CCI Ltd

HOD (Mech)

The Letterhead of the Bidder

Annexure-1

Covering letter

To,
HOD (Mech)
Cement Corporation of India Ltd. Bokajan Cement Factory
Distt Karbi Anglong (Assam) 782490

Sub:- Design, Construction, Erection, Hooking up and commissioning of Pulse Jet Bag House(PJBH) FOR KILN 1 & 2 (COMBINED) & HOOK UP WITH EXISTING SYSTEM ON TURNKEY BASIS.

Ref:-Your NIT No.BKO/MECH/PJBH/KL/2021-22 Dated …….

Dear Sir,

With reference to your tender for the above work, We/I hereby submit our/my tender online in two Parts i.e.; Part-A Techno-Commercial bid and Part-B Price-bid as per NIT. and instructions in the tender documents.

Part-A: Techno-Commercial Bid:

On-Line Submission (Soft Copy)
The following documents duly filled in, signed digitally and stamped are up-loaded On-Line through **www.cci-etender.com of Antares Systems**

Sl. No.	Description	Yes/No/NA
1.	The Tender Special terms and conditions in Part III Annexure-B duly signed digitally and stamped on each page in token of acceptance of the same in its entirety	
2.	Scanned copy of Covering letter Annexure -1) (Available in CCI website)	
3.	Scanned copy of Integrity pact & IEM. (Annexure -2) (Available in CCI website)	
4.	Certificate whether any officer of your Corporation is related to me/us or not (Annexure-3) (Available in CCI website)	
5.	List of unexecuted orders in hand as per (Annexure-4) (Available in CCI website)	
6.	Bidder firm/ Company profile (Annexure-5) (Available in CCI website)	
7.	Details of plant and machinery installed. (Annexure -6) (Available in CCI website)	
8.	Details of testing facilities installed. (Annexure -7) (Available in CCI website)	
9.	Details of orders executed, including CCI during last 3 years (Annexure-8) (Available in CCI website)	

10.	Declaration letter having read and understood the GTC. (Annexure-9) (Available in CCI website)	
11.	GST Registration No	
12.	Scanned copy of the PAN card in the name of company.(in case of proprietary firm it can be in the name of the proprietor)	
13.	Partnership Deed/Memorandum & Article of association	
14.	Balance sheet for last three years.	
15.	In case of firm registered with MSME, Certificate from MSME (NSIC Certificate) clearly Specifying the date of registration along with starting of manufacturing process and whether it is registered under ST/SC. The firms registered with MSME will also have to submit a copy of Udyog Aadhar Memorandum	
16.	Input Tax credit(Annexure D)	
17.	Submission of EMD(DD/BG/Gateway)	

Part-B: <u>Price bid: submitted on-line as per "PRICE BID" format Annexure E</u>

We/I hereby declare that We/I have not been debarred from tendering for contracts in any of the departments of Govt./Semi Govt./Public Sector Undertaking and Local Bodies.

We/I certify that the information given by us/me in the tender documents is correct and if at any stage the same is found to be incorrect, the contract will be liable to be terminated /rescinded and action may be taken against us/me by the Corporation for damages.

We are/I am duly authorized/ empowered to sign all the tender documents

a) Name of the Tenderer…….

b) Full Postal Address: ……
……
…….

c) Telegraphic Address/Telex/Fax……

d) Phone: Office……Residence…….

e) E-mail ……

Yours faithfully,

SIGNATURE OF THE TENDERER WITH SEAL

WITNESS (NAME & ADDRESS)

1----------

2----------

Annexure -B

CEMENT CORPORATION OF INDIA LTD.

(A Govt. of India Enterprise)

PART-III

SPECIAL TERMS AND CONDITIONS OF TENDER FOR DESIGN, ENGINEERING, MANUFACTURE, SUPPLY, CIVIL/STRUCTURAL DESIGN, CONSTRUCTION, ERECTION & COMMISSIONING OF PULSE JET BAG HOUSE (PJBH) FOR KILN 1 & 2 (COMBINED) TO MEET LATEST POLLUTION NORMS FOR CEMENT PLANTS & HOOK UP WITH EXISTING SYSTEM ON TURNKEY BASIS.

In addition to the General Terms and Conditions of tender under PART – I & II, the following terms and conditions will also apply to the contract. These special terms and conditions, if contradictory to any conditions given in PART - I & II, will prevail upon the conditions given therein. The order will consist of four parts i.e. PART – A, PART – B, PART - C and PART-D. PART – A is for civil & structural works, PART–B is manufacturing and supply PART-C is for Fabrication and erection and PART –D is for Hooking up, commissioning and PG test.

In addition to the above, the following will also apply.

1.A PRE-BID MEETING :

a) A pre-bid meeting open to all the prospective Bidder(s) will be held at the venue, date& time specified in NIT, wherein they shall be given an opportunity to obtain clarifications, if any, regarding the work and bid conditions.

b) All Prospective vendors shall review the tender documents and attend the pre-bid meeting, along with their quarries, if any, against the terms and conditions of the tender along with their suggestions. Vendors can also upload/seek clarification through e-mail or letter from tendering authority before the last date fixed for raising queries. The queries raised shall be shared with every bidder attending the pre bid meeting and be part of the minutes. No clarification or observation will be entertained after the pre-bid meeting is over.

c) The vendors shall attend the pre-bid meeting at their own cost; the tenderer shall be allowed to visit the site prior to the pre-bid meeting under the supervision of the site/project in-charge on prior intimation as per date mentioned in NIT.

d) The pre-bid meeting shall be open meeting and one time only, the date of meeting shall be decided by the corporation. In case of any change in schedule of the pre- bid meeting, the same shall be posted in website with one week notice. In case the tenderers fail to attend the meeting, their request for rescheduling and reorganizing the pre-bid meeting shall not be entertained.

e) Raising the observations or suggestions by the tenderers shall not give them the right to modify the terms and conditions unless it is agreed/approved by the corporation.

f) The pre-meeting shall be attended by the committee of officials of the corporation as decided by the competent authority.

g) No further commercial or other deviations will be entertained in the tender process after pre-bid

meeting.

h) In case there is no modification in terms and conditions, the queries raised by the vendors and clarifications given by CCI committee shall be uploaded against the above tender on CCI website. The original tender terms shall be applicable.

i) Based on the pre-bid meeting, the terms/specification/design will be freeze accordingly, if required. In case there is modification in the tender which shall be uploaded as a corrigendum in the tender along with the queries of all vendors and replies of CCI.

j) Those parties, who have not attended the pre-bid meeting, can also participate in the tender. The tender terms will be applicable to all parties in uniform irrespective of attending the pre-bid meeting.

1.B REVERSE AUCTION:

Instructions for Reverse Auction

1. CCI reserves the right to go for e-auction as additional condition. In case of any eventuality, the cases will be decided as per the rates submitted in the e-tender. Hence, the bidders are advised to submit their offers accordingly.

2. Only the Bidders who have qualified the techno commercial bid of the tender and whose price bid has been opened are eligible for participating in the reverse auction.

3. The lowest landed cost (net price) of e-tender, evaluated after opening of price bids shall be considered as base price (floor price) for reverse auction and accordingly the reverse auction shall be started. All bidders will be given opportunity to look at to L-1 price and submit their net price in the reverse auction process.

4. The procedures and other terms & conditions of reverse auction shall be uploaded on our website one week before the opening of price bids and starting of reverse auction. The bidders are requested to go through our website regularly to keep them updated about the procedures and terms & conditions.

   The bidders participating in reverse auction shall be required to complete all formalities & submit the required documents as desired under the above stated procedures and terms & conditions.

Parameter of E-Reverse Auction:

Estimated Cost / Entry Start Price / Reverse Price for e-Reverse Auction	L1 price of the financial bids of the Techno-commercially Qualified Bidders.
Minimum decremental value	To be notified by CCI on case to case basis in NIT.
Eligible Bidders to participate in e-Reverse Auction	Techno-commercially qualified bidders to give declaration to participate in Reverse Auction within an hour of opening of Price bids and all such bidders be issued user id and pass word for Reverse Auction.
Start Date & Time of e-Reverse Auction	_____ at 15.00 Hrs. (after 2 working days of opening of price bids)

Initial Duration of e-Reverse Auction	02 Hrs (from 15.00 Hrs to 17.00 Hrs.)
Automatic Extension of "Reverse Auction closing time" if the last bid received within a predefined time duration before the "Reverse Auction closing time:"	Yes
Pre-defined time duration (as mentioned above)	05 minutes
Time of each Automatic Extension	15 minutes
Display of Lowest Bid (L1)	Yes (To all Bidders) (Without the bidder identity)

Reverse Auction Procedure:

1. The reverse auction is to be carried two days after the opening of e-price bids.
2. If L1 party decides to be out of reverse auction, the party will be allowed to do so. However, if the Reverse Auction yields a lower price, the L-1 party would have no claim / right to be awarded.
3. Other parties if opts out they will be assumed to be to be not participating in tender. No chance shall be afforded later.
4. Bidder has to quote price inclusive of P&F, inspection charges, taxes & freight etc.
5. The L-1 bidder after reverse auction shall be considered, as final L-1 & the case for awarding shall be processed as per policy & NIT.
6. In case bidder, not eligible for participation in reverse auction as per Clause VIII below mentioned guidelines, is an MSE, but their price quoted is within the band of L-1 + 15%, their bid shall be considered for participation in Reverse Auction in line with "Public Procurement Policy for Micro & Small Enterprises (MSEs) order-2012".
7. The break-up of final price viz. basic rate, freight charge, inspection charge etc. will be taken for processing the case after reverse auction has concluded.
8. After conduction of reverse auction, distribution of work amongst bidders shall be done as per NIT, after evaluating L-1, L-2 etc.

Guidelines for Reverse Auction:

1. Any tender can be cancelled/withdrawn at any time before award of contract, which is invariably mentioned in NIT.

2. Number of participants allowed in reverse auction:
   a) In case of single eligible (techno- commercial qualified) party, no reverse auction shall be conducted & tender shall be finalized subject to reasonability of the rate.
   b) Reverse Auction shall be conducted for two (2) or more techno-commercially qualified parties.
   c) For 2-4 techno- commercially qualified parties, reverse auction shall be conducted with all parties.
   d) For 5-6 techno- commercially qualified parties, one highest bidder (H-1) shall not be allowed to participate in reverse auction.
   e) For 7-10 techno commercially qualified parties, two highest bidders (H-1 & H-2) shall not be allowed to participate in reverse auction.
   f) For more than 10 techno- commercially qualified parties, only lowest 8 (eight) bidders shall be allowed to participate. However, in case of tie in the eighth (last) position, all such parties shall be allowed to participate in the reverse auction i.e., in case there is tie of 2 parties in 8th lowest position (L-8), then both of them shall be allowed to participate in reverse auction.

3. Lowest bid implies the bid whose landed cost is lowest considering freight, inspection charge & less input credits for GST. (Reverse auction shall be conducted on landed cost excluding GST).

4. The base price, minimum detrimental value, pre-defined time duration of quoting the revised rate (in minutes) shall be available with the service provider portal as per the format to be uploaded with NIT.

5. Closing price (CP) of reverse auction shall be treated as new L-1 and tender shall be processed accordingly.

Complaints may be given, if any regarding denial of service or any related issue, in writing through e-mail/fax to the service provider, with copy of mm_co@cciltd.in, within 15 min prior to initial closing time of reverse auction.

Bidder shall be assigned user id & password by the service provider, which is presently M/s. Antares Systems Pvt. Ltd.

2.0 <u>SCOPE OF WORK AND TECHNICAL SPECIFICATIONS:</u>

The details Scope of Work will include Design, Engineering, Manufacture, Supply, civil / structural design, including civil works / foundations, erection & commissioning of Pulse Jet Bag House (PJBH) for Kiln 1 & 2 (Combined) & hook up with existing system on turnkey basis to meet Norms of Pollution Control Board i.e. less than 30 mg/Nm3.

The detailed scope of work & technical specifications is given in Part-IV Annexure –C 3 of the tender documents.

Activity wise break up of total scope of works is as under:-

1. Party should visit site and study the site conditions for design, layout and carry out the measurement of necessary process parameters etc. for proposed PJBH.
2. Design, Engineering, and lay out for PJBH system
3. Civil works such as excavation, earth back filling, RCC work of footing, columns, beams, foundation of equipments, roof and flooring and structural works etc.
4. Supply of equipments viz. Bag House, fans, conveyors, RA locks, gearbox, motors, electrical & instrumentation panels along with I/O panels, power & control cables etc.
5. Fabrication of items like interconnecting ducts, casings, chutes etc.
6. Erection and trial run of the equipments by the supplier.
7. The shed /roof of suitable height is to be provided for replacement of bags / maintenance and to protect PJBH system from rain water.
8. Suitable supports to the inlet and outlet ducts are to be provided.
9. Hooking up with existing system.
10. Performance Guarantee Test

The above activities may be taken up by one individual tenderer or by forming a consortium of two or more with overall responsibility resting with the leader of the consortium members who will fulfill the techno

commercial terms & conditions of the tender and shall be responsible to CCI in all aspect of the tender. The leader of the Consortium could be any party taking up work

i. Design, Engineering and Civil work.
ii. Manufacturing, supply etc.
iii. Erection & Commissioning works and Hooking up with existing system.
iv. PG test.

3.1 ELIGIBILITY CRITERIA :

The tenderer are to quote for Design, Engineering, Manufacturing, Supply, Civil / Structural Design, Including Civil Works / Foundations, Erection & Commissioning for Pulse Jet Bag House (PJBH) to Meet Norms of Pollution Control Board on turnkey basis by one individual tenderer or by forming a consortium of two or more with overall responsibility resting with leader of the consortium members as mentioned above.

The role of individual constituent consortium member shall be defined by the tenderer for specific work and their eligibility will be considered on the basis of the criteria given in the tender with the qualification and experience for specific work to be taken up by the consortium member.

The eligibility of individual partner of the consortium to carry out the above scope of work has been defined below. The credentials of the consortium partners who shall carry out the specific work should be submitted in the Techno Commercial Bid along with photocopies of order executed and also in hand, copy / copies and performance certificates issued for the jobs executed by them to consider their eligibility.

The tenderer will sign MOU with the other consortium members. A copy of the (MOU) shall be submitted along with the Techno Commercial Bid. The successful tenderer shall submit a detailed Legal agreement later on before issuance of the order.

3.2 **ELIGIBILITY CRITERIA FOR DESIGN, ENGINEERING, MANUFACTURING, SUPPLY, CIVIL /STRUCTURAL DESIGN, ERECTION & COMMISSIONING OF PULSE JET BAG HOUSE (PJBH) FOR KILN 1 & 2 (COMBINED) AND HOOK UP WITH EXISTING SYSTEM ON TURNKEY BASIS**.

