

TECHNICAL CORRIGENDA

TENDER ENQUIRY NO. PE/PG/KR1/E-6508/2020 DT. 01/09/2020

AGITATOR for
(3x200 + 3x500 + 1x500)MW KORBA STPP FGD PROJECT

Ref: Enquiry: PE/PG/KR1/E-6508/2020 Dtd. 01.09.20

Item: Supply of Agitator for KORBA FGD project for (3X200+3X500+1X500) MW KORBA STPP FGD.

S.No.	Ref. clause	Page No.	As mention in Spec.	To be read as
1	TECHNICAL PRE-QUALIFICATION REQUIREMENT (PQR)		---	Revised technical PQR is attached as Annexure -A.
2	SECTION-II,ANNEXURE-8 : AGITATOR SCHEDULE	379-80/397	Agitator Schedule	Revised agitator schedule is attached as Annexure-B.
3	Section -I, SUB SECTION-C1, CL.-4.1 (II), Technical requirement	Page 90 of 397	All agitators shall be designed for continuous operation unless otherwise specified. The design of the agitators shall be of proven type.	Revised technical requirement is attached as Annexure-C.
4	Section -I, SUB SECTION-C1, CL.-10 (8), Inspection and testing	page 100 of 397	As a part of the Quality Assurance Plan, bidder has to demonstrate the power consumption of each agitator at shop with the available fluid along with relevant calculation to establish the correlation with the slurry used for the project.	Revised technical requirement is attached as Annexure-D.
5	SECTION -II, ANNEXURE-I, List of documents to be submitted with bid	Page No- 370 of 397	List of documents to be submitted with bid	Revised List of documents to be submitted with bid is attached as Annexure-I
6	SECTION -I, SUB SECTION-D, ANNEXURE-II, MANDATORY SPARES LIST	Page no- 296 of 397	Mandatory spares list	Revised Mandatory spares list annexure-II attached.
7	Annexure-III (list of mandatory spares) of suggested price format		---	Revised Annexure-III (list of mandatory spares) of suggested price format attached.
8	SECTION-I Sub Section-D,ANNEXURE-III :SIZING CALCULATION, SELECTION PARAMETER FOR ALL TANKS	305/397	Sketch of Auxiliay absorbent tank	Mounting (Horizontal/ Vertical) of Agitators will be as per revised agitator schedule (Refer Annexure -B) . Revised Agitator Schedule shall be followed by bidders.

Hansraj Kumar

Jayant Roy.

अभिषेक मोहपात्रा

ANNEXURE A OF AMENDMENT 1 OF TECHNICAL SPECIFICATION

	PROJECT: (3X200+3X500+1X500) MW KORBA STPP FGD PRE-QUALIFICATION REQUIREMENT (PQR) AGITATORS	DOC NO.: PE-PQ-466-571-18000-A001	
		DATE	24.09.2020
		REV NO.	01

1.0	The bidder shall submit its credentials having previously designed and manufactured agitators (vertical and horizontal) in a Wet Limestone based FGD application in Coal fired power plant, which is in successful operation for a period of not less than one (1) year as on 21.02.2020. The rating of the Agitator shall not be less than that supplied for 500 MW or higher size unit for similar application.
2.0	In case the Bidder is not manufacturer of Agitators as per clause no.1.0 above, but is a manufacturer of Agitators for application in petrochemical, metals and mining industry, sugar, paper, fertilizer industry etc., and has previously designed and manufactured Agitators (vertical and horizontal) having a minimum rating of 37 KW & 22 KW (each for vertical and Horizontal respectively) which is in successful operation for a period of not less than one (1) year as on 21.02.2020.
3.0	In case the Bidder is not manufacturer of proven Agitators as per clause no. 1.0 & 2.0 above, it shall fulfil the requirement placed at Annexure-1 for clause no. 1 & Annexure-2 for clause no. 2 respectively pertaining to the Proven-ness criteria for Agitators for (3X200+3X500+1X500) MW KORBA STPP FGD.
4.0	The supplier has to submit following supporting documents meeting above mentioned pre-qualifying requirement: a) Copy of minimum one (1) performance certificate (in English) from end user along with copy of related Purchase Order (PO) or Letter of intent (LOI) or Letter of Award (LOA) or Work Order (WO) in support of PQR clause at S.No.1.0 / S.No. 2 above as applicable. These documents must contain details of both vertical as well as horizontal agitators. b) Copy of all documents to establish conditions as mentioned in Annexure-1 / Annexure-2 as applicable. i) Copy of document of incorporation of JV/ Subsidiary company in India. ii) Copy of valid ongoing collaboration / licencing agreement / technology transfer agreement. iii) Copy of document of at least 26% equity participation of qualified equipment manufacturer in the Indian JV company/subsidiary company directly or indirectly through its holding/Subsidiary company, which shall be maintained for a lock-in period of seven (7) years from the date of incorporation of such JV/Subsidiary or up to the end of defect liability period of the contract whichever is later. iv) The details of collaborator or technology provider of the qualified equipment manufacturer who meets the requirement stipulated at clause 1.0 / 2.0 /3.0 shall be filled by the bidder in the format placed at Annexure-3.
5.0	Bidder shall submit design documents to substantiate technical parameters specified in PQR, if the same is not mentioned in performance certificate/purchase order.
6.0	Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a translation of its pertinent passages in English language in which case, for purposes of interpretation of the bid, the translation shall govern. The English Translation of the documents shall be carried out by professional translators and the translator shall certify that he is proficient in both languages in order to translate the document and that the translation is complete and accurate. Further, translation shall be authenticated by the Indian Consulate located in the Country where the documents have been issued or the Embassy of that Country in India.