3.3 Average annual financial turn over during last three years ending 31st March of previous financial year should be Rs. 1.30 Crore.

3.4 Experience of having successfully completed similar works during last seven years ending last day of month previous to the one in which applications are invited should be either of the following :

a) Three similar completed works costing not less than Rs. 1.7 Crore.

or

b) Two similar completed works costing not less than Rs. 2.2 Crore.

or

c) One similar completed work costing not less than Rs. 3.5 Crore

3.5 The tenderer should have supplied / executed Pulse Jet Bag House (PJBH) **on turnkey basis** within or outside India in last 7 years and the same is operational till date for at least last one year.

3.6 The tenderer should have supplied/executed/installed/commissioned such type of PJBH on turnkey basis within or outside India of cement plant (Clinkerization) of capacity more than 1000 TPD & is under operation since last 10 years with a PG/FAC from client.

Sequence of activities and payments thereof.

a) Successful tenderer has to accept the order and sign the Agreement within a week's time.
b) Submission of Bar chart, & Billing schedule within 30 days.
c) Submission of document of Design, Engineering, Drawing, Layout of Civil/Structural and Plant layout within 45 days duly approved by the consultant (appointed from the list of consultants as per (annexure C.7). Review/Approval from CCI will be accorded within 15 days from date of submission and after having discussion / clarifications of points.
d) Supply of materials and equipment for civil work viz., Excavation equipment, Tor steel, Shuttering material, ready-mix machines / installation etc.
e) Supply/ fabrication of metal plate and structural steel for site fabrication of Bag House, duct, chutes, connecting ducts etc.
f) Supply of bought out items of mechanical, Electrical & Instrumentation viz., fans and its motors, Bag house material , conveyors , panels ,MCC, cables etc.
g) Erection of equipments in sequence after/along with Civil work.
h) Electrical and instrumentation work.
i) Charging of control panels and simulation
j) Hooking up with existing system & trial run and Performance Guarantee test.

The complete project is on Turnkey project, from concept to commissioning.

4.0 <u>PROJECT SCHEDULE :</u>

4.1 The complete job as per the scope of work given at Part-IV Annexure -C starting from Design, Engineering up to successful commissioning and PG Test is to be completed within SIX (06) months from the date of placement of LOI. The date of award of LOI shall be considered as the zero date for all purposes.

4.2 The shutdown period required for hooking-up/commissioning shall be loaded on the quoted rate for comparison purpose, to evaluate the lowest bidder (L 1) as follows :

a) No loading charges will be loaded for first seven (07) days of shutdown period.
b) During eight (08) to ten (10) days of shut-down period, loading charge Rs. 3.45 Lakh per day will be loaded.
c) If shutdown period exceeds from ten (10) days then Rs. 6.35 Lakh per day will be loaded.

Hence vendors should clearly mention plant shutdown period required for hooking-up/commissioning.

4.3 The successful tenderer has to submit

a) Detailed General Arrangement Drawings of the system
b) Technical Specifications,
c) Load data details,
d) Parameters/data for design,
e) Bar Chart for the complete project etc. to CCI within 30 days from the date of award of LOI.

4.4 Decision of CCI in respect of all the technical specifications, design, drawings, diagrams, schemes and

selection of vendors/contractors will be final.

4.5 The successful tenderer has to submit item wise Billing Schedule for the supply of the material in sequence of erection at the site for approval to CCI. The approved billing schedule may be item wise/ tonnage basis as the case may be and shall be used for purpose of raising the bills.

5.0 PRICES :

5.1 The Bank Guarantees as mentioned under different columns (EMD, Security Deposit, Advance & Performance guarantee etc.) are to be submitted as per CCI formats from any Nationalized Banks only of equal amount as per validity indicated in the relevant clause with claim period of further three months.

5.2 Prices are to be quoted on firm and F.O.R. destination basis inclusive of Packing/Forwarding charges, insurance, GST, freight & Entry Tax etc. showing break up as per Price Bid format only. However, GST, freight (against paid LR/GR/RR) and Entry Tax will be payable as per actual as applicable at the time of dispatch on submission of documentary evidence or as quoted by the tenderer whichever is lower. No escalation during the period of contract / execution of the entire contract / extended period on whatever reasons thereof will be allowed in prices.

5.3 The price should be quoted strictly in our prescribed Price Bid Performa only enclosed with the tender, both in figures and words to avoid ambiguities. In case of any difference in figures & words, the lower amount of the two willbe taken into consideration.

5.4 Award of contract will be solely at the discretion of CCI.

6.0 **PAYMENT TERMS:**

6.1 - 5% (Five percent) of the total contract price excluding taxes, duties and freight will be released against submission of Basic Engineering, drawings, Basic Engineering data, submission & approval of General Layout drawings, PERT Chart & Manufacturing & Billing schedule for the total contract.

6.2 PART -A

Civil / structural work: earth work, excavation, concrete work, structural works, foundation work (including grouting, reinforcement, inserts, etc.), columns, beams, roofing, flooring etc. of Pulse Jet Bag House(PJBH) for kiln 1& 2 (combined) & hooking up with existing system.

6.2.1 70% (Seventy PERCENT) of Civil works along with 100% taxes & duties (GST/ Taxes will be paid subject to appearing in GSTR-2A report), will be released within 30 days on submission of monthly running bills and certification of the work by CCI.

6.3 PART- B

Supply of the main equipment i.e motor, fans, bags, conveying system, fan, compressed air system, Fresh air dampers / air dilution damper and accessories required for its smooth and trouble free operation complete with all electrical & instrumentation items of Pulse Jet Bag House(PJBH) for kiln 1

& 2 (combined) & hooking up with existing system.

6.3.1 70% (Seventy percent) of prices of components/items (supply) & complete material for electrification etc., along with 100% taxes, duties & freight (GST/ Taxes will be paid subject to appearing in GSTR-2A report), will be released within 30 days on its receipt at site, inspection & certification by CCI officials.

For this purpose, the tenderer should indicate the breakup of prices involved, item wise as per the price bid format/ BOQ and get the same approved by CCI before commencement of dispatches. The dispatches should be made in sequence to their erection i.e., the item to be erected first will have to be supplied first.

The following documents are to be submitted for release of payment.

a) Three copies of invoice along with excise E- way bill, packing list etc.
b) Certificate of inspection conducted by CCI officials at our site.
c) Copy of equipment/machinery list along with value as per billing schedule to be submitted by the successful tenderer duly approved by CCI.
d) Material receipt at CCI Bokajan by tenderers representative, its unloading and inspection report from the Bokajan Cement factory indicating value of material with respect to (b) above.

6.4 PART- C

Fabrication, Assembling, Fixing & Erection of equipment including inlet –outlet, ducting and Bag House with dust extraction system in position at all heights, painting of structures and fixing of insulation, side cladding , walkway , ladders , platforms, etc. wherever needed .Complete electrical & instrumentation work of Pulse Jet Bag House(PJBH) for Kiln 1 & 2 (combined)& hooking up with existing system along with any other accessories required .

6.4.1 70%(Seventy percent) of prices of Fabrication, assembling, fixing & Erection work after completion along with 100% taxes, duties & freight (GST/ Taxes will be paid subject to appearing in GSTR-2A report), will be released within 30 days against submission of running bills.

6.5 PART- D

Hooking –up and Commissioning of Pulse Jet Bag House (PJBH) for Kiln 1 & 2 (combined) & hooking up with existing system**.**

6.5.1 70% (Seventy percent) of prices of commissioning along with 100% taxes (GST/ Taxes will be paid subject to appearing in GSTR-2A report) & duties will be released after successful completion of commissioning and submission of running bills.

6.6 **P.G. TEST :**

On successful completion of erection, commissioning & satisfactory completion of P.G. Test, 15% (Fifteen percent) of the total contract prices (excluding taxes, duties & freight), will be released after

deduction of L.D.& other recoveries, if any.

6.7 Balance 10% (Ten percent) may be released on submission of B.G. for 10 % of total value of contract (excluding taxes & freight) against P.G. Test / Performance guarantee/ Warranty, for a period of 12 months with a claim period of 03 months. The B.G., towards P.G / Warranty will be returned within 02 months of successful completion of P.G / Warranty.

6.8 All payment will be released through e-transaction mode within 30 days after receipt of materials duly certified after inspection by CCI.

Payments will only be released after submission Security Deposit towards contract as per clause No.6.0 of Part-III Special terms & conditions.

6.9 **MODE OF PAYMENT**

6.9.1 Payment to the tenderer through e-payment only.

6.9.2 Approval of billing schedule submitted by the successful tenderer one week before the dispatch of the first consignment by the tenderer.

The following documents are to be submitted.

Three copies of invoice along with document such as excise gate pass, packing list, consignment note (consignee copy) as per approved schedule by CCI and dispatch documents certified by CCI conforming to the approved schedule / work certified by CCI in case of erection and commissioning charges.

(i) Copy of insurance policy, clearly indicating the part consignment by underwriter, Inspection report by CCI certifying acceptance of consignment and value conforming to the schedule of material already certified by CCI.

(ii) Any other documents as required by CCI Finance.

6.9.3 The payment shall be released by RTGS / NEFT on receipt and acceptance of materials/ equipments at CCI site or approval of running bills in case of erection and commissioning charges, as mentioned above at Clause No.6.0 .

7.0 PENALTY / L.D. :

7.1 Any delay beyond the scheduled completion period of the project will attract penalty @ 0.5% delay per fortnight of the total contract value subject to the maximum ceiling of 5% of the total contract value.

7.2 The date of successful commissioning on the basis of certificate given by CCI will be treated as the date of completion for the purpose of calculating penalty. However, Performance Guarantee Test shall be carried out as per technical specifications (Annuxure-C-6.) within a period of 15 days from the date of successfulcommissioning.

8.0 SECURITY DEPOSIT :

8.1 The successful tenderer shall have to furnish Security Deposit equivalent to 10 % (ten percent) of the total value of the contract including taxes & duties by way of Demand Draft / Bank Guarantee (in CCI format to be provided by CCI) in lieu of Clause 2.0 of PART – II General terms and conditions of the tender towards satisfactory performance of the contract within 15 days from the date of award of the work order to our Bokajan unit.

8.2 This Security Deposit shall be refunded within 2 months from the date of satisfactory completion of the PG Test and on basis of certificates given by CCI.

9.0 INVOICING :

9.1 Three set of copies of invoices showing basic rates, excise duty, full taxes amount / GST, freight etc. etc. along with packing list, delivery challan, Railway Receipt / Lorry Receipt / Parcel way bill or similar other documents are to be sent to the consignee, in case of direct payment option by DD submitted to CCI duly certified by CCI representative in the manner specified under Clause 6.3.1 &6.9.2 of part III special terms and conditions for obtaining payment. Copy of these documents should also be sent immediately after dispatch of the consignment to the destination by fax / mail to avoid demurrage / wharf age.

9.2 Three copies of invoices of which one shall be original duly pre-receipted along with Packing list/delivery challan shall be sent to the paying authority directly.

9.3 If any extra charges including wharf age / demurrage are incurred in taking delivery of the consignment due to supplier's failure to observe the conditions mentioned above, the same would be recovered from the supplier.

10.0 CONSIGNEE:

10.1 HOD (Mech.) – BOKAJAN (ASSAM). However, the consignment note (**C/N**) / LR / RR shall be endorsed by CCI in the name of tenderer's representative posted at CCI BOKAJAN Unit to facilitate receipt, unloading, transport and safe custody by him at CCI's site.

10.2 The successful tenderer should ensure that their site in-charge would be available at Bokajan unit, before the first lot of material reaches the unit, for ensuring the receipt, unloading of the material and its safe unloading as well as custody etc.

10.3 Transit insurance, insurance during storage will be in the scope of successful Tenderer only.

11.0 PAYING AUTHORITY:

H.O.D. (FINANCE) – BOKAJAN CEMENT FACTORY, BOKAJAN

12.0 **INSPECTION :**

12.1 Pre-dispatch inspection, if any shall be done at the tenderer's works or at the works of tenderer's vendors. The tenderer shall give an advance notice of minimum seven days for enabling CCI to depute the inspector. Material will be dispatched only after pre-dispatch clearance certificate given by CCI's inspector.

12.2 The equipments shall also be inspected at works of purchaser's plant site by the Corporation representative.

12.3 Inspection shall, in no way, absolve the responsibility of the supplier for workmanship, quality and performance guarantee offered by them.

13.0 PERFORMANCE GUARANTEE TESTS :

13.1 The successful tenderer shall be required to give performance guarantee tests as per Tender clause separately given in Annexure C-6 of the tender document within 30 days from the date of successful commissioning.

13.2 The tenderer shall ensure that proper illumination level inside / outside in PJBH Building and other equipment lighting. as specified.

14.0 WARRANTY/ GUARANTEE :

14.1 The tenderer shall guarantee that all the equipments supplied by them whether manufactured at their works or fabricated at our site or by their sub-suppliers or purchased from any other source and supplied to the Corporation will be new and free from all defects and shall be of first class workmanship and quality.

14.2 The tenderer shall warranty that to replace, rectify or repair free of cost at our Factory site, the components or the parts of the machinery, including the bought outs which have become unserviceable due to any of the defects within a period of 12 (Twelve) months from the date of successful commissioning of the plant or 18 (Eighteen) months from the date of completion of the delivery whichever is earlier. If the tenderer is not complying with the above within a reasonable time, the Corporation shall have the option to rectify, repair or replace the defective parts / machinery after expiry of two weeks' notice and at the risk and cost of the tenderer.

15.0 TRANSPORTATION, INSURANCE& HANDLING AT SITE :-

The freight and insurance charges will be borne by the successful tenderer. All loading, unloading, transportation and storage at site will be done by the successful tenderer. Suitable covered space shall be provided by CCI for critical and other sensitive components free of charges. Erection cum storage insurance shall also be included in the successful tenderer's scope.

16.0 TECHNICAL INFORMATION / DATA :-

The tenderers are required to furnish the information particulars i.e. capacity, power in kw , material of construction & any other special parameters along with their tender.

17.0 SUBMISSION OF DRAWINGS / SCHEMES / TECHNICAL DOCUMENTS etc ..

Six (6) sets of complete descriptive catalogue, Dimensional General Arrangement Drawings, detailed parts list of each and every item are to be furnished by the successful tenderer to enable us to verify the items at the time of receipt & installation.

18.0 RETURNS :-

Monthly report of the dispatches for each previous month shall be sent by the Successful tenderer by 5th of the subsequent month to the CCI, Bokajan with following particulars : -

i) Quantity due for supply during the month.
ii) Quantity actually dispatched with reasons for variation.
iii) LR / RR No. and date.
iv) Bill No. and date.
v) Quantity awaiting dispatches.