	PROJECT: (3X200+3X500+1X500) MW KORBA STPP FGD PRE-QUALIFICATION REQUIREMENT (PQR) AGITATORS	DOC NO.: PE-PQ-466-571-18000-A001	
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7.0	Notwithstanding anything stated above, BHEL/ NTPC reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL /NTPC.
8.0	After satisfactory fulfilment of all the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all the other terms of the tender.

Notes:

- a) Please note, PQR indicated at Clause no 1 is requirement of BHEL's end customer (M/s NTPC) with respect to capacity and FGD application in coal fired power plant and to be considered by M/s NTPC while approving the bidder.
- b) BHEL will take up with M/s M/s NTPC for relaxation with respect to rating and alternate process application which are indicated at clause no. 2.
- c) Bidders are advised to furnish the PQR documents in line with Clause no.1 which is specific requirement of BHEL's end customer. However, in case the bidder feels that they are not meeting the requirements of clause no. 1, but can meet the requirement of clause no. 2, then they are advised to submit the bids along with the PQR documents meeting the clause no. 2. The bids meeting the requirement of clause no.2 shall be technically recommended by BHEL and shall be forwarded to end customer for acceptance of any relaxation in line with the clause no. 2 and shall be subject to approval of bidder(s) by M/s NTPC.
- d) A Bidder can offer their bid only against either Clause No. 1 or Clause No. 2 to be read conjunction with Clause No. 3.
- e) In case BHEL's end customer (M/s NTPC) does not consider any relaxation with respect to Clause no. 2 above, the bids and the bidder's approval shall be governed with respect to clause no.1 of PQR and bidder will not have any claim for qualification with respect to clause no.2.

Prepared By

Reviewed By

Approved By

Annexure-1 to Doc No. PE-PQ-466-571-18000-A001, R-01

1. A JV / Subsidiary Company formed for manufacturing and supply of equipment(s) as listed at clause no. 1.0 of document no. PE-PQ-466-571-18000-A001,R-01 in India can also manufacture such equipment(s), provided that it has a valid collaboration or licensing agreement for design, engineering, manufacturing of such equipment(s) in India with a qualified equipment manufacturer who meets the requirements stipulated at the said clause (or the technology provider of the qualified equipment manufacturer) for the respective equipment(s).

Further, in such a case, such qualified equipment manufacturers should have, directly or indirectly through its holding company/ subsidiary company, at least 26% equity participation in the Indian Joint Venture Company/ Subsidiary Company, which shall be maintained for a lock-in period of seven (7) years from the date of incorporation of such Joint Venture/ Subsidiary or up to the end of defect liability period of the contract, whichever is later.

2. In case the Bidder is not manufacturer of proven Agitators as per clause no. 1.0 of document no. PE-PQ-466-571-18000-A001, R-01 but is a manufacturer of Agitators for similar process/duty application in petrochemical, metals and mining industry, the Bidder can also manufacture Agitators, provided it has collaboration or valid licensing agreement for design, engineering, manufacturing, supply of such Agitators in India with such manufacturer who meet the requirements stipulated at the said clause.
3. Before taking up the manufacturing of such equipment(s) as per clause 1 & 2 above, the Bidder must create (or should have created) manufacturing and testing facilities at its works as per Collaborator / licensor's design, manufacturing and quality control system for such equipment(s) duly certified by the Collaborator / licensor. Further, the Collaborator / Licensor shall provide (or should have provided) all design, design calculation, manufacturing drawings and must provide (or should have provided) technical and quality surveillance assistance and supervision during manufacturing, erection, testing, commissioning of equipment(s).
4. BHEL/NTPC reserves the right to fully satisfy himself regarding capability and capacity of the proposed arrangement and may prescribe additional requirement before allowing manufacture of the equipment listed above for this contract.

Annexure-2 to Doc No. PE-PQ-466-571-18000-A001, R-01

1. A JV / Subsidiary Company formed for manufacturing and supply of equipment(s) as listed at clause no. 2.0 of document no. PE-PQ-466-571-18000-A001, R-01 in India can also manufacture such equipment(s), provided that it has a valid collaboration or licensing agreement for design, engineering, manufacturing of such equipment(s) in India with a qualified equipment manufacturer who meets the requirements stipulated at the said clause (or the technology provider of the qualified equipment manufacturer) for the respective equipment(s).