19.0 LAWS GOVERNING THE CONTRACT:-

This contract shall be governed by the laws of Union of India in force. All the state & central labour law will be applicable to the worker to the working at the site

19.1 ESI REGISTRATION

The tenderer & their authorized contractor should have ESI Registration & ESI code no. under ESI Act 1948**.**

20.0 Terms and condition for Erection and Commissioning

The details of terms and condition for Erection and Commissioning are given in Part-IV Annexure-C.4 of the tender documents.

Annexure - C

CEMENT CORPORATION OF INDIA LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE)

PART- IV : TECHNICAL SPECIFICATIONS

SPECIAL TERMS AND CONDITIONS OF TENDER FOR DESIGN, ENGINEERING, MANUFACTURE, SUPPLY, CIVIL/STRUCTURAL DESIGN, CONSTRUCTION, ERECTION & COMMISSIONING OF PULSE JET BAG HOUSE (PJBH) FOR KILN 1 & 2 (COMBINED) TO MEET LATEST POLLUTION NORMS FOR CEMENT PLANTS & HOOK UP WITH EXISTING SYSTEM ON TURNKEY BASIS.

1.0 PRESENT SYSTEM:

Brief description of Plant:

Bokajan cement plant (BCF) is a unit of Cement Corporation of India Ltd, Government of India Enterprises under the Ministry of Heavy Industries. Bokajan Cement Factory went into commercial production in 1977. Plant is situated at Bokajan, Karbi Anglong, Assam on the NH-39 (Golaghat Road) which is connecting to the site with Dimapur on South and Golaghat on North through the Bokajan town. Plant is well connected by Rail and Road; it is 1.4 Km far from Bokajan Railway station, 10Km from Dimapur Railway Station and the nearest airport is Dimapur at 18KM. Bokajan Cement factory is having its own Railway siding(CCIB) adjacent to Factory.

Geographical Location of the site: 26^0 01/13.8//N & 93^0 45/52.5//E

Soil investigation report of CCI Plant: Safe load bearing capacity of soil 30.00 Tonne / M^2 at -3.00 mtr. Below G.L.

Level of Soil: CCI Bokajan plant is covered by old Alluvial soil .

Seismic Zone : CCI Bokajan fall under (Zone V)

Temperature Range : 12^0C to 34^0C

Existing Process & Equipment specifications details:

There are two nos. of Coal fired Kiln using dry process technology, each of capacity 300 TPD with individual stream of conventional cyclones on 4 stages Pre-heater and Individual Grate Cooler.

Each Pre-heater outlet duct connected to individual pre heater fan having capacity 69,000 M^3/Hr at gas Temp 350^0C at pre-heater fan inlet & at 350mm WG. After Pre-heater fan, gases from both the fans merged into a single duct and goes to GCT (Gas Conditioning Tower).

GCT outlet gas temp is being maintained at 150^oC normally but sometimes its goes up to 240 ^{o}C on failure of GCT water pump. GCT out let is connected to ESP (1, 46,000 M^3/Hr) having negative draft of 150mmWG and temperature 150 ^{0}C by ESP Fan capacity 1, 44,000 M^3/Hr.

ESP output is going in to the Stack (Stack height 59.70mtr above ground level (MSL 138mtr).Flow sheets attached with tender documents. (Sheet 1, 2 & 3)

OPERATIONAL PARAMETERS FOR THE DESIGN OF PJBH AT 300 TPD KILN (2 nos. combined) CAPACITY

Sr.No.	Parameters	At 300 TPD Kiln (2 nos. combined) Running proposed	Remarks
01	Gas Volume At ESP Inlet	146000 m^3/Hr	At 150 ^{0}C, 150mm WG
02	Inlet Gas Temperature	Max. 240 ^{0} C	On failure of GCT
03	Inlet moisture Content	10– 15%	-
04	Inlet dust concentration (inlet to GCT)	80 g/m^3	-
05	Outlet dust concentration	< 30mg/Nm^3	As per the MOEF &CC Notification GSR 612 (E) dated 24th August 2014.
06	Outlet Dust Load	0.125 Kg/Ton of Clinker	As per the MOEF &CC Notification GSR 612 (E) dated 24th August 2014.

PROPOSED SYSTEM :

New Pulse Jet Bag House (PJBH) to be installed as per site conditions and Layout.

Inlet side of PJBH with proper Expansion joints

Outlet side of PJBH with proper Expansion joints

a) Outlet duct from the PJBH to the inlet of PJBH fan.

b) Outlet duct from the PJBH fan to the existing stack however the tenderer can suggest their design if it is not convenient /unsuitable.

c) Collected material from PJBH to be conveyed and connected to existing GCT & ESP dust conveying system. Tenderer has to make/modify lay out drawings and required equipments to suit site conditions.

Dampers (Electrically Operated) :

a) Knife edge Damper at the appropriate place in the duct taken from GCT outlet .
b) Fresh air dampers / air dilution damper at the appropriate places to dilute the air to control gas temperature.
c) Louver Damper before PJBH fan.

Expectation from party/vendor/supplier:

Parties are expected to carry out any extra/In addition to the scope of work which has not been mentioned in the scope of work arises during execution of work and required for the smooth operation of the PJBH system as it is turnkey project without any additional charges.

Efforts have been made to give clarity to the parties/vendors/suppliers to extent possible. However interested parties/vendors/supplier should depute their representative to visit our site for physical inspection of the site for study of layout and required/necessary data collection, accordingly designing the system before submitting their offer for which all cooperation will be extended by us.

i. Air to Cloth Ratio for Kiln Bag house. 0.9 to 1.0 (m3/min)/m2,

ii. Pressure drop across bag house 125-150 mm WG, which is as per NCB guide norms for Cement Plant Operation.

a) Design, Engineering, Material Flow diagram, Plant layout drawing for the system suggested by the party with the equipment suppliers as per approval of CCI, Including civil works on turnkey basis.

b) Party should visit site and study the site conditions for design, layout, process parameters etc. for erection of proposed PJBH.

c) Process/GA Diagram & layout of proposed system along with process instrument details.

d) Party should study the existing Power supply system etc. in our plant.

e) Party should give the list of bought-out item by them and their supply just before the time of their erection duly approved by CCI.

f) Minimum erection hookup / commissioning time.

g) Performance Guarantee/warranty for achieving scope of work.

Parties are requested to carry out anything extra / In addition to the scope of work which have not been covered and are essential for smooth running of the proposed system without any extra cost.

SCOPE OF WORK

Design, Engineering and supply of proposed Pulse Jet Bag House, preparation of general arrangement and other arrangement drawings, manufacture and supply of all equipments for the system. Civil design of foundations, structures, supports etc. and preparation of related drawings. Electrical and Instrumentation schemes and supply of the equipments.

New Pulse Jet Bag House (PJBH) for Kiln 1 & 2 (combined) to meet latest Pollution norms for Cement Plants & hook up with existing system on turnkey basis

1. From GCT outlet duct and up to connecting duct to stack.
2. Material collected in PJBH is to be conveyed by suitable conveying system to our existing conveying system.
3. PJBH should also be deigned to take Raw Meal dust from mill outlet duct to PJBH inlet with isolation damper for smooth operation of Kilns.

The Pulse Jet Bag House should have adequate nos. of compartments, hoppers, main ID fan of adequate size and capacity required nos. of dampers, conveying equipments and other accessories etc. so as meet the latest emission norms of less than 30 mg/Nm3.

This includes the followings:

1.0 Bag House Structural

1 Casing with roof and access doors(Upper & Lower)

2 Bag Fixing Plates & thimbles

3 Bag Hanging support Steel

4 Internal access platforms & Ladders

5 Hoppers with access doors

6 Set of matching flanges with nuts and bolts for bag house inlet and outlet

7 Set of bearings including base plate and anchor plate

8 Set of inlet butterfly type dampers (manually operated)

9 Any other necessary required parts as per design.

2.0 Filter Bag System

1 Fiber glass Woven (Membrane with PTFE lamination) / any other suitable membrane to meet the operating temperature and suitable for latest PCB norms i.e less than 30 mg/Nm3 along with its accessories

2 Compressor (1W + 1S) with its necessary accessories for Pulse Jet Bag House and the poppet damper operation shall be in bidders scope.

3.0 Exterior Access

1 Access platform at compartmental lower door level

2 Access platform at compartmental upper door level

3 Staircase from bearing level to PJBH upper door level

4 Access platform at inlet damper operator level

5 Railing for all platforms and staircases

6 All the platforms shall have staircases (not monkey ladder) for accessibility and hand railing for safety.

7 Any other necessary access platform & staircase required as per design.

4.0 Dust Conveying System

1 Rotary Air Locks for hoppers along with coupling, geared motors & brackets etc.

2 Manual Slide Gates above each RAL.

3 Expansion Joints below each RAL.

4 Any other accessories required to hook up suitably with existing dust conveying system

5.0 Controls

1. Pneumatic Control valves, piping, fittings and accessories between pneumatic damper and compressor.
2. Oil Filter, Moisture trap, pressure regulator with gauge for compressed air line
3. Local control panel
4. Set of High level Indicators (Level Switch)
5. Differential Pressure switch for bag house and for each compartment
6. Zero Speed switches for RAL
7. Differential Pressure Transmitter for Bag House
8. Pressure switch for compressed air line
9. Any other required controls as per Design.

6.0 General:

6.1 Commissioning spares

6.2 Spares for 2 years of operation

6.3 GA Drawings indicating the load details shall be in the tenderers scope.

6.4 Cement will be issued free of cost from CCI store/Packing plant and all other building material like Tor steel, Structural steel, CGI sheets of 20 SWG, Coarse aggregate, Sand, Stone, Bricks etc. except cement will be arranged by the party. All the civil construction material except cement will be at the cost of party. Cement will be issued as per the design / drawing according to the nominal mix, as per the CPWD consumption pattern. Cement consumption is allowed as per the CPWD / DSR-2016 coefficient for cement consumption. Permissible variation limit for cement consumption is (+/-) 3% consumption of cement as per CPWD norms (Cement will be issued at free of cost basis for incorporation of the work). Excess consumption over +3% will attract penal recovery at market value +10% as overheads.

6.5 Tor steel of reputed make such as SAIL / Tata / Jindal / RINL or steel confirming to IS-226, Fe-500D grade only allowed to be used in Pulse Jet Bag House.

6.6 Structural steel required for the above work of make such as SAIL / Tata / Jindal / RINL on confirming to IS standards only allowed to be used for the work.

6.7 The tenderer has to follow all industrial & statutory rules of Central Govt .and State Govt .

6.8 Equipments for excavation, concrete mixture machine, vibrators, shuttering & centering material, skilled, un-skilled manpower required to complete the civil works as per design / drawing shall be completely responsibility of the contractor.

6.9 Necessary binding wire, tor steel, 20 mm, 40 mm granite coarse aggregate, sand, finishing materials like tiles, doors, shutters, windows, false ceiling if any required to complete the civil works including concrete bed approaches etc shall be done by the party at their cost, on turnkey basis.

6.10 Necessary chemical compound Nito bond of Fosroc to be applied to old concrete to bond for new concrete wherever required, by the party at their cost.

6.11 Party should execute the civil works as per design / drawing, grade of concrete, all other items as per the specifications including necessary curing etc. in all respect and to complete the civil works on turnkey basis. Building material procured at site should be of good quality and if required, material like coarse and fine aggregate will be tested as per IS code of civil construction in laboratory and testing charges will be in contractor scope.

6.12 To check the quality of concreting work, testing of compressive strength of cube (7 days & 28 days), sample will be arranged by the contractor at his own cost. All quality norms will be followed as per IS code and as per CPWD technical specifications

6.13 After completion of the civil works, party should intimate the same to civil deptt. / HOD (Civil).

6.14 Party should ensure all items (civil) to be bought of standard make; approval from Civil In-charge / HOD (Civil) should be obtained prior to its use for work.

6.15 For all the clauses / conditions CCI's General Conditions of contract for civil works will form part of this tender. The general terms & conditions applicable for civil works in available with the corporation, which may be referred.

7.0 SCOPE OF WORK FOR OTHER ALLIED JOBS:-

The scope of supply includes but not limited to the following items for the successful erection and commissioning of the Pulse Jet Bag House

The Broad scope of work includes Design, Engineering, manufacture, supply, and erection &Commissioning of mechanical, electrical, Instrumentation and Controls with all required accessories.

The technical specification and parameters given by us are only to give a broad view about the present and proposed system. Tenderer has to make a detailed study of the system including taking of gas flow and dust concentration measurement. As the ultimate responsibility of bringing down the outlet dust concentration to less than 30 mg / Nm^3 lies with the tenderer.

The supply portion consists of the following equipments accessories. (Any item left out in the list but required for the smooth, trouble free running of the system also form and part of scope and the same may be specifically mentioned in your offer).

1. Civil foundation for the Pulse Jet Bag House, ducting's and Fan / Motor system.
2. Supporting columns (R.C.C) for the Pulse Jet Bag House.
3. Supporting columns R.C.C & steel for ducts at different height.
4. Ducting's for the Pulse Jet Bag House (Pre-fabricated)
5. Suitable slide gates between hopper and rotary air locks.
6. Suitable screw conveyor or / drag chain conveyor and any other appropriate conveyor system below the rotary air lock valves and it should be connected to the existing dust disposal Screw Conveyor at the appropriate place.
7. Suitable PTFE coated membrane bags of diameter not less than 150 mm and length / height not less than 6 meter.
8. The Pulse Jet Bag House casing, Fan casing and the ducts have to be appropriately thermal insulated as given below.

   LRB mattress thickness• 75 mm

   LRB mattress density 120 kg/m^3

   22 SWG Aluminium sheet for thermal insulation sheeting.
9. Suitable variable frequency drives fan and motor with control panel for the PJBH

8.0 Supply of the following items

a) 1 Nos. of Pulse Jet Bag House consisting of the main equipment i.e. motor, fans, bags, conveying system, fan, compressed air system and accessories required for its smooth and trouble free operation.

b) All required power, instrumentation and control cables, panels with cable Trays and other required accessories for cable connection and etc.

c) All Fabricated/structural items with one coat of Red Oxide and one coat of smoke Grey enamel paint for non-insulated parts.

d) In the M.C.C. for each size /category of feeders, a spare feeder may be provided

e) Successful tenderer should submit all EQUIPMENT GA DRAWINGS & LOAD DATA CIVIL DRAWINGS, Mechanical, Electrical, Instrumentation, Power control drawings for approval before manufacturing.

f) Any other equipments/accessories required for the smooth running of the system (Please specify in the tender with details).

9.0 PLATFORMS:

i) Platforms & staircases with hand railing suitable for the maintenance and operation of all the equipments shall be provided by the tenderer.

ii) All platforms shall have staircases (not monkey ladders) for accessibility and hand railings for safety.

10.0 BYPASS CHUTES: Fabricated from MS Plates of thickness not less than 8 mm

11.0 DIVERTING VALVES / DAMPERS MANUAL / AUTO REMOTE:

The diverting valves shall be manually operated, fitted with anti-friction bearings (SKF/FAG -MAKE) for smooth operation. Bush bearings shall not be acceptable.