Further, in such a case, such qualified equipment manufacturers should have, directly or indirectly through its holding company/ subsidiary company, at least 26% equity participation in the Indian Joint Venture Company/ Subsidiary Company, which shall be maintained for a lock-in period of seven (7) years from the date of incorporation of such Joint Venture/ Subsidiary or up to the end of defect liability period of the contract, whichever is later.

2. In case the Bidder is not manufacturer of Agitators as per clause no. 2.0 of document no. PE-PQ-466-571-18000-A001, R-01 the bidder can also manufacture Agitators, provided it has collaboration or valid licensing agreement for design, engineering, manufacturing, supply of such Agitators in India with such manufacturer who meet the requirements stipulated at the said clause.
3. Before taking up the manufacturing of such equipment(s) as per clause 1 & 2 above, the Bidder must create (or should have created) manufacturing and testing facilities at its works as per Collaborator / licensor's design, manufacturing and quality control system for such equipment(s) duly certified by the Collaborator / licensor. Further, the Collaborator / Licensor shall provide (or should have provided) all design, design calculation, manufacturing drawings and must provide (or should have provided) technical and quality surveillance assistance and supervision during manufacturing, erection, testing, commissioning of equipment(s).
4. BHEL/NTPC reserves the right to fully satisfy himself regarding capability and capacity of the proposed arrangement and may prescribe additional requirement before allowing manufacture of the equipment listed above for this contract.

F. Agitators: We declare that, we _____ have designed (either by itself or under collaboration / licensing agreement),*manufactured/*got manufactured and supplied at least one (1) number of Agitators with rating not less than that supplied for 500 MW or higher size unit for similar application, Vertical/Horizontal type working in Wet Limestone based FGD application in Coal fired power plant and which has been in successful operation for minimum one(1) year reckoned as on the date of consideration for approval but not later than six months to award date of contract to the Main bidder, as per the details furnished below::

Sl. No.	Description	Reference Work
1.	Name of the reference plant & location:	
2.	Client name and his address:	
3.	No. of units and capacity in MW of unit:	
4.	Whether power plant is coal fired	-*Yes/*No
5.	Whether operating in a Wet Limestone based FGD application in coal fired power plant	-*Yes/*No
6.	Name of equipment manufacturer & address:	
7.	Date of commission of the equipments:	
8.	Model no. of the equipment:	
9.	Brief Technical particulars of the equipments:	
10.	Agitators supplied for	MW unit size

Signature of authorized signatory.....

KINDLY REFER PQR (DOC NO. PE-PQ-466-571-18000-A001) FOR MINIMUM CAPACITY AND DATE OF CONSIDERATION BY WHICH ONE YEAR OF SUCCESSFUL OPERATION IS TO BE ESTABLISHED

Sl. No.	Description	Reference Work
11.	Whether the equipment(s) are in successful operation in atleast one(01) plant for a period not less than one(01) year reckoned as on the date of consideration for approval but not later than six months to award date of contract to the Main bidder	-*Yes/*No
12.	Flue gas Desulphurization system details:	*Technical extract/ *paper letter/ *email/ *Drwaing from user or *contract document or *scheme or *any document in public domain enclosed at annexure....to Attachment-3K
13.	Scope of Work:	*Letter of Award or *Contract or *P.O. enclosed at Annexure.....to Attachment-3K
14.	Performance details:	*Certificate/*Letter/*E-mail from End user enclosed at Annexure.....to Attachment-3K

*** Strike off whichever is not applicable.**

NOTE: 1) THE FORMAT IS APPLICABLE FOR BIDDERS WHO OFFER THEIR BID AGAINST CLAUSE NO.1 & 3 OF PE-PQ-466-571-18000-A001.
2) INCASE BIDDER OFFER THEIR BID AGAINST CLAUSE NO.2 & 3 OF PE-PQ-466-571-18000-A001, DETAILS TO BE FURNISHED BY THE BIDDER IN THE ABOVE FORMAT SUITABLY.
3)THE FORMAT TO BE FILLED SEPARATELY FOR BOTH HORIZONTAL AND VERTICAL AGITATOR.

Signature of authorized signatory.....

ANNEXURE -B OF AMENDMENT -1 OF TECHNICAL SPECIFICATION

KORBA (FGD) STPP, Stage-I,II& II (3x200MW +3x500 MW+1X500 MW)

[illegible]

d)	Motor Protection Class	IP-55/ Outdoor	IP-55/ Outdoor	IP-55/ Outdoor	IP-55/ Outdoor	IP-55/ Outdoor	IP-55/ Outdoor	IP-55/ Outdoor	IP-55/ Outdoor	IP-55/ Outdoor
e)	Motor Efficiency Class	IE-3	IE-3	IE-3	IE-3	IE-3	IE-3	IE-3	IE-3	IE-3
5	Impeller									
a)	Type of impeller	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
b)	No. of impeller per agitator	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
c)	Impeller diameter	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
d)	Impeller tip speed	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
e)	Operating speed	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
f)	Agitator Pumping Capacity	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
g)	Volume/Agitator	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
6	Baffle Plates (not in bidder's scope)									
a)	No. & size of baffle plates	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
b)	Thickness of baffle plates (mm)	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
c)	Distance from Bottom of the tank	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
7	Nozzle (not in bidder's scope)									
a)	Size of the nozzle on which agitator frame is mounted	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	NA	NA	NA
8	Loads									
a)	Static Load	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
b)	Dynamic load	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
c)	Torsional Moment (Nm)	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
d)	Bending Moment (Nm)	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder	To be filled by bidder
9	Power loading for Auxiliary power consumption	Not applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not applicable	Not applicable	Not applicable
10	Parameters to be considered compulsarily by bidder for design of Agitators									
a)	Uniform suspension of solids by Agitators	The agitators shall keep the solid particles in suspended mode in liquid slurry with "Full off-Bottom Suspension" of solid particles to 98% of liquid column to virtually "Uniform Solid Concentration".								
b)	Mounting of Agitaor (For vertical mounting)	The Agitators shall be mounted on the Agitator platform which shall be approximately at a height of 1.0 m from the tank roof. However, the Agitator platform is excluded from bidder's scope.								
c)	Power Number for Agitator	0.3 - 0.35	0.3 - 0.35	0.3 - 0.35	0.3 - 0.35	0.3 - 0.35	0.3 - 0.35	0.3 - 0.35	0.3 - 0.35	0.3 - 0.35
d)	Impeller tip dia/ tank dia	--	1/3 (approx)	1/3 (approx)	1/3 (approx)	1/3 (approx)	1/3 (approx)	1/3 (approx)	1/3 (approx)	1/3 (approx)
e)	Minimum number of stage of impeller	--	2	2	2	2	2	1	1	1
Notes										
1	There shall be complete re-suspension of all solids after a 24 hour outage. Accumulation of solids shall not prevent agitator restart.									
2	Agitation shall be provided to prevent settlement of slurry by side entry agitators . All the side-entry agitators shall be similar.									
3	Tank low level trip requirement shall be provided by the bidder									
4	Maximum Sound Pressure Level at a height of 1.5 m above floor level in elevation, and at a distance of 1.0 m horizontally shall be 85 dBA.									
5	*Although the height of all tanks is fixed above, same may vary slightly during detailed engineering as per design calculation of tanks.									
6	Slope of roof shall be considered approximate 5 deg for all the tanks.									

	TITLE: KORBA SUPER THERMAL POWER PLANT TECHNICAL SPECIFICATIONS FOR AGITATORS	SPECIFICATION No: PE-TS-466-571-18000-A001	
		SECTION-I, SUB-SECTION-C1	
		REV. 01	DATE: SEPT 2020
		SHEET :	

4.1	TECHNICAL REQUIREMENTS
I	Agitators shall be supplied in tanks and vessels to prevent caking and settlement of particles out of the slurry, e.g. in the limestone slurry tank, Auxiliary Absorbent tank, and sumps etc.
II	All agitators shall be designed for continuous operation unless otherwise specified. The design of the agitators shall be of proven type. BHEL, during detail engineering reserves the right to ask for CFD (Computational Fluid Dynamics) analysis to accurately determine equipment requirements. Successful Bidder shall provide the same without any additional price implication.
III	Standard type agitators with suitable characteristics shall be used wherever practical. The agitators shall be complete with motor, gearbox, agitator shaft, coupling, safety guards, mechanical seal (for side entry agitators), impeller, support legs, agitator mounting flange including bolts nuts and gasket etc.
IV	All agitator parts and accessories in contact with the stirred fluid shall be constructed of materials specifically designed for the conditions and nature of the stirred fluid and be resistant to erosion and corrosion.
V	The material for the shaft (which is continuously in contact with slurry) and agitator blades of the Auxiliary Absorbent Tank Agitators shall be made with Alloy 926 or better material. For Agitators in other tanks, agitator blades shall be made with Alloy 926 or better material and shaft can be rubber lined (minimum 6 mm thick Chlorobutyl Rubber). This does not release the bidder of the responsibility for selecting the correct materials.
VI	Each agitator and its associated equipment shall be arranged in such a manner as to permit easy access for operation, maintenance and agitator removal without interrupting plant operation. It shall be possible to remove the sealing devices of the side mounted agitators without having to drain completely the slurry inside the tank.
VII	-VOID-
VIII	Lifting lugs and eyes and other special tackle shall be provided as necessary to permit easy handling of the agitators and their components.
IX	Static and dynamic (as per the requirement of Indian Standard/ Equivalent standards) balancing of all agitators shall be carried out after assembly.
X	All agitator parts and components shall be designed and calculated for fatigue life, considering maximum bending loads, induced by fluctuating hydraulic forces and torsional loads, based on the installed motor power. For side entry agitators the alternating bending moment resulting from impeller and shaft weight has to be considered additionally.
XI	All exposed moving parts shall be covered by guards.
XII	The shape of the impeller blades of side entry agitators/top entry agitators shall be designed to avoid wear on the impellers which will affect the agitator performance as specified for a minimum period of 2 years of continuous operation under design conditions for the range of coal & limestone specified in the specification. In order to avoid excessive wear impeller tip speeds must not exceed 12 m/s.
XIII	Belt drives (if applied for side entry agitators) shall be properly designed to provide a minimum lifetime of 2 years under design conditions
XIV	It shall be noted that all Agitators are meant for keeping the solid particles in suspended mode in liquid with “Full off-Bottom Suspension” of solid particles to 98% of liquid column to virtually “Uniform Solid Concentration”. No chemical reaction will takes place.