12.0 CHUTES :

All chutes (common chute, gravity chutes and inverted Y-chutes) shall be Fabricated from wear resistant plate. The thickness of plates used for fabrication shall not be less than 8 mm.

13.0 GENERAL POINTS (Tenderer's Scope)

The following shall be within the scope of the tenderer:

i) All the modifications required to be carried out in the existing system, hooking up of the proposed system with the existing mechanical, electrical equipments and control system and removal of the existing equipments which come in the way of the proposed system.

ii) All civil and structural work, like foundations, structures, platforms etc. and any other civil modification required in the existing arrangement to install the proposed system etc.

iii) All interconnecting chutes, ducting, piping etc. and also insulation of them wherever required.

iv) Even though the scope of equipment supply is elaborated it is the responsibility of the tenderer to ensure that manufacture, supply, erection & commissioning is complete including auxiliaries, ducts, chutes, supports, dampers, expansion joints and any other items required for proper functioning of the proposed Systems on turnkey basis.

v) Four sets of Operational and Instructions manuals of all equipments, six prints of all drawings prepared for the system, fabrication and erection.

vi) One set of all reproducible of all the drawings prepared for the proposal to be supplied by the successful tenderer after approval and execution of the job by incorporating the changes made during erection and commissioning.

vii) Manufacturing drawings (6 sets of blue prints along with RTF's and soft copy) of the following spares are to be supplied by the tenderer:-

a) Sizes of the bearings / bearing housings and couplings.

b) Dimensional drawings of motors with technical data.

c) Dimensional drawings of Filter bags, Cage, Venturi etc.

d) Dimensional general arrangement drawings with Civil, Mechanical, Electrical and Instrumentation schemes to be furnished.

viii) Control panel and power distribution board for supply to all drives should be designed and engineered by the tenderer but shall be as per approval of CCI. Suitable local on/lockable off push buttons are to be provided for all the drives. 20% spare modules / feeders are to be provided / incorporated in the MCC with minimum one Extra feeder for every category.

ix) All power control and instrumentation cables required for the system and earth conductors for grounding with main grid shall be of suitable size. Wherever cable trays are not existing, suitable cable trays shall be provided. Separate earth pits shall be provided for new installations.

x) Each floor of a shed to be suitably illuminated by providing energy efficient LED lamps of Philips / Osram / Bajaj/SYSKA make. PVC armored Aluminum conductor cable size 2x2.5 / 4x2.5 sq.mm to be laid for this purpose and to be kept in the scope of supply / erection / commissioning. Besides, suitable miniature circuit breaker panel in dust & vermin proof. Lighting distribution board (LDB) to be provided / installed by the successful tenderer.

14.0 For electrical/ instrumentation equipment and other related items, special conditions, over and above those given in the proceeding Para's are given below : -

i) All the equipments are to be suitably mounted, assembled, aligned and inter- connected with various sections, checking of each components for satisfactory mechanical and electrical operation and cleaning of contacts, mounting of loose supplied components to their respective positions,

setting of relays in accordance with the requirements, Mounting and properly wired of all converters, Isolators, Transmitters and Hooking up with the existing System.

ii) Laying of LT control, instrumentation and special cables including supply / fabrication of all cable accessories such as junction boxes, indoor, outdoor end termination / straight through / tee joining kit for cables, cable gland, cable lugs, cable ferrules, rigid / flexible pipes, cable racks / supports / trays etc. cable laying shall be as per approved schedule and shall be carried out in a neat and systematic manner with codified markings.

iii) Supply and erection of earthing station, mains and connections with all accessories for the proposed system including control arrangement. The work includes earthing of all drives, cables, power equipment and electrical boxes. The instrumentation panels and screened cables should be separately and effectively earthed. All work shall be carried out in accordance with Indian Electricity Rules and the code of practice as per Indian standards IS 3043.

iv) Supply and erection of lighting system inside / outside sheds is under the scope of this order as per statutory requirement.

v) All erection and standard tests as per BIS and electricity regulations shall be carried out, documented and countersigned by the purchaser's representative, which shall be an integral part of the installation and commissioning work.

vi) The successful tenderer shall provide all the drawings, layouts and relevant data for getting the statutory approval from the central electricity authorities as per rules in vogue

vii)For laying of screened / shielded cables separate cable trays shall be provided.

viii) Software engineer / programmer will stay for 01 month after commissioning of the System for any modification / additional programming needed as per process requirement.

15.0 ELECTRICAL / INSTRUMENTATION

15.1 Only energy efficient motors having energy efficiency class – IE3(Premium) as per IS: 12615 of Kirloskar / Crompton / ABB / Bharat Bijlee / Siemens / BHEL/ NGEF make with IP55 enclosure and Totally Enclosed Fan Cooled (TEFC) shall be used. Insulation quality shall be class 'F' suitable for 3 phase supply voltage of 415 V $\pm$ 10% and Frequency of 50 $\pm$ 5% combined variation +/- 10% as per IS325. Geared Motors should be of Power Build / ELECON/ Siemens/ BBL make Motors should be of Cast Iron Body only. Aluminium body not acceptable. IS applicable – IS 4691, IS-12615, IS325, IS-1231, IS-6362.

15.2 The proposed system is to be integrated with the existing electrical & new instrumentation schemes and should be operated from the Control Room with new PLC system. (Supply and laying of power cable, control supply cables, communication cable, cable glands, lugs, ferrules etc. shall be in the tenderer's scope).

15.3 Ammeters shall be provided at MCC and current transmitter with 4-20 mA output proportional to Amps and should be hooked up with new PLC & relay logic system through new I/O rack to Control Room for all motors having rating of 0.5HP and above. Digital KW transducers are to be provided having 4-20 mA to hook up with control desk for control room indication of 0.5HP & above motors and MCC total load. Ammeters should be AE / MECO / L&T / SCINIEDER. CONZERV. Transmitters / transducer should be P&F/ Siemens/ PEPL/ ROSEMOUNT/ EMERSION/ RISHUBH.

15.4 The supply of MCC is under the scope of Tenderer. The incoming cable from existing PCC shall be laid by the tenderer up to the MCC of the proposed equipments.

15.5 Tenderer has to supply suitable MCC as per specification enclosed (Annexure). The MCC should be dust and vermin proof having 20% extra feeders with minimum one extra feeder for every category. All components fitted in the MCC should be of Siemens make only. MCCs feeders should be provided with digital Ammeters/load manager. Incomer feeder should be provided with Volt meter & Ammeter of accuracy class 1.0, multi function Energy meters should be of accuracy Class 0.5. For other feeders digital CT operated ammeters are to be provided with local and remote provisions. MCC Incomer and outgoing feeder of 250Kw should be provided with suitable Air Circuit Breaker of GE/ABB/Siemens make with over current, earth fault, short circuit, under voltage protection and instantaneous earth fault and over current protection.

15.6 Supply and laying of Power, Control & Communication cables required is in the scope of Tenderer. Power / control cables shall conform to BIS specification IS:7098, Part -I / IS : 1554, Part -I, Voltage Grade -1100 and should have IS mark. Shielded & Screened control cables should be used wherever required. Only following makes of power / control cables shall be acceptable - Universal / Fort Gloster / Polycab / Finolex / NICCO / Unistar All control cables are of XLPE/ PVC insulated, PVC sheathed Copper Conductor with Screen and Steel armoured. The communication cable should be Lapp / Belden make.

15.7 The necessary instruments required to hook-up with our existing relay logic system (like I/O Rack, Isolators, convertors) for operation of the system are to be considered during engineering & hook up with the existing control & instrumentation scheme. The make of the equipments proposed shall be approved by CCI.

15.8 Hooking of entire Pulse Jet Bag House system with our existing relay logic system in all respect as required for smooth operation. The programming of PLC panel and control system related to supply is in the scope of tenderer.

15.9 List of the measuring instrument such as solenoid valves, level switch/ transmitters, draft, DP, Temp., flow, zero speed switches, transmitter, convertor, isolator & RTDs with make as to be indicated. The Pulse Jet Bag House system should be capable of 20 % extra input/output Digital as well as analog system.

15.10 All measuring instruments like level switch/ transmitters ,temperature, draft, air flow, vibration, level etc. should be two wire 420 mA with isolation shall be of make- P&F/ Rishabh / Siemens/ ABB /Rosmount /PEPL/ EMERSION only. Local control panel with switches and indicators for operating the system in local.

15.11 As per Indian Electricity Rules standard earthing through separate earth pits for all electrical equipment should be done by successful tenderer. All required convertor / isolator should be wired and mounted in a common panel with 220VAC Power supply. The system should have 220 V AC Control supply.

15.12 All Fans' Motors of LV/MV should have VFD / VVVFD Control with 12 pulse and with by-pass contactor system having speed regulation from 40-100%. Make : ABB/Siemens/L&T/ Allen Bradely / Schneider with vibration monitor having following specifications :

i The VFD Control Panel shall have 12 Pulse control with by-pass contactor systems. VVVFD control shall have speed regulation form 10 – 100%.

ii The supply of motor shall be fed from 3 Phase, 415 V, 50 Hz MCC, as per requirement.

iii The panel shall be free standing, enclosed, self-ventilated design preferably without back access.

iv VVVFD shall consist of a pulse width modulated (PWM) inverter design.

v VVVFD shall have all the standard features like customer interface and shall be complete with metering, protection, and communication port (RS-485) in totality.

15.13 The drive unit shall be complete with

15.14 Hardware, Control Logic, Control Mode, Auto Tuning, Starting Mode,,Stopping Mode, Auto-re-start capability, Load loss detection, Digital I/O, Fault configurations, Protection features, Metering, Communication protocol RS-485 MODBUS, Isolated analog input and output configurable for speed reference input (4-20 mA), speed output (4-20 mA), Current (4-20 mA), Load KW output (4-20 mA),Motor space heater control, Pilot devices, Motor run time meter, Operator interface module. VVVFD for fan application shall be rated for 150% continuous load.

15.15 VVVFD system shall be designed to remain in uninterrupted operation during transient line disturbances according to the specified voltage tolerances of +/- 10%, Frequency +/- 5% and combined V&F of 10%.

15.16 Other field instruments like temperature measuring instruments, level instruments, zero speed / belt sway switches etc. shall be of make like Temsens / Toshniwal / PEPL/ NIVO CONTROL / SIEMENS/ JAYASHREE / BINMASTER / IFM. Damper Actuators shall be of AUMA & Siemens make only. Local Push button stations of dust and vermin proof (IP-54) shall be provided for all the drives are in the scope of the supplier.

15.17 INSPECTION / TEST REPORTS: from a Govt. / Govt. approved / Reputed agency is to be furnished by the tenderer along with delivery of equipments. The tenderer should inform the name of the agency in their techno commercial bid.

15.18 Approval of Electrical / Instrumentation drawings and inspection of installation by CEA is in the scope of successful tenderer.

16.0. SPECIFICATION FOR 415 VOLTS A.C. DRAW OUT MOTOR CONTROL CENTRES

16.1 General Specification of Equipment:

16.1.1 The Motor Control Centers shall be metal clad, totally enclosed, rigid, floor mounting, air insulated, cubicle type with fully draw out starter modules for use on 415 volts 3 phase 50 cycles system with a fault level of 50 kA RMS symmetrical.

16.1.2 The equipment shall be designed for operation in high ambient temperatures and high humidity tropical atmospheric conditions. The equipment shall be for indoor installations.

16.1.3 The equipment shall be designed for an auxiliary voltage of 220 volts AC.

16.2.0 **Standards:**

16.2.1 The equipment shall be designed to conform to the requirements of;

i) IS 8623 and IEC 439 – Factory Built assemblies of switchgears and control gears.

ii) IS 4237 – General Requirement for switchgear and control gear for voltages not exceeding 1000 volts.

iii) IS-2147-Degree of protection provided by enclosures for low voltage switchgear and control gear.

iv) IS-375-Marking and arrangement of bus bars.

v) IS-3914 – Code of practice for selection of AC induction motor starters.

16.2.2 Individual equipment housed in the motor control centers shall confirm to the following IS specification.

i) IS 1822-AC Motor starters of voltage not exceeding 1100 Volts. IS 2959 – AC Contactors of voltage not exceeding 1000 Volts

ii) IS 4604 – (Part II)-1978-Air break switches and fuse combination units/ MCCBs for voltage not exceeding 1000 volts (specific requirements for the direct switching of individual motors).

iii) IS 694 (1977) and IS 8130 (1976) – PVC Insulated cables and aluminium conductors.

iv) IS 1248 – Direct acting electrical indicating instruments.

v) IS 2208 1962 or IS 9227,: 1979 – Low voltage fuses.

vi) IS 2516 – Alternating current circuit breakers.

16.3.0 **Construction:**

16.3.1 Structure of the motor control centers shall be totally enclosed, dead front, free standing assemblies, made up of requisite vertical sections and of dust and vermin proof construction.

16.3.2 The structure shall be of rigid welded / bolted construction with hot rolled sheet steel of not less than 2 mm thickness. The doors, covers, barriers etc. shall be made of minimum 1.6 mm thick sheet steel. All doors shall be provided with neoprene gaskets and lockable devices.

16.3.3 The structure shall contain horizontal bus bars running throughout the length of the MCC and be readily accessible. Each vertical panel structure shall contain a vertical wire / cable way with provision for suitable cable supports. The cable compartment shall have hinged door. Each vertical section shall be divided into the following well-defined zones by metallic/insulated barriers:

Main bus bar chamber at top, Unit chamber, Cabling chamber at the right hand side of Unit chamber, Vertical riser chamber behind unit chamber, Horizontal wire way at top, in front of main bus bar chamber.

16.4.1 The structure shall be mounted on a right base frame of folded sheet steel of minimum 3 mm thickness and 50 mm height. This shall be painted black.

16.4.2 The Motor control center shall be designed for single front as may be required. The design of the chassis shall not change for single front design.

16.4.3 The motor control center shall be provided with a degree of protection of not less than IP 51 as per IS 2147.

16.4.4 The Motor Control Centre shall have a depth of 500 mm for bus bar rating up to 1600 amps and 875 mm for bus bar ratings of 2500 / 3000 amps (suitable rating). The maximum operating height of the Motor control center shall be 1.9 Mtrs.

16.4.5 The Motor control center shall be extensible on both sides by addition of vertical sections.

16.4.6 Provision shall be made for permanently earthing the frames and other metal parts of the MCC through an aluminum earth bar running throughout the full length of the MCC panel at the bottom. It shall be possible to earth the MCC at two independent points.

17.0 **Bus bars:**

17.1 The Bus bars shall be air insulated and made of high conductivity, high strength aluminium complying with the requirements of grade E91E of IS 5082.