ANNEXURE- D OF AMENDMENT -1 OF TECHNICAL SPECIFICATION

	TITLE: KORBA SUPER THERMAL POWER PLANT TECHNICAL SPECIFICATIONS FOR AGITATORS	SPECIFICATION No: PE-TS-466-571-18000-A001	
		SECTION-I, SUB-SECTION-C1	
		REV. 01	DATE: SEPT 2020
		SHEET :	

	new condition only. It is cannot be considered as a guarantee of functional objective of rubber used.
7	Mechanical Run Test (in air) Each Agitator unit shall be given a 4-hour mechanical run test in air at vendor's shop. Agitator unit shall be mounted in the same manner as it will operate in the field. During this test the record shall be made of: a) Shaft run out at free end. b) Dynamic shaft deflection adjacent to the mechanical seal/packing/vapour seal. c) Gearbox oil temperature and temperature of bearing housing in stool. The temperature of the gear box oil shall not exceed ambient plus 40 Deg.C and that of bearing housing shall not exceed from room temperature plus 20 Deg.C after temperatures have stabilized. d) Bearing Housing vibration checks shall be carried out. maximum acceptable vibration velocity shall be 6 mm/sec. e) Noise level shall be checked and shall be within the specified limits mentioned in the specification. f) Agitator shaft RPM and motor RPM. g) Check of satisfactory operation of shut off and retracting arrangement.
8	Mechanical Run Test (in slurry of similar concentration as applicable for the project) Each agitator unit shall be given a load test in slurry at the vendor's shop. The duration of this test shall be 4 hours unless agreed otherwise between the Purchaser and the vendor. The following parameters shall be recorded during the test: a) Dynamic shaft deflection adjacent to the mechanical seal/packing/vapor seal. b) Gear box bearing oil temperature and temperature of bearing housing in stool. The temperature of gear box oil shall not exceed ambient plus 40°C and that of bearing housing shall not exceed room temperature plus 20°C after the temperatures have stabilized. c) Bearing housing vibrations. Maximum acceptable vibration velocity is 6 mm/sec. d) Noise levels shall be checked and shall be within the specified limits mentioned in the specification. e) Electrical power input to the motor. f) Agitator shaft RPM and motor RPM. g) Check of satisfactory operation of shut off and retracting arrangement. As a part of the Quality Assurance Plan, bidder has to demonstrate the power consumption of each agitator at shop with the slurry used along with relevant calculation to establish the correlation with the slurry used for the project.
9	Acceptance Test (at Site) After the agitator has been installed at site and is ready for test, vendor shall depute his representative to supervise the site acceptance test
10	DYNAMICS
10.1	CRITICAL SPEED
10.1.1	Operation speed of the Agitator motor shall be at least 25% below the first critical speed
10.1.2	Additional to the requirement of the critical speed of Agitator, as specified above. Agitator manufacturer is to analyze the torsional critical speed of combined system of Agitator, Gear Box and Motor to establish there is a separation margin of minimum 20% between the torsional critical speed (dry/wet) and any operating speed.

	KORBA SUPER THERMAL POWER PLANT TECHNICAL SPECIFICATION FOR AGITATORS		SPECIFICATION No: PE-TS-466-571-18000-A001	
			SECTION : II	
	LIST OF DOCUMENTS TO BE SUBMITTED WITH BID		REV: 01	DATE: SEP 2020
			SHEET 1 OF 1	

ANNEXURE-1

BIDDER SHOULD SUBMIT THE SIGNED AND STAMPED COPY OF THE FOLLOWING DOCUMENTS:

1. Compliance cum confirmation certificate (Refer Annexure-2 of section-II)
2. Pre-bid clarification schedule as per format given under Section-II (Annexure-3), in case of any clarifications.
3. Deviation schedule as per format given under Section-II (Annexure-4), in case of any deviations by bidder.
4. Guaranteed power consumption format (In the format attached in the price schedule) declaring guaranteed power consumption value in KW.
5. Un priced format for main package (mentioning quoted against each item)
6. Un priced format for mandatory spare (mentioning quoted against each item)
7. Un priced format for Tools and Tackles (mentioning quoted against each item)
8. Un priced format for Commissioning spare (mentioning quoted against each item)
9. List of makes of sub vendor items (Refer Annexure-6 of section-II)
10. Agitator Schedule filled up by the bidder (Refer Annexure-8 of section-II)
11. GA drawing, Exploded view with Material of construction, total weight of all Agitators models offered
12. Agitator and Motor Sizing Calculation
13. Electrical Load data filled up by the bidder (Refer Annexure-5 of section-II)
14. Documents for meeting the Pre-Qualification Requirement (3K format has to be submitted along with supporting documents)
15. Schedule of guarantees(Refer Annexure-10 of section-II)
16. Priced offer
17. Test arrangement @ shop
18. Product catalogue