17.2 The bus bars shall be suitably braced with non-hygroscopic SMC supports, to provide a through fault withstand capacity of 50 kA RMS symmetrical for one second and a peak short circuit withstand of 105 kA minimum. The neutral as well as the earth bar should also be capable of withstanding the above fault level. Ridges shall be provided on the SMC supports to prevent tracking between adjacent bus bars.

17.3 Main horizontal bus bars shall have the following ratings and total cross sectional area for operation at 110 Deg. C maximum at an ambient of 40 Deg. C. Vertical bus bars for outgoing compartments shall have rating of 400, 630 and 800 amps and shall run the full height of the panel to cater to all combinations of modules in a section.

BUS BAR RATING TOTAL CROSS SEC. AREA (PER PHASE)

1000 Amps 975 sq.mm, 1400 Amps 1463 sq.mm, 1600 Amps 1950 sq.mm,2500 Amps 2925 sq.mm, 3000 Amps 3900 Sq.mm.

17.4 The main horizontal bus bars shall be positioned at top portion and suitable colour identification shall be provided. Suitable barrier shall be provided in front of vertical bus bar against accidental contact after the module has been withdrawn.

17.5 Suitable barrier shall be provided in front of vertical bus bar against accidental contact after the module has been withdrawn.

18.0 **Unit Module:**

18.1 Each module shall be suitable for mounting required number of contactors, bi-metal relays, auxiliary contactors, push button, isolators, fuse switch, MCCBs, control fuses, main fuses, indicating lamps, power and control contacts, terminal blocks, etc. to suit non reversing, reversing and assisted start motor applications.

18.2 Each module shall be provided with individual door and the door shall be mounted on the main structure. The doors shall be provided with concealed hinges. The module door shall have a knob with a white dot to indicate position.

18.3 Unit doors shall be interlocked mechanically with isolator / fuse switch/MCCBs to prevent unintentional opening of the door while unit is in energized condition. Means for defeating this interlock shall also be provided.

18.4 Padlocking arrangement shall be provided to permit locking of the isolator / fuse switch in OFF position.

18.5 All modules shall be of the fully draw out types and with three distinct positions i.e. Service, Test and Isolated. A positive guiding system shall be provided for accurate alignment of power contacts and control contacts.

18.6 The main and control circuit contacts shall be of the self aligning type suitable for taking a mismatch up to +/- 4mm. There shall not be any necessity to disconnect any wires before drawing out the module. The main power contacts shall be capable of with-standing a short circuit current of 50 kA.

18.7 In order to prevent mismatch during replacement all control and indicating equipment like push button, indicating lamps, meters etc. in a module shall be mounted on a hinged panel which shall be integral with the module. It shall be possible to manually reset the thermal overload relay without opening the door of the module.

18.8 Main HRC fuses /MCCBs shall be positioned before the isolator to eliminate any possible hazards during a fault at the isolator terminals. The HRC fuses/MCCBs however, shall not be accessible when they are in live condition.

18.9 The module shall be connected to the vertical bus bars by plug-in contacts. The contacts shall be between copper and copper, both silver plated even in bus bars are of aluminum.

18.10 Each module tray shall be provided with a scraping earth contact and connected to a vertical earth Bar. For higher size modules a plug-in type earth contact suitable for withstanding the let through energy of HRC fuses shall be provided as per IS 8623 for protection against shock in case of a fault.

19.0 **Fuses Switches, MCCBs and Isolators.**

19.1 The incoming to the MCC shall be a fuse switch unit with HRC fuse links /MCCBs or alternatively the MCC panel shall be suitable for coupling with one or more incoming Air Circuit breakers.

19.2 Rotary isolators up to 40 Amps shall be used for the starter modules. Above this fuse switch /MCCBs units shall be used. Both isolators and fuses switch units/MCCBs shall comply with the

requirements of IS 4064: 1978 for AC 23 duty (motor duty).

19.3 Fuse switch units with HRC Fuse links shall have a withdrawal Fuse carriage for quick replacement of HRC fuses in complete safety.

20.0 **Motor Starters:**

20.1 **Contactors:**

20.1.1 Contactors shall be of electromagnetic type rated for uninterrupted duty as defined in IS 2959 unless otherwise specified (all contactors of 170 Amp. and above should be of vacuum type).

20.1.2 The main contacts shall be of silver or silver alloy with insulation class for the coils shall be class E and each contactor shall be provided with 2 normally open and 2 normally closed auxiliary contacts.

21.0 **Thermal overload relays:**

21.1 Thermal overload relays shall be of three elements positive acting ambient temperature compensated type with adjustable setting with single phase preventer.

21.2 Thermal overload relays shall be of self/hand reset type as specified in the detailed requirements.

22.0 **Indicating Instruments:**

22.1 Digital Ammeters and Voltmeters shall be of grade 1.0. The size of the instruments shall be 90 mm sq. for starter and fuse switch compartments.

22.2 Ammeter with suppressed scale current rating shall be provided for specific requirement.

23.0 **Internal wiring:**

23.1 Internal wiring for control circuit shall be made with 1100 V grade multi strand copper PVC cable.

23.2 Power wiring shall be done either with copper flexible PVC insulated cable of 1100 V grade or with solid copper conductors.

23.3 The minimum size of control wiring shall be 2.5 Sq.mm copper for CT circuits and 1.5 Sq/mm copper for other circuits.

23.4 The wiring shall be terminated in the respective terminal with suitable crimp type of sockets.

23.5 Horizontal as well as vertical wire ways shall be provided. At the top, horizontal wire way shall connect the inter panel wiring.

24.0 **Terminal blocks:**

24.1 Terminal blocks shall be of 1100 V grade with contacts of rating not less than 10 amps. They shall be of the stud type with barriers between adjacent contacts.

24.2 The wire terminations to the blocks shall be of screw type suitable for crimp type socket.

24.3 Suitable provision shall be made to terminate control / power connections in the respective module.

25.0 **Power Cable terminations:**

25.1 Gland plates of adequate size shall be provided at the top / bottom of cable chamber to facilitate cable entry from top / bottom. Compression type gland shall be provided.

25.2 Crimp type sockets made of tinned aluminum shall be provided for terminating cables.

25.3 Suitable shrouds shall be provided to prevent accidental contacts with live out going terminations of other feeders while carrying out maintenance of one feeder.

25.4 Cable riser shall be adequately supported to withstand the effects of rated short circuit current without damage and without causing secondary faults.

25.5 For bottom entry cables a cable space of 646 sq.mm shall be provided. For cables coming from the top a space of 460 sq.mm shall be provided.

26.0 Labels:

Labels shall be of anodized aluminum with white engraving on black background. They shall be properly secured with fasteners.

27.0 **Tests:**

27.1 The design of the motor control center shall have been type tested in accordance with the following sections of IS: 8623.

a) Verification of short time current withstand and peak current withstand of main and vertical.
b) Through fault withstand on power draw out contacts of MCC module with HRC fuses/ MCCBs in series. Through fault withstand of control draw out contacts of MCC module with HRC fuses in series.
c) Temperature rise tests on main bus bars, vertical risers, power contacts and control contacts.

27.2 **Routine tests shall be conducted on each Motor Control Centre in accordance with IS 8623 and shall comprise:**

i. Inspection of the MCC including inspection of wiring and electrical operational tests where necessary.
ii. Dielectric Tests.

ANNEXURE- C.4

Terms and Condition for Erection and Commissioning

Tenderer has to submit the completion certificate to CCI after completing the erection. Then the CCI will inspect all the system /equipment based on tenderer certificate. During inspection if any defect found should be rectified than the same will be re- inspected before starting of trial run. After successful trial runs, commissioning can be carried out.

1. COMPLETION OF ERECTION WORK

1.1 Rectification/ modification as required before erection as well as during erection and after trial run of machineries with and without load, shall be the responsibility of the Successful tenderer

1.2 Arrangement of adequate number of safety equipments for erection and storing shall be the responsibility of the Successful tenderer.

1.3 Arrangement of all necessary erection materials like machined and un-machined packing's will be made by the Successful tenderer.

1.4 Erection, staging structures and necessary supporting hardware, consumables as may be required shall be arranged by the Successful tenderer.

1.5 The Successful tenderer shall provide all approved foundation drawings, structural drawings, erection drawings, permissible erection tolerances and relevant Performa in reproducible sheets for individual equipments erection and checks. All checking of the erected machinery would be done with these basic drawings and tolerances.

1.6 The Successful tenderer may carry out fabrication work at site for which facilities like space and power supply will be provided free of cost by CCI.

1.7 Roof & side cladding work shall be carried out by 18 SWG I.S. standard G.G.I sheet as per established practices.

1.8 The Successful tenderer at his own cost for all equipments, platform, hand railings, supports and structures etc will do painting with red-oxide and two coats of enamel paints.

1.9 The existing equipments removed from their foundation including scrap materials are to be shifted to a place indicated by CCI. The entire work premises are to be cleaned after completion of erection work.

2. RESPONSIBILITY OF THE SUCCESSFUL TENDERER.

2.1 A schedule for the erection work will be made out by the contractor keeping in view the supply schedule and the construction schedule for carrying out the job sequentially within the overall time schedule as specified in the order.

2.2 Unloading and handing of all the equipments forming scope of supply, from the railway wagons or road transport (truck/trailer) to the contractor's storage shed/yards or to the storage points within the plant areas, as may be indicated by CCI. However, required storage area will be provided by CCI for the critical & other sensitive equipments.

2.3 Safety of contractor's equipments during transportation and handling and safe custody of all the equipments during the storage.

2.4 Successful tenderer at his expenses shall comply with all labour laws and shall indemnify Cement Corporation of India Ltd.(CCI) against accident/damage caused to their equipment or employees.

2.5 Handling and transportation of all equipments from storage sheds/yards/storage points/CCI's go-down/storage yards to the equipment foundations and placing them over the foundations.

2.6 The Successful tenderer shall be responsible for demurrage and wharf age charged by railways, all damages, shortages and security of materials and equipment under his charge till the same are erected and commissioned on full load, certified in writing as such and taken over by the CCI.

2.7 Safety of personnel will be the responsibility of the tenderer. All required PPE (Personal protection equipment) has to be provided by the Successful tenderer.

2.8 Tenderer should ensure the timely payment to their work force as per minimum wages.

3. TOOLS AND TACKLES

Arrangement of all tools and tackles, instruments, cranes, winches, derricks, ropes, sleepers, lifting and transport equipment, jacks, chain blocks, crow bars, welding and gas cutting sets, testing and checking equipments etc. in adequate numbers will be the responsibility of tenderer.

4. CHECKING OF EQUIPMENT FOUNDATION

4.1 Checking of levels, foundation centre distances cross checking, alignment of Civil foundations and structure for machinery installation purpose according to the relevant drawing & design.

4.2 The modifications required in the existing civil structures and other structures for erecting the proposed PJBH without damaging to the existing structure is also in the scope of erection work.

5. ELECTRICAL AND INSTRUMENTATION ERECTION:-

For electrical and instrumentation equipment and other related items, special conditions, over and above those given in the preceding para's are given below.

All the equipments such as motors, starter panels, switchgear panels, control equipments etc., are to be suitably mounted, assembled aligned and inter-connected with various sections, checking of each components for satisfactory mechanical and electrical operation and cleaning of contacts, mounting of loose supplied components to their respective positions, setting of relays in accordance with the requirements.

5.1 Laying of LT, control, instrumentation and special cables including supply/fabrication of all cable

accessories such as junction boxes, indoor, outdoor end termination/straight through/tee jointing kit for cables: cable glands: cable lugs: cable ferrules, rigid/flexible pipes cable racks/ supports/ trays etc. cable laying shall be as per approved schedule and shall be carried out in a neat and systematic manner with codified markings.

5.2 Supply and erection of earthing stations: mains and connections with all accessories for the mechanical transportation system including control arrangement. The work includes double earthling of all drives, cables, power equipment and electrical boxes. The instrumentation panels and screened cables should be separately and effectively earthed. All work shall be carried out in accordance with India Electricity Rules and the code of practice as per India Standards.

5.3 Supply and erection of lighting system inside the covered sheds is under the scope of this order, as per statutory requirement.

5.4 All erection and standard tests as per BIS and electricity regulations shall be carried out, integral part of the installation and commissioning work.

5.5 Complete automation system should be integrated with our existing relay logic system.

5.6 The tenderer shall provide all the drawings, layouts and relevant data for getting the statutory approval from the State Government authorities/ electrical inspectorate as per rules in vogue.

6. OTHER TERMS AND CONDITIONS

6.1 Commencement and completion period of erection.

6.1.i The detailed time schedule for erection is to be prepared in consultation with CCI and will be approved by CCI. Alteration of schedule will be kept to minimum but not changed without written approval of CCI.

6.1.ii Erection of equipments of PJBH complete system will be considered completed, when each equipments is ready for trial & commissioning. If any defects or deficiencies are found during the pre-commissioning test, or trial run, due to sub- standard quality of equipment, workmanship of the successful tenderer the same shall be rectified/replaced by the successful tenderer expeditiously.

6.2 Contractor's site Supervisory Staff:

6.2.1 All necessary staff headed by the site Manager or Resident Engineer should be available at site according to the progress of erection and quantum of erection. Replacement in case of unforeseen eventualities shall be done expeditiously, Manager will be considered as Chief Authority representing the contractor for all purposes of communications with CCI and his representatives. He will also be responsible for his sub-supplier representatives, staff etc. for this purpose.

6.2.2 Site Electrical in- charge must possess valid Electrical Supervisory licence.

7. Site Facilities:-

7.1 CCI will provide to the contractor, free of cost, necessary water and electrical power facilities and cement 43 gr./PPC within the factory premises for the purpose of erection and civil works.

7.2 Land for storage yard, site office and fabrication yard shall be made available to the contractor within the factory premises free of cost.

7.3 The accommodation to the Staff/Engineer of the contractor shall be provided on chargeable basis, if available. No transportation will be provided by CCI.

8. TRIAL RUNS AND COMMISSIONING

a) After the completion of erection work of mechanical, electrical and instrumentation equipments, party shall offer the entire system for trial runs and commissioning the alignment of all the drives and the equipments shall be checked jointly and defects, if any, shall be rectified by the party.

b) After the erection but before the power supply is switched on, the insulation of all electrical equipments shall be tested by suitable instrument and any defects revealed shall be rectified by the party.

c) All the motors of equipments shall be run on no load at least for eight hours.

d) On supply of power to the system, the following tests shall be carried out- the correctness of all the circuits, interlocks and sequence of operation etc.

e) The satisfactory operation of all the protective devices.

I. Satisfactory operation of all the local push button (LPBs)
II. Calibration of all the instruments.
III. After the successful no load trails/tests as indicated above, the defects observed, if any shall be rectified by the party before taking load trial.

f) The following details shall be recorded in regard to the trial and commissioning of the system.