ANNEXURE-II OF AMENDMENT-1 OF TECHNICAL SPECIFICATION

TECHNICAL SPECIFICATION FOR AGITATOR FOR MANDATORY SPARES LIST (3 x200 + 3 X 500 + 1 X500) MW KORBA STPP		SPECIFICATION NO. :PE-TS-466-571-18000-A001
		ANNEXURE-II
Sl. No.	PARTICULARS	Unit /Quantity (Nos./SET/%)
1	AGITATORS	
1.1	AUXILIARY ABSORBENT TANK AGITATOR	
1	Impeller Assembly	1 no. of each type and size
2	Bearing Assembly	1 no. of each type and size
3	Motor	1 no. of each type and size
4	Belt and Pulley (If applicable)	1 no. of each type and size
5	Gear Box Assembly (If Applicable)	1 no. of each type and size
6	Agitator shaft assembly	1 no. of each type and size
7	Shaft Seal	1 no. of each type and size
8	Complete Agitator Assembly	1 no. of each type and size
1.2	LIMESTONE SLURRY STORAGE TANK AGITATORS	
1	Impeller Assembly	1 no. of each type
2	Bearing Assembly	1 no. of each type
3	Motor	1 no. of each type
4	Belt and Pulley (If applicable)	1 no. of each type
5	Gear Box Assembly (If Applicable)	1 no. of each type
6	Agitator shaft assembly	1 no. of each type and size
7	Complete Agitator Assembly	1 no. of each type and size
1.3	PRIMARY HYDRO-CYCLONE FEED TANK AGITATOR	
1	Impeller Assembly	1 no. of each type
2	Bearing Assembly	1 no. of each type
3	Motor	1 no. of each type
4	Belt and Pulley (If applicable)	1 no. of each type
5	Gear Box Assembly (If Applicable)	1 no. of each type
6	Agitator shaft assembly	1 no. of each type and size
7	Complete Agitator Assembly	1 no. of each type and size
1.4	SECONDARY HYDROCYCLONE FEED TANK AGITATOR	
1	Impeller Assembly	1 no. of each type
2	Bearing Assembly	1 no. of each type
3	Motor	1 no. of each type
4	Belt and Pulley (If applicable)	1 no. of each type

TECHNICAL SPECIFICATION FOR AGITATOR FOR MANDATORY SPARES LIST (3 x200 + 3 X 500 + 1 X500) MW KORBA STPP		SPECIFICATION NO. :PE-TS-466-571-18000-A001
		ANNEXURE-II
Sl. No.	PARTICULARS	Unit /Quantity (Nos./SET/%)
5	Gear Box Assembly (If Applicable)	1 no. of each type
6	Agitator shaft assembly	1 no. of each type and size
7	Complete Agitator Assembly	1 no. of each type and size
1.5	FILTRATE WATER TANK AGITATOR	
1	Impeller Assembly	1 no. of each type
2	Bearing Assembly	1 no. of each type
3	Motor	1 no. of each type
4	Belt and Pulley (If applicable)	1 no. of each type
5	Gear Box Assembly (If Applicable)	1 no. of each type
6	Agitator shaft assembly	1 no. of each type and size
7	Complete Agitator Assembly	1 no. of each type and size
1.6	WASTE WATER TANK AGITATOR	
1	Impeller Assembly	1 no. of each type
2	Bearing Assembly	1 no. of each type
3	Motor	1 no. of each type
4	Belt and Pulley (If applicable)	1 no. of each type
5	Gear Box Assembly (If Applicable)	1 no. of each type
6	Agitator shaft assembly	1 no. of each type and size
7	Complete Agitator Assembly	1 no. of each type and size
1.7	Agitator for Drain Pit (For Absorber, Gypsem and limestone area)	
1	Impeller Assembly	1 no. of each type and size
2	Bearing Assembly	1 no. of each type and size
3	Motor	1 no. of each type and size/rating
4	Belt and Pulley (If applicable)	1 no. of each type and size
5	Gear Box Assembly (If Applicable)	1 no. of each type and size
6	Agitator shaft assembly	1 no. of each type and size
7	Complete Agitator Assembly	1 no. of each type and size
Note:		