(a) Alignment of all motors, gear boxes and equipments.
(b) Value of insulation resistance of motors and other electrical equipments.
(c) Correctness of all circuits, interlocks, sequence of operations and calibration data of all instruments.
(d) Satisfactory operation of all protective devices.
(e) Any other remark, if required.

Annexure-C.5

Makes of Bought Out Items

Sr. No.	Item Description	Makes	To be filled by Tenderer
	MECHANICAL : -		
1	Filter bags	Midwesco / AFT / IFF / BWF/Gore/Donaldson/BHA/TTG/Sinoma/Mastural/Maxtech/Testori/Supreme/Arvind/Hongyuan	
2	Rotary Airlock Valve	Expert/Alstom/FLS/TKP/Sanghvi/ Self make	
3	Drag Chain Conveyor	Mahindra / Demech / Stockredler/ Self make	
4	Pneumatic Cylinder for damper	Rotex / Schradder/ Self make	
5	Expansion joints	Flexicon/ Eagle Burgmann/ Keld/ Self make	
6	ID Fan	Flakt / Reitz / Batliboi/Accel/ Clair/ Self make	
7	Compressor	ELGI/ Kriloskar/ ATLASCOPCO/ make	
8	Explosion vents (Rupture disc)	N.A.	
	ELECTRICAL & INSTRUMENTATION:		
1	Geared Motor for RAV	POWERBUILD/LASSAM/ICB	
2	Drive motor for ID fan	Siemens /ABB/Kiloskar/BHEL	
3	Sequence controller	Kana / Xcaliber/Pyrotech	
4	PLC	Allen Bradley/Siemens/ABB	
5	PLC Enclosure / Panel	System House of Allen Bradley	

6	Differential Pressure / Pressure Switch	Switzer / Honeywell / Danfoss	
7	Differential Pressure / transmitter / Temp. transmitter	Rosemount / ABB / Siemens / Honeywell	
8	Pressure Gauge	H Guru/Warree/Wika	
9	Zero speed switch for RAV	Jayshree/ Kana	
10	Hopper level switch	EIP / Nivo Control / Sapcon	
11	Thermostat	Switzer	
12	Temp. Elements with Temp. Indicating Controller	Pyrotech/Warree/MB Control	
13	Air Filter Regulator	ShavoNorgan/Hawe	
14	RTD / Thermocouple	Toshniwal / Pyrotech	
15	Junction boxes	Standard make /Despande/ Unique/ Mithsagar	
16	Limit switch	BCH / Jai balaji	
17	Proximity switch	Jayshree / Kana	
18	TIC / TDIC / DPIC	Switzer / Danfoss	
19	Vibration monitor	Shenck / IRD MTL/ifm	
20	Electrical actuator	Auma /Technomech/ Marsh/ HI-Lehmon	
21	MCC	Siemens/ABB/Snieder/L&T	
22	MCC Enclosure / Panel	Siemens/ABB/Snieder/L&T	
23	Pulse & Solenoid Valves	ASCO / Rotex/Seico	

Performance Guarantee Test for System as a whole

Performance guarantee tests for the system as a whole shall be conducted within 30 days from the date of successful commissioning or as per the direction of CCI.

1. Tenderer shall arrange all instruments, electrical meters, tools and tackles, equipment required for carrying out performance guarantee tests. All arrangements for the performance guarantee tests shall be carried out by the party. The PG test will be conducted two times by the party at the interval of 15 days or more and should meet all the norms as specified and the third time PG test, after passing earlier two tests in all respect, shall be carried out and Certified by NCCBM (A government agency) at the cost of the tenderer and should pass in all respects. For each emission test party has to conduct three times and all three tests should pass the norms, then the average of three tests will be taken as one test.

2. The tenderer shall rectify the defects, if any, observed during the above tests, and only after the rectification of such defects, test can be further conducted.

3. Dust emission after PJBH should be less than 30 mg/Nm^3. Test should be carried out during operation of the Kiln 1 & 2 combined and single kiln operation alone.

4. Pressure drop across the pulse jet Bag House should not be more than as per the design, which will be tested during the operation.

5. The Capacity of the fan & its head will be tested and should be as per the specification.

6. If dust emission is found more than 30mg/ Nm3, which is not acceptable. Tenderer has to achieve the required emission level by replacing bags and other modification within 30days of the system to get emission ultimately less than 30mg/Nm3. Then again performance guarantee test will be carried out.

7. During the test, the actual kw and current drawn at the full load capacity of the system by each drive shall be compared with the rated current for 10 per cent margin. The tenderer shall be required to replace the drive in which 10% margin is not available over and above the rated capacity.

8. The Party shall guarantee the successful and satisfactory operation of the equipments and materials supplied, erected and commissioned under the contract, as per the specifications and documents.

9. The modifications / alterations/rectification, if any, shall be carried out immediately on completion of the performance guarantee test, but in any case within a period of 30 days from the date of performance guarantee test. In case the Party fails to carry out the modifications / alterations / rectification within the above period, CCI reserves the right to carry out the same at the risk and cost of the Party.

10. Tenderer has to carry out the leakages detection test for the bags house.

ANNEXURE- C.7

LIST OF CONSULTANTS

1	M/s. Holtec Consulting (P) Ltd. SushantLok Phase I, Sector 43, Gurgaon, Haryana 122009 **PHONE**: 0124 404 7900	Fax : 0124 –2385114 E-mail :info@holtecnet.com
2	M/s Development Consultants Ltd House, Block DG 4, Sector 2, Bidhannagar, West Bengal 700091 **PHONE**: 033 40125300	Tel: 033 – 22297601/609
3	M/s. ERCOM Consulting Engineers Pvt. Ltd.. C-1, C Block Community Centre NarainaVihar New Delhi-110028	FAX : 011-25779152 011-2574391 E-MAIL :ercom @ vsnl.com Tel : 011-25799153
4	National Council for Cement & Building Materials(NCBM) 34, Km. Stone Delhi Mathura Road (NH-2) Ballbhgarh –121004 Haryana	FAX: 0129-5242100 0129-5246175 E-mail: nccbm@glassdl0.vsnl.net.in
5	M/s. Cemtech Consultants Pvt.Ltd. 202, Saket New Delhi – 110017	FAX : 011-26862488 J- Tel : 011- 26761745 -26961618
6	M/s Cement Engg.Solution New Delhi	
7	M/s. EXELON Techno Engineers Aman Chambers , 2nd Floor 47/21-22. Old Rajinder Nagar Main Pusa Road New Delhi- 110060	FAX : 011-25739719 Tel : 011-2573 : -25758624

8	Metallurgical & Engineering Consultants	FAX : 0651-2502189
	(India) Ltd.	-2502214
	Doranola, Ranchi-834002	Tel : 0651-2501002
	Jharkhand	-2501216

Any other reputed consultant having sufficient experience in the line may be considered by CCI, for which prior approval shall be obtained by the tenderer.

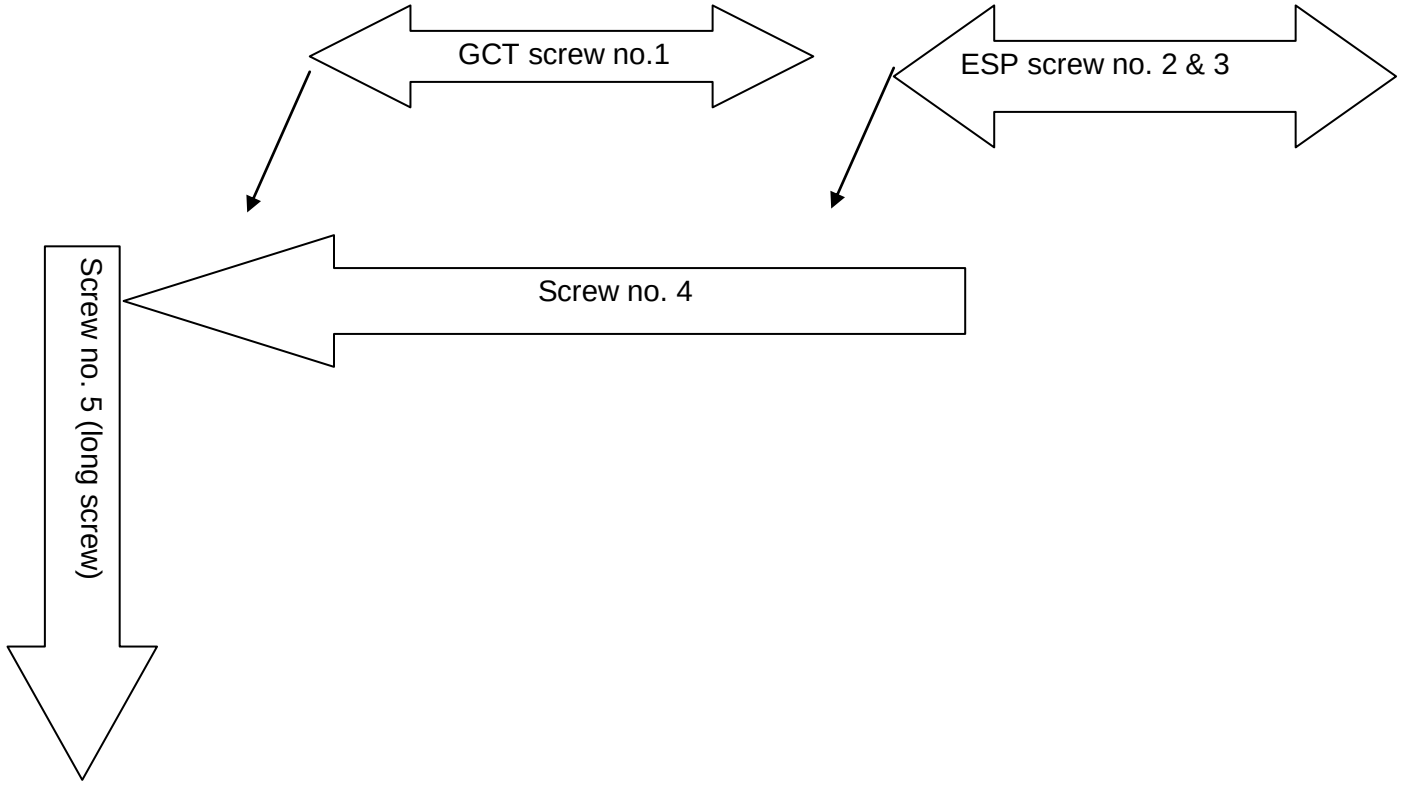
The tender will nominate three names of the consultant from above Annexure –C 7 and CCI will decide the consultant for the said project from these names.

Sheet -1

Material flow of GCT and ESP circuit

SCREW CONVEYOR

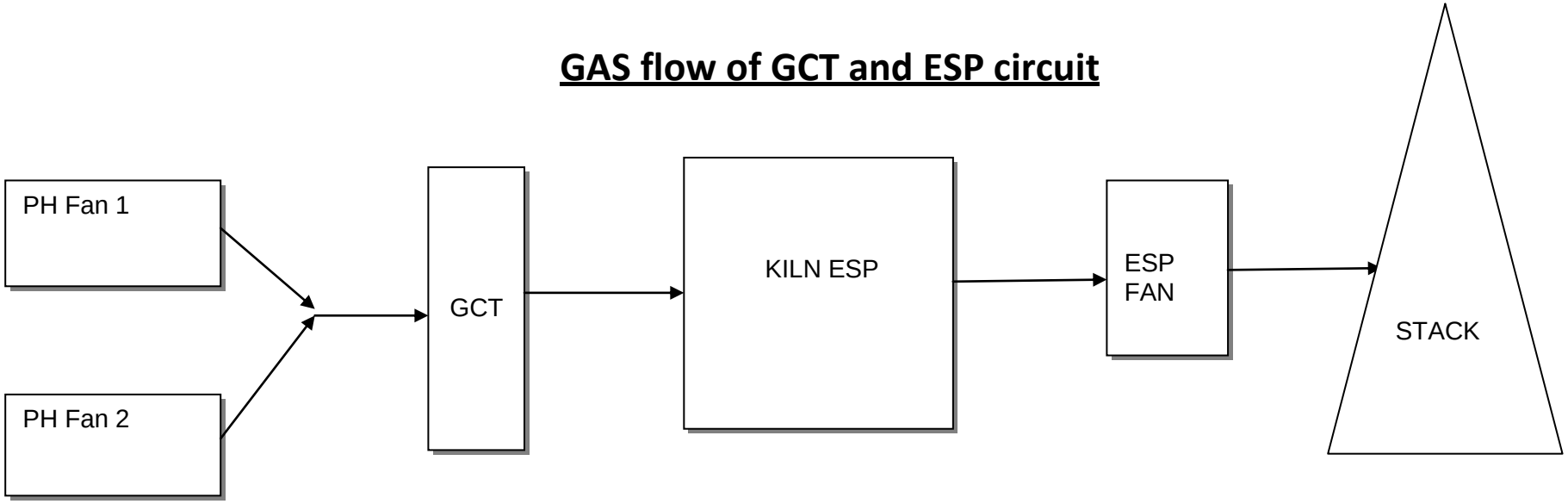
1. 250MM DIA
2. 250MM DIA
3. 250MM DIA
4. 300MM DIA
5. 450MM DIA



All the system was designed keeping in view of 600TPD clinker

Sheet-2

GAS flow of GCT and ESP circuit



Duct Size	Dia (mm)
PH Fan 1 Outlet Duct	1400
PH Fan 2 Outlet Duct	1400
GCT inlet common duct	2000
GCT outlet duct	1600 x 1600
ESP Fan inlet Duct	1460x2190
ESP Fan outlet Duct	2190
Stack	2500

Sheet -3

DETAILS OF PLANT AND MACHINERIES OF THE EXISTING GCT AND ESP CIRCUIT

		NORMAL CONDITIONS	OPERATING CONDITIONS	MOTOR	RPM	STATIC PRESSURE MMWG	TEMP.(C^0)
1	PREHEATER FAN (2 NOS.)	69000 M^3/Hr	72000 M3/hr	185kW	1480	350	350
2	ESP FAN	144000 M^3/Hr	144000 M3/hr hr at 150^0 C	150kW	980		150
5	ESP	146000 M^3/Hr	146000 M3/hr at 150^0 C				150
	SCREW CONVEYOR	size		drive	RPM		
1		250mm		2.2 kW	1480		
2		250mm		2.2 kW	1480		
3		250mm		2.2 kW	1480		
4		300mm		3.7 kW	1480		
5		450mm		3.7 kW	1480		
7	GCT	dia 6.0x39.25 mtrs					
8	STACK	dia 2.5 x 59.7 mtr.					

ANNEXURE : D

CEMENT COFRPORATION OF INDIA LIMITED BOKAJAN

CEMENT FACTORY

(A Govt. of India Enterprises - ISO 9001:2015 Certified)

INPUT-TAX CREDIT

We are entitled for availing of INPUT-TAX Credit in respect of GST paid on materials. For availing INPUT-TAX Credit, following documents are required to be submitted along with supply of materials:-

i) A clear GST invoice, having HSN code duly stamped and signed by the supplier.
ii) The GST rate and amount should be clearly shown separately in the Tax-invoice.
iii) The copy of the Tax-invoice or as specified in GST meant for transporter.

iv) In Addition to above supplier will also upload tax Invoice on GST Portal & pay GST to Govt.

Please confirm all the documents would be submitted along with each and every supply for availing the INPUT-TAX Credit. In case any of the documents is not submitted, INPUT-TAX Credit is not allowed by Tax authority on the GST paid by us, then the amount will be debited from your bill for the concerned supply or other payment.

Please submit this Annexure duly sealed and signed along with techno-commercial bid as token of acceptance of the above.

Signature of
Tenderer with stamp
& seal

ANNEXURE-E

PRICE BID PROFORMA

TENDER FOR DESIGN, ENGINEERING, MANUFACTURE, SUPPLY, CIVIL/STRUCTURAL DESIGN, CONSTRUCTION, ERECTION & COMMISSIONING OF PULSE JET BAG HOUSE (PJBH) FOR KILN 1 & 2(COMBINED) & HOOK UP WITH EXISTING SYSTEM ON TURNKEY BASIS AT FOR BOKAJAN.

Description		Basic Rate	GST as applicable (%)	Other Charges/ Taxes if any	Total (Including GST)	
					Figures	Word
A	Civil / structural Works					
B	Manufacturing and Supply					
C	Fabrication & Erection					
D	Hooking up & Commissioning					
Total= (A+B+C+D)						

The Lowest Quoted (L1) rate shall be evaluated on the basis of total of PART-A, B, C & D only.

1. The Lowest Quoted (L1) rate shall be evaluated on the basis of total of PART-A, B, C & D only.
2. The prices are to be quoted as per clause. 2 of Part-III - Special terms & conditions.
3. The shutdown period required for hooking-up/commissioning shall be loaded on the quoted rate for comparison purpose, to evaluate the lowest bidder (L 1) as follows:
   a) No loading charges will be loaded for first seven (07) days of shutdown period.
   b) During eight (08) to ten (10) days of shut-down period, loading charge of Rs. 3.45 Lakh per day will be loaded.
   c) If shutdown period exceeds from ten (10) days then Rs. 6.35 Lakh per day will be loaded.

( )

Signature Name and design.
With company's stamp

Design Basis Report

Of

DUST EXTRACTION SYSTEM FROM OUTLET OF KLIN - 1 & 2

A/c**CEMENT CORPORATION OF INDIA,**

BOKAJAN UNIT, KARBIANLONG, ASSAM

CCI	*Client:*	**Cement Corporation of India** **Bokajan Unit**

INDEX

Sl no	Description	page no
1	Site Details	3
2	Existing System	4
3	Proposed System	5
4	Pulse Jet Bag Filter Description & Details	6
5	ID Fan description & Details	9
6	Selection of PJBH	11
7	Selection of Comp. Air requirement	11
8	Selection of compressor	12
9	Selection of Motor for ID fan	12
10	Selection of Screw Conveyor	13
11	Unit Consumption of the PJBH System	14
12	Proposed scheme of DE system	15
13	Valve Catalogue	16
14	Sketch of Bag Filter	17
15	Pressure Drop Calculation	18
16	Duct Friction Loss Chart	19

SITE DETAILS

Brief description of Plant:

Bokajan cement plant (BCF) is a unit of Cement Corporation of India Ltd, Government of India Enterprises under the Ministry of Heavy Industries. Bokajan Cement Factory went into commercial production in 1977. Plant is situated at Bokajan, KarbiAnglong, Assam on the NH-39 (Golaghat Road) which is connecting to the site with Dimapur on South and Golaghat on North through the Bokajan town. Plant is well connected by Rail and Road; it is 1.4 Km far from Bokajan Railway station, 10Km from Dimapur Railway Station and the nearest airport is Dimapur at 18KM. Bokajan Cement factory is having its own Railway siding(CCIB) adjacent to Factory.

Geographical Location of the site:

260 01/13.8//N & 930 45/52.5//E

Soil investigation report of CCI Plant:

Safe load bearing capacity of soil 30.00 Tonne /M² at -3.00 mtr.

Below G.L. Level of Soil: CCI Bokajan plant is covered by old Alluvial soil.

Seismic Zone :

CCI Bokajan fall under (Zone V)

Temperature Range : 12Deg C to 34°C

EXISTING SYSTEM

There are two nos. of Coal fired Kiln using dry process technology, each of capacity 300 TPD with individual stream of conventional cyclones on 4 stages Pre-heater and Individual Grate Cooler. Each Pre-heater outlet duct connected to individual pre heater fan having capacity 69,000 M³ /Hr at gas Temp 350°C at pre-heater fan inlet & at 350mm WG. After Pre-heater fan, gases from both the fans merged into a single duct and goes to GCT (Gas Conditioning Tower). GCT outlet gas temp is being maintained at 150°C normally but sometimes its goes up to 240°C on failure of GCT water pump. GCT out let is connected to ESP (1,46,000 M³/Hr) having negative draft of 150mmWG and temperature 150°C by ESP Fan capacity 1, 44,000 M³/Hr. ESP output is going in to the Stack (Stack height 59.70mtr) above ground level (MSL 138mtr).It has been decided to introduce a Pulse Jet Bag House to reduce the emission level. Flow sheets of existing system is attached as annexure-1.

CCI FURNISHED OPERATIONAL PARAMETERS FOR THE DESIGN OF PJBH AT 300 TPD KILN (2 nos. combined) CAPACITY

Sr no	Parameter	At 300 TPD Kiln (2 nos. combined) Running proposed	Remarks
01	Gas Volume At ESP Inlet	146000 m³/Hr	At 150° C, 150mm WG
02	ESP Inlet Gas Temperature(MAX)	240° C	On failure of GCT pump
03	Inlet moisture Content	10– 15%	

04	Inlet dust concentration (inlet to GCT)	04 -60 g/m 3 -	
05	ESP Outlet dust concentration	< 30mg/Nm3	As per the MOEF &CC Notification GSR 612 (E) dated 24th August 2014
06	Outlet Dust Load	0.125 Kg/Ton of Clinker	As per the MOEF &CC Notification GSR 612 (E) dated 24th August 2014.

PROPOSED SYSTEM

The Dust laden Air from Outlet of the existing GCT at a temperature approx 240°C to be taken to a INDVENT Make Pulse Jet Bag Filter (PJBH) for cleaning the gas. Finally the filtered gas will be discharged to the atmosphere through ID fan and existing chimney. Also, the duct carrying raw meal dust shall be connected with the PJBH inlet through isolating damper after measurement of Mill Outlet to suit fitment of the required equipment at site. By installing this system, the existing ESP can be used as a stand by system if required.

The accumulated dust from Bag Filter to be transported to the existing screw conveyor located underneath of ESP, through newly inducted screw conveyor as shown in the drawing. Kindly refer to Flow diagram in Page No.15.

Control of the System :

The proposed MCC & PLC panels shall be housed in the existing kiln control room as required with space for maintenance and statutory clearance of the panels provided by CCI during installation

B. The Pulse Jet Bag Filter

The cleaning operation of bag filter shall be automatic on line cleaning. The bags shall be cleaned by means of compressed air pulse jet through solenoid operated pulse valves &Micro PLC. The time interval of cleaning operation & compressed air pulse duration & frequency shall be adjustable. The pressure switch (at compressed air line) and DP switch (across bag filter)are to be operated through the said PLC so that cleaning operation takes place when there is sufficient compressed air pressure & pressure drop across bag filter is above the set value.

Bag filter assembly shall consist of the following;

(i) Modular shell
(ii) Hopper for each module with manual slide gate & motorized RAV
(iii) Inlet & outlet manifolds
(iv) Manual damper at inlet & outlet of each module
(iv) Access door
(v) Tube sheet
(vi) Filter bags & cages
(vii) Solenoid operated pulse valves (24 V DC)
(viii) Bag filter control panelplc
(ix) Compressed air line with valve, filter regulator & manifold tank
(x) Level switch in bag filter hopper & storage hopper
(xii) Pressure switch at compressed air line
(xiii) DP switch(Fixed Differential type) across bag filter
(xiv) Pressure gauge at inlet & outlet of bag filter and at compressed air line
(xv) Weather cowl/rain shed over bag filter
(xvi) Supporting structure of bag filter with service platforms &approach Staircases

TECHNICAL DETAILS

Sl no	Description	Details
(i)	Gas Volume at Bag Filter Inlet	1,61,000 CMH AT 240°C approx.
(ii)	Type of dust	Kiln dust
(iii)	Guaranteed outlet emission	Less than 30 mg/ Nm^3
(iv)	Air to cloth ratio (maximum)	0.99 m^3 / min/ m^2approx
(v)	Type of filter bag	Fiber glass woven Bag /suitable fiber bag PTFE surface treatment
vi)	Bag thickness (minimum)	1 mm approx.
(viii)	Bag size (approx)	160 mm dia. & 8100 mm long
(ix)	No. of hopper	2 nos;Separate hopper for each module
(x)	Dust discharge device below hopper	Dust from bag filter hoppers to be disposed to screw conveyor through RAV and slide gate.
(xi)	Thickness of casing, top cover & hopper	5 mm MS as per IS : 2062, Gr A
(xii)	Tube sheet	5 mm MS as per IS : 2062, Gr A
(XV)	Filter Bag Material	Fiber glass woven Bag /suitable fiber bag PTFE surface treatment
	Maximum Temp. Withstand Capacity	260°C (Short time)
	Burst Strength	As per manuf. standard
(xiii)	Cages	3 mm MS/ alum. Painted wire(Splitted)
(xiv)	Ventury	GI

(xv)	Canopy over Bag Filer Equipment	Provided
(xvi)	Flexible joints	At bag filter inlet
(xvii)	Pulse valve size	2.5”
(xviii)	voltage	24V DC
(xix)	No of Valve	2x22
(xx)	Compressed Air Requirement	170 m³/hr at 5 bar
(xxi)	Compressor capacity	264 m³/hr at 6 bar
(xxii)	Make of compressor	ELGI/ATLASCOPCO/Kirloskar
(xxiii)	No Of Compressor	2 (1W+1S)
(xxiv)	Motor rating of Compressor	30 kw

The ID Fan Unit

De-dusting system fans are single width single inlet centrifugal type with inlet box. The fan will be arranged horizontally, rigidly mounted on concrete foundation. The fan shall be directly coupled to drive motor through resilient type coupling. Fan rpm shall not exceed 1000. One bearing on each side (supported by independent pedestals) of fan shall be provided with shaft extending through the inlet box. Fan housing shall be self-supporting type. Fan casing, impeller & shaft shall have provision for thermal expansion. Non-metallic/metallic flexible joint shall be provided at fan inlet & outlet. The fan shall be supplied with base plate, foundation bolts and suitable arrangement to prevent rain water entry to fan, motor etc. Adequate no of duplex platinum RTD(100 ohm at zero Deg C)temperature indicator shall be provided for bearing metal temp. control & monitoring. The design and supply of transition duct at chimney entrance shall be properly designed along with all required expansion joints, guide vanes etc which will be connected to chimney flues.

Fan characteristics curve shall be such that the maximum pressure is 15 to 20 % more than the design pressure. The design point should be chosen at a point located to the right of the optimum efficiency on the fan characteristic curve. The distance between the design point and the maximum pressure limit shall be minimum 40%, referred to the volumetric rate.
Manual cum electrically actuated damper (open/ close type) shall be provided at fan inlet. Manual damper shall be provided at fan outlet.

TECHNICAL DETAILS

Sl No	Description	Design DATA
1	Fan/Impeller Type	SISW/Backward curved (single inlet single width)simply supported
2	Application/Equipment No.	ID Fan
3	Duty	continuous

4	Quantity	1 NO
5	Fan Arrangement	Simply supported
6	Fan Model	To be furnished later
7	Design Mass Flow (m^3/hr)	161000 at 240°C
8	Static Pressure @Inlet (mmWC) at 20°C	350
9	Total Pressure(mmWC)	360
10	Dust load(mg/Nm^3)	30
11	Service Temperature(°C)	200 max
12	Mechanical design Temp for continuous run	300 to 400 °C
13	Power Consumptions approx. (kW)at operating temperature 20°C / 200 °C	205 KW APPROX / 122 KW APPROX
14	Total FAN Efficiency (%)	±81 max.
15	Recommended Motor(KW/Pole/Hz)	250kw/6P/50 Hz (considering margin 15%)

Pulse Jet Bag House Selection

Capacity at Bag Filter Inlet = 1,61,000cmh/hr at 240°C
Select φ160 mm diam. Bag x 8100 mm long., filtering area/bag=4.07m²
Select Air to cloth ratio =0.99 m³/mint/m²
No of Bags Required =161000/60/4.07/0.99=660 bags
Select model no 2/15x22
No of Module =2, No of valve /module=22
No of Bags / Module =330
Total no of Bags=660, Total Filtering area=2686.2 m²
Actual ACR =0.99
Type of hopper = Point Discharge/pyramidal (Ref sketch)
Comp. Air Requirement
WE considered as under:
No of Valve=44, Valve size=65mm,Valve Kv=118(as per manufacturer)
Actual valve pulsing time(on Time)=0.2 sec, No of Pulsing/Valve/hr=6
(Bag cleaning cycle every 10 minutes considered)

By Formula Q= 4.73*Kv* Pa(Air inlet pressure)
Where, Q= Air Flow through Valve
4.043= Dimension Factor
Kv= Flow Factor
Pa = inlet Pressure=6 Bar
Therefore Q=4.73*118*6=3348 Ndm³/sec
Actual Air Flow through Valve/pulsing=3348 Ndm³/sec*0.2 sec
=669.76Ndm³
Total quantity of Required Air
=669.76Ndm³*6pulse/hr*44=176808.8Ndm³/hr
=176Nm³/hr=176*1.16m³/hr=204.2m³/hr say=204m³/hr
Add 10% margin =204m³/hr*1.1 = 224.4m³/hr, say 224 m³/hr

Selection of Screw Conveyor

Total Air volume =161000m³/hrwith80g/m³ dust (As per CCI Doc)
Total dust accumulated under Bag House =161000x60g/hr
= 9660000g/hr=9.66t/hr
The Capacity of Screw Conveyor =say 10 t/hr
Estimated Length of Screw Conveyor= 21mapprox.
By Formula Q=(3.14*D²÷4)*S*n*ρ*C*φ*60
Where Q=conveying capacity t/hr= 10
D= Diameter of Screw in meter
S = Screw Pitch=Dx0.8
n = Screw RPM =37.5
ρ = Bulk weight of materials =1.2 t/m³
φ = loading efficiency=0.5

$$D = \sqrt[3]{\frac{4*Q}{60*3.142*0.8*37.5*1.2*0.5}}$$

= 0.227 m = 227 mm
= Say 250 mm screw

Selection of Screw Conveyor

Total Air volume =161000m³/hrwith80g/m³ dust (As per CCI Doc)
Total dust accumulated under Bag House =161000x60g/hr
= 9660000g/hr=9.66t/hr
The Capacity of Screw Conveyor =say 10 t/hr
Estimated Length of Screw Conveyor= 21mapprox.
By Formula Q=(3.14*D²÷4)*S*n*ρ*C*φ*60
Where Q=conveying capacity t/hr= 10
D= Diameter of Screw in meter
S = Screw Pitch=Dx0.8
n = Screw RPM =37.5
ρ = Bulk weight of materials =1.2 t/m³
φ = loading efficiency=0.5

$$D = \sqrt[3]{\frac{4*Q}{60*3.142*0.8*37.5*1.2*0.5}}$$

= 0.227 m = 227 mm
= Say 250 mm screw

Power Required (P) ={Q*L*friction eff(3)}/367 kw

Where

Q= Conveying capacity of screw conveyor t/hr
L= Length of Screw Conveyor in Meter
Friction Efficiency= 3 as per table for non-abrasive free moving matl.