TECHNICAL SPECIFICATION FOR AGITATOR FOR MANDATORY SPARES LIST (3 x200 + 3 X 500 + 1 X500) MW KORBA STPP		SPECIFICATION NO. :PE-TS-466-571-18000-A001
		ANNEXURE-II
Sl. No.	PARTICULARS	Unit /Quantity (Nos./SET/%)
	1)One set means 100% complete replacement of the particular component/equipment, as mentioned i.e., Set for the particular equipment, would include all components required to replace the item. For example, a set of bearing shall include all hardware normally required while replacing the bearings. It is further, intended that the assembly / sub-assembly which have different orientation (like left hand or right hand, top or bottom), different direction of rotation or mirror image positioning or any other reasons which result in maintaining two different sets of the spares to be used for the subject assembly / sub-assembly, these shall be considered as different types of assembly/sub-assembly.	
	2) Wherever the quantities have been indicated for each type, size, thickness, material, radius, range etc. these shall cover all the items supplied and installed.	
	3) In case spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to offered design with quantities generally in line with the approach followed in the above list.	
	4) Any item which is quoted as “not applicable” in the above list and is found to be “applicable” at a later date shall be supplied by the Bidder without any commercial implications. The Bidder shall note that if there in any change/ variation in equipment/ system during detail engineering which causes any change/ variation in the essential spares quantity, the same shall be supplied without any commercial implications. The price indicated for the mandatory spares shall be considered for the purpose of evaluation.	
	5) Mandatory spares shall not be dispatched before dispatch of corresponding main equipment. Pls. refer NIT for delivery schedule. The spares shall be treated and packed for a long storage under the climatic condition prevailing at site.	
	6) All spares supplied under this contract shall be strictly interchangeable with parts for which they are intended for replacements. These spares should include all mounted accessories like components, boards, add or items, fitting, connectors etc. and be complete in all respects so that the replacement of the main items by these spares does not require any additional item. The vendors must conform the pair to pair compatibility of each electrical spares modules with the modules supplied in the original package. All electronic modules should be pre-set and/or pre-programmed for ready use at site. Alternatively, suitable instruction sheet indicating the details of required PCB jumper position, BCD which is setting, EPROM/PROM listing etc should be packed along with each module. Also a caution mark sign should be put on all such module which needs pre-setting/pre-programming before putting them in to service. The spare shall be treated and properly packed for long term storage.	
	7) Each spare shall be clearly marked and labelled on the outside of the packing with its description. When more than one spare part is packed in single case, a general description of the contents shall be shown on the outside of such case and a detailed list enclosed. All cases, containers and other packages must be suitably marked and numbered for the purpose of identification.	
	8) Set for the particular equipment, would include all components required to replace the item, for example a set of bearing shall include all hardware normally required while replacing the bearings. It is further intended that the assembly / sub-assembly which have different orientation (like left hand or right hand, top or bottom), different direction of rotation or mirror image positioning or any other reasons which result in maintaining two different sets of the spares to be used for the subject assembly / sub-assembly, these shall be considered as different types of assembly/sub-assembly.	
	9)All the spares shall be manufactured along with the main equipment components as a continuous operation as per same specification and quality plan.	
	10)The Contractor shall warrant that all spares supplied will be new and in accordance with the Contract Documents and will be free from defects in design, material and workmanship.	

ANNEXURE-III OF AMENDMENT-1 OF TECHNICAL SPECIFICATION

SUGGESTED PRICE FORMAT ANNEXURE-III LIST OF MANDATORY SPARES			Doc No:	PE-PF-466-571-18000-A001
			Rev No:	01
			Date of issue	30.09.2020
NAME OF PROJECT:		KORBA (FGD) STPP, Stage-I,II& II (3x200MW + 3x500 MW+1X500 MW)		
NAME OF PACKAGE:		AGITATORS		
TECHNICAL SPECIFICATION:		PE-TS-466-571-18000-A001		
Sl. No.	DESCRIPTION	HSN CODE	Unit /Quantity (Nos./SET/%)	TOTAL AMOUNT (Ex-Works)
1	Agitators			
1.1	Auxiliary Absorbent Tank Agitator (Horizontal Type)			
1	Impeller Assembly	84799040	1 no. of each type and size	
2	Bearing Assembly	84799040	1 no. of each type and size	
3	Motor	84799040	1 no. of each type and size	
4	Belt and Pulley (If applicable)	84799040	1 no. of each type and size	
5	Gear Box Assembly (If Applicable)	84799040	1 no. of each type and size	
6	Agitator shaft assembly	84799040	1 no. of each type and size	
7	Shaft seal	84799040	1 no. of each type and size	
8	Complete Agitator assembly	84799040	1 no. of each type and size	
1.2	Limestone Slurry Storage tank Agitator			
1	Impeller Assembly	84799040	1 no. of each type	
2	Bearing Assembly	84799040	1 no. of each type	
3	Motor	84799040	1 no. of each type	
4	Belt and Pulley (If applicable)	84799040	1 no. of each type	
5	Gear Box Assembly (If Applicable)	84799040	1 no. of each type	
6	Agitator shaft assembly	84799040	1 no. of each type and size	
7	Complete Agitator assembly	84799040	1 no. of each type and size	
1.3	Primary Hydrocyclone feed tank Agitator			
1	Impeller Assembly	84799040	1 no. of each type	
2	Bearing Assembly	84799040	1 no. of each type	
3	Motor	84799040	1 no. of each type	
4	Belt and Pulley (If applicable)	84799040	1 no. of each type	
5	Gear Box Assembly (If Applicable)	84799040	1 no. of each type	
6	Agitator shaft assembly	84799040	1 no. of each type and size	
7	Complete Agitator assembly	84799040	1 no. of each type and size	
1.4	Secondary Hydrocyclone feed tank Agitator			
1	Impeller Assembly	84799040	1 no. of each type	
2	Bearing Assembly	84799040	1 no. of each type	
3	Motor	84799040	1 no. of each type	
4	Belt and Pulley (If applicable)	84799040	1 no. of each type	
5	Gear Box Assembly (If Applicable)	84799040	1 no. of each type	
6	Agitator shaft assembly	84799040	1 no. of each type and size	
7	Complete Agitator assembly	84799040	1 no. of each type and size	
1.5	Filtrate water tank Agitator			
1	Impeller Assembly	84799040	1 no. of each type	
2	Bearing Assembly	84799040	1 no. of each type	
3	Motor	84799040	1 no. of each type	
4	Belt and Pulley (If applicable)	84799040	1 no. of each type	