Therefore, P = (10*21*3)/367 kw = 1.71 Kw
Select Geared Motor with 2.2 KW motor

Unit Consumption of the PJBH System

Fan – 1 No. 122 BKW at 200°C operating temp.

122kw x 24hrs = 2928 unit (KWH) per day

Screw Conveyor – 2.2 KW – 2 Nos
2.2kw x 2 x 24hrs = 105.60 unit (KWH) per day

Rotary Air Lock – 0.37 KW – 2 Nos
0.37kw x 2 x 24hrs = 17.76 unit (KWH) per day
Air Compresor – 1 No. 27.6 BKW
27.6 KW x 24 hrs = 662.40 unit (KWH) per day

Overall power consumption of PJBH unit = 2928 + 105.60 + 17.76+ 662.40
= 3713.76 units per day.
The increase in consumption is due to increase in capacity of the system from 1,44,000 m^3/hr to 1,61,000 m^3/hr

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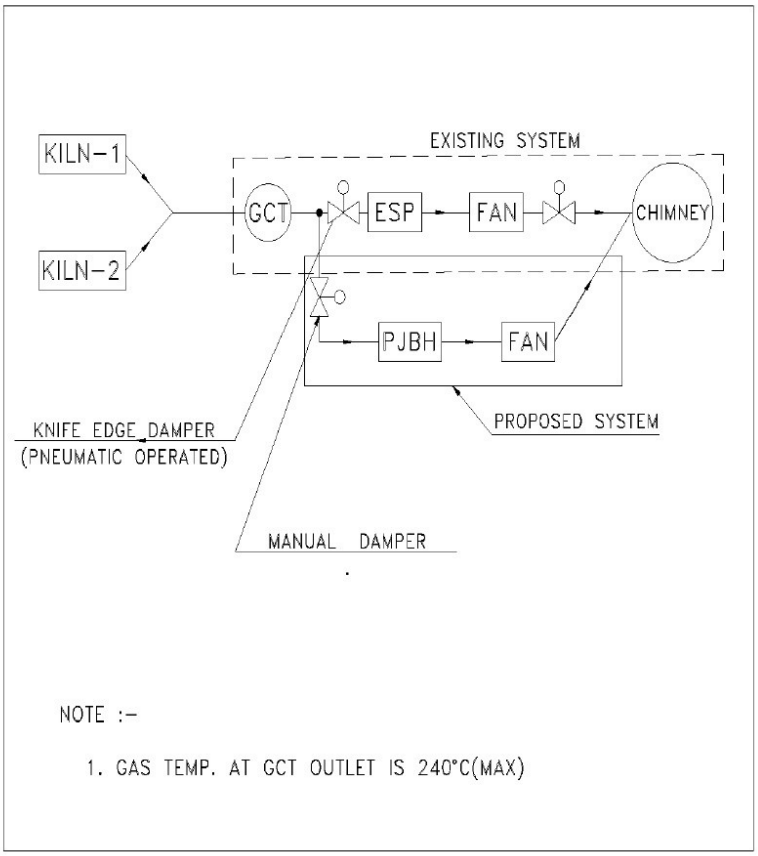

NOTE :-

1. GAS TEMP. AT GCT OUTLET IS 240°C(MAX)

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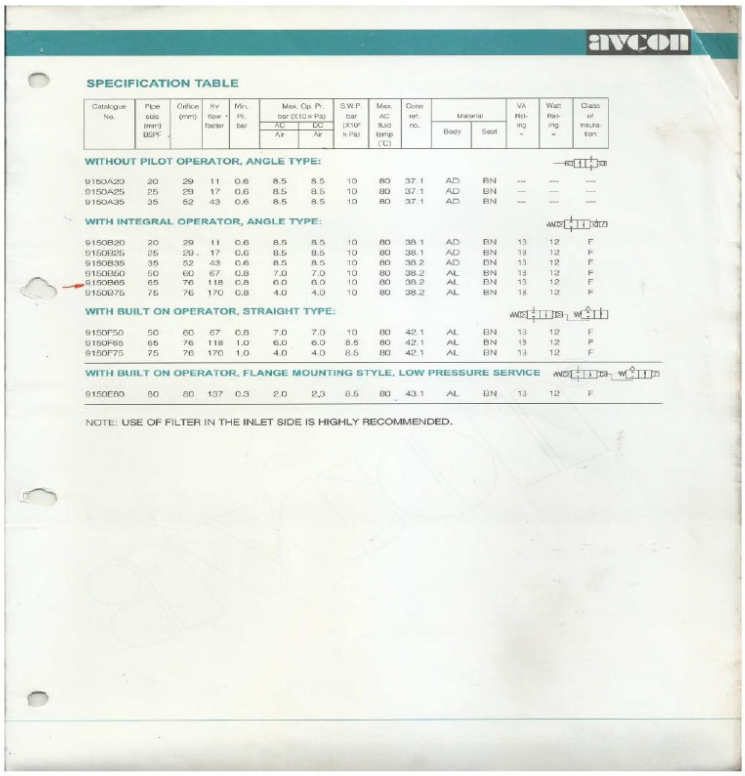

avcon

SPECIFICATION TABLE

Catalogue No.	Pipe size (mm) BSP	Orifice (mm²)	Kv flow factor	Min. Pi. bar	Max. Op. Pr. bar (X10 k Pa) AC Air	Max. Op. Pr. bar (X10 k Pa) DC Air	S.W.P. bar (X10² k Pa)	Max. AC fluid temp (°C)	Conn ref. no.	Material Body	Material Seat	VA Rating ~	Watt Rating ~	Class of Insulation
WITHOUT PILOT OPERATOR, ANGLE TYPE:														
9150A20	20	29	11	0.6	8.5	8.5	10	80	37.1	AD	BN	---	---	---
9150A25	25	29	17	0.6	8.5	8.5	10	80	37.1	AD	BN	---	---	---
9150A35	35	52	43	0.6	8.5	8.5	10	80	37.1	AD	BN	---	---	---
WITH INTEGRAL OPERATOR, ANGLE TYPE:														
9150B20	20	29	11	0.6	8.5	8.5	10	80	38.1	AD	BN	13	12	F
9150B25	25	29	17	0.6	8.5	8.5	10	80	38.1	AD	BN	13	12	F
9150B35	35	52	43	0.6	8.5	8.5	10	80	38.2	AD	BN	13	12	F
9150B50	50	60	67	0.8	7.0	7.0	10	80	38.2	AL	BN	13	12	F
9150B65	65	76	118	0.8	6.0	6.0	10	80	38.2	AL	BN	13	12	F
9150B75	75	76	170	0.8	4.0	4.0	10	80	38.2	AL	BN	13	12	F
WITH BUILT ON OPERATOR, STRAIGHT TYPE:														
9150F50	50	60	67	0.8	7.0	7.0	10	80	42.1	AL	BN	13	12	F
9150F65	65	76	118	1.0	6.0	6.0	8.5	80	42.1	AL	BN	13	12	F
9150F75	75	76	170	1.0	4.0	4.0	8.5	80	42.1	AL	BN	13	12	F
WITH BUILT ON OPERATOR, FLANGE MOUNTING STYLE, LOW PRESSURE SERVICE														
9150E80	80	80	137	0.3	2.0	2.3	8.5	80	43.1	AL	BN	13	12	F

NOTE: USE OF FILTER IN THE INLET SIDE IS HIGHLY RECOMMENDED.

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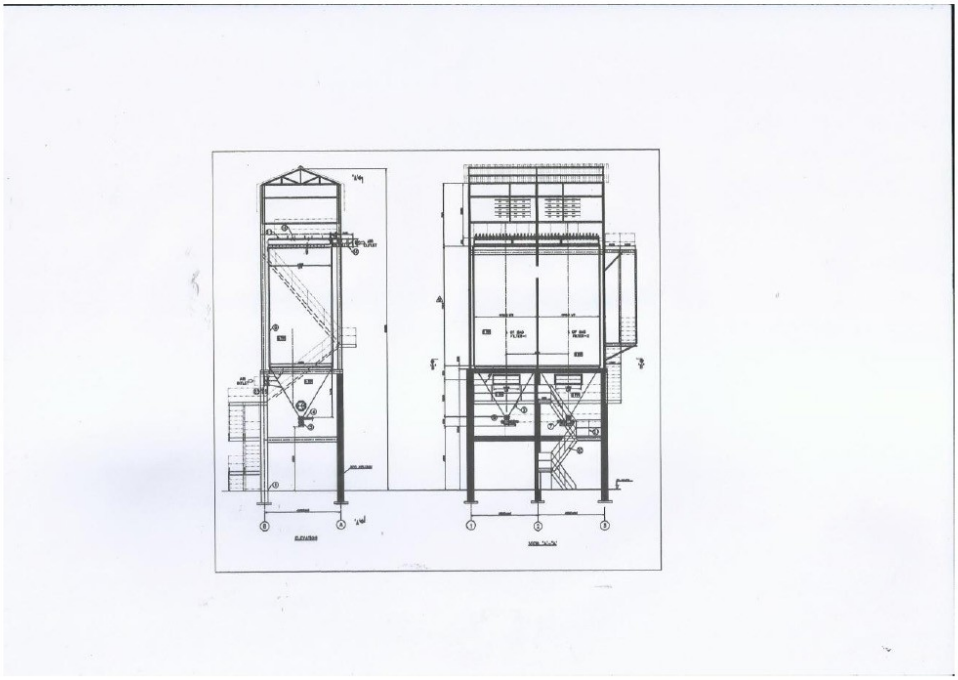

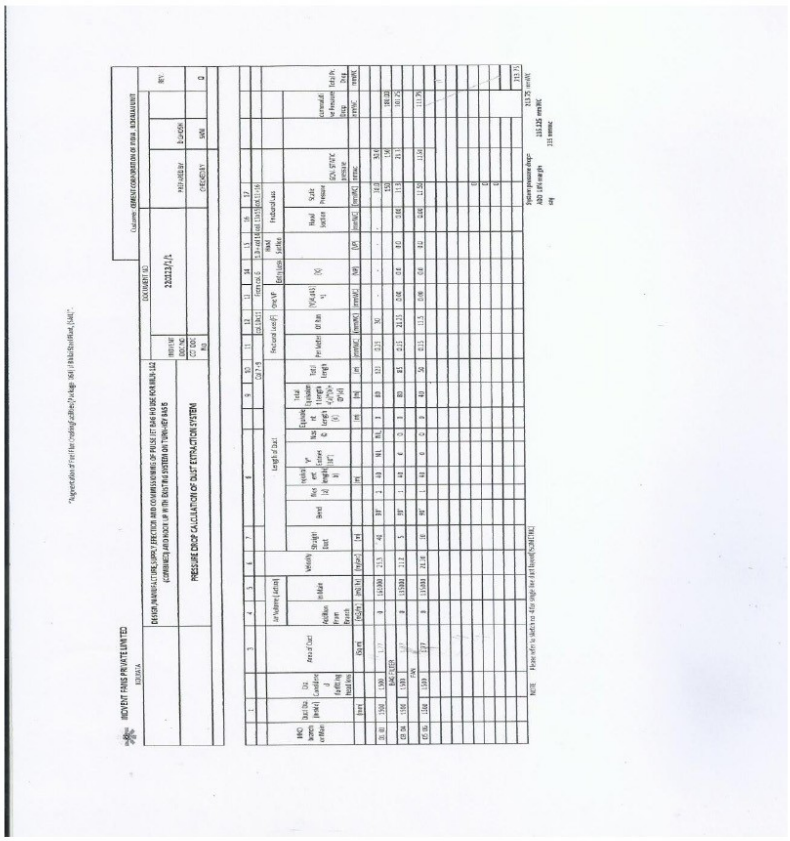

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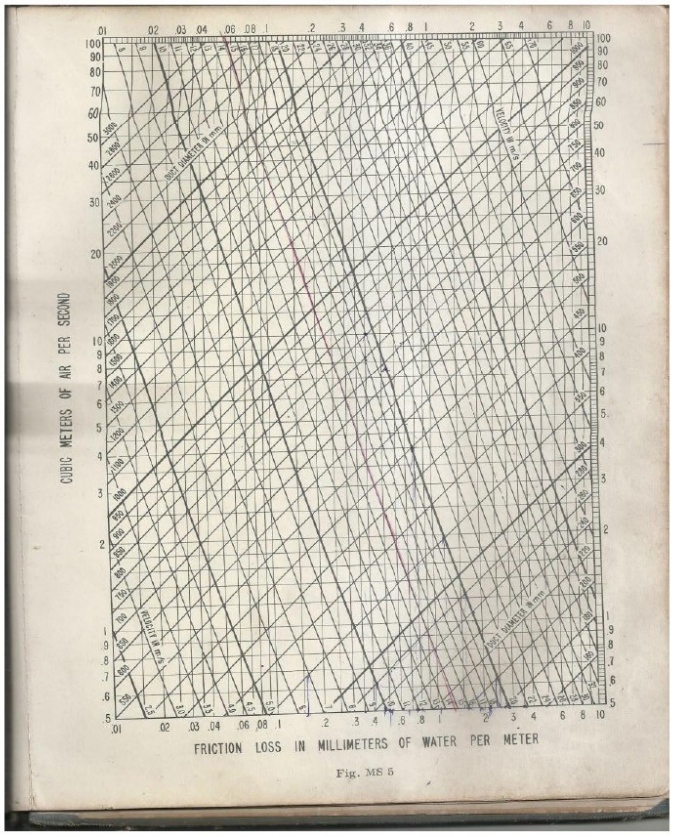

Fig. MS 5

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