5	Gear Box Assembly (If Applicable)	84799040	1 no. of each type	
6	Agitator shaft assembly	84799040	1 no. of each type and size	
7	Complete Agitator assembly	84799040	1 no. of each type and size	
1.6	Waste water Tank Agitator			
1	Impeller Assembly	84799040	1 no. of each type	
2	Bearing Assembly	84799040	1 no. of each type	
3	Motor	84799040	1 no. of each type	
4	Belt and Pulley (If applicable)	84799040	1 no. of each type	
5	Gear Box Assembly (If Applicable)	84799040	1 no. of each type	
6	Agitator shaft assembly	84799040	1 no. of each type and size	
7	Complete Agitator assembly	84799040	1 no. of each type and size	
1.7	Agitator for Drain Pit (For Absorber, Gypsum and limestone area)			
1	Impeller Assembly	84799040	1 no. of each type and size	
2	Bearing Assembly	84799040	1 no. of each type and size	
3	Motor	84799040	1 no. of each type and size /rating	
4	Belt and Pulley (If applicable)	84799040	1 no. of each type and size	
5	Gear Box Assembly (If Applicable)	84799040	1 no. of each type and size	
6	Agitator shaft assembly	84799040	1 no. of each type and size	
7	Complete Agitator assembly	84799040	1 no. of each type and size	
	TOTAL PRICE OF MANDATORY SPARES			

Note:

1) One set means 100% complete replacement of the particular component/equipment, as mentioned i.e., Set for the particular equipment, would include all components required to replace the item. For example, a set of bearing shall include all hardware normally required while replacing the bearings. It is further, intended that the assembly / sub-assembly which have different orientation (like left hand or right hand, top or bottom), different direction of rotation or mirror image positioning or any other reasons which result in maintaining two different sets of the spares to be used for the subject assembly / sub-assembly, these shall be considered as different types of assembly/sub-assembly.

2) Wherever the quantities have been indicated for each type, size, thickness, material, radius, range etc. these shall cover all the items supplied and installed.

3) In case spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to offered design with quantities generally in line with the approach followed in the above list.

4) Any item which is quoted as "not applicable" in the above list and is found to be "applicable" at a later date shall be supplied by the Bidder without any commercial implications. The Bidder shall note that if there is any change/variation in equipment/ system during detail engineering which causes any change/ variation in the essential spares quantity, the same shall be supplied without any commercial implications. The price indicated for the mandatory spares shall be considered for the purpose of evaluation.

5) Mandatory spares shall not be dispatched before dispatch of corresponding main equipment. Pls. refer NIT for delivery schedule. The spares shall be treated and packed for a long storage under the climatic condition prevailing at site.

6) All spares supplied under this contract shall be strictly interchangeable with parts for which they are intended for replacements. These spares should include all mounted accessories like components, boards, add or items, fitting, connectors etc. and be complete in all respects so that the replacement of the main items by these spares does not require any additional item. The vendors must conform the pair to pair compatibility of each electrical spares modules with the modules supplied in the original package. All electronic modules should be pre-set and/or pre-programmed for ready use at site. Alternatively, suitable instruction sheet indicating the details of required PCB jumper position, BCD which is setting, EPROM/PROM listing etc should be packed along with each module. Also a caution mark sign should be put on all such module which needs pre-setting/pre-programming before putting them in to service. The spare shall be treated and properly packed for long term storage.

7) Each spare shall be clearly marked and labelled on the outside of the packing with its description. When more than one spare part is packed in single case, a general description of the contents shall be shown on the outside of such case and a detailed list enclosed. All cases, containers and other packages must be suitably marked and numbered for the purpose of identification.

8) Set for the particular equipment, would include all components required to replace the item, for example a set of bearing shall include all hardware normally required while replacing the bearings. It is further intended that the assembly / sub-assembly which have different orientation (like left hand or right hand, top or bottom), different direction of rotation or mirror image positioning or any other reasons which result in maintaining two different sets of the spares to be used for the subject assembly / sub-assembly, these shall be considered as different types of assembly/sub-assembly.

9) All the spares shall be manufactured along with the main equipment components as a continuous operation as per same specification and quality plan.

10) The Contractor shall warrant that all spares supplied will be new and in accordance with the Contract Documents and will be free from defects in design, material and workmanship.

Particulars of bidder / authorised representative

Name	Designation		Signature & company seal	Date