This job specification shall be completely filled-in, duly signed by supplier and enclosed along with offer.

OFFER FOR 2X250MW FGD OXIDATION BLOWER

PROJECT: 2X250MW NTPC/ NSPCL BHILAI

TYPE: _____

REF: _____

Technical Offer

MANUFACTURER: _____
_____
_____
_____
_____

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1.0 APPLICABLE SPECIFICATIONS : TC52545 (Standard specification of FGD Blowers for NTPC Projects)/ ISO 10816-1/ ISO7919-3. In case of conflicts between standard specification TC52545 and job specification TC62674, job specification prevails.

2.0 PROJECT INFORMATION:

NSPCL has setup coal based thermal power plant of 2X250 MW capacity at Durg, Bhilai in Chhattisgarh primarily to meet captive power requirement of SAIL, NSPCL is supplying balance power to the beneficiaries in the western region. Both the units have been commissioned during 2008-09 and commercialized during 2009-10. The NSPCL site is located at District Durg, Bhilai. The nearest- airport is at Raipur, about 35kms away from the site. The nearest town is Bhilai, approx. 10 km from the project site

a.	Owner	NTPC/ NSPCL
b.	Buyer	BHEL, Hyderabad
c.	Process/Application	Flue Gas Desulphurization

A) SITE CONDITIONS

Guarantee point

1.	**Ambient Temperature and Relative Humidity**		
	Ambient Temperature	:	27 deg C
	Relative Humidity	:	60 %

Design point

2.	**Ambient Temperature and Relative Humidity**		
	Ambient Temperature (Design)	:	45 deg C
	Relative Humidity	:	60 %

Note :

1.Guarantee point site condition shall be applicable for performance test at shop/ site

2.Equipment and material must be suitable for the range of ambient conditions.

B) WATER ANALYSIS

The following water to be used for quenching the Oxidation air discharge temperature to less than ≤70 deg C.

S.No	Constituents	Unit	Design clarified water	Process Water (after considering 5.5 COC)
1.	Calcium as $CaCO_3$	ppm	38	190
2.	Magnesium as $CaCO_3$	ppm	22	121
3.	Chlorides as $CaCO_3$	ppm	20	110
4.	Sulphate as $CaCO_3$	ppm	17	93.5
5.	Alkalinity as $CaCO_3$	ppm	54	297
6.	Iron as Fe	ppm	0.1	0.55
7.	Total silica	ppm	07	38.5
8.	pH		7.5	7.5
9.	Turbidity	NTU	02	11

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Note: Clarified water is used for CW system as make-up & the CW system is expected to operate at about 5.0 — 5.5 Cycles of Concentration (COC) with suitable chemical treatment program using acid, scale & corrosion inhibitor dozing. As CW blow down water is tapped from CW system, the water quality of CW blow down shall accordingly be arrived by the bidder.

3.0 INTENT OF SPECIFICATION

This specification covers the minimum requirements for the complete design, material, manufacturing, shop inspection, testing at the manufacturer's works, supervision of erection & commissioning and performance testing of Oxidation blower along with accessories which is to be furnished in the Flue Gas Desulphurization plant of NSPCL Bhilai 2x250MW project. The following points may be noted.

a. There are two units of 250 MW and each unit is envisaged with one FGD system. Each FGD system will be provided with 2 numbers of Oxidation Blower (1 working + 1 standby) which are located inside the Recirculation Pump & Oxidation Blower shed.

b. Bidder shall assume full unit responsibility for the entire equipment assembly and make all possible efforts to comply strictly with the requirements of this specification and other specifications/attachments to inquiry/order.

c. The Bidder shall offer only proven design which meets the Provenness criteria indicated in **Annexure-I of TC62674.** Necessary document evidences as per **Annexure-3K of TC62674** for qualification shall be submitted along with the bid. If the Bidder doesn't meet the specified provenness criteria, then the Bidder will not be allowed to participate in the Tender.

d. In case, deviations are considered essential by the Bidder (after exhausting all possible efforts), the same shall be separately listed in the Bidder's proposal under separate section, titled as "List of Deviations/Exceptions to the Enquiry as listed in **Annexure I of TC52545**.

e. Any deviation, not listed under the above section, even if reflected in any other portion of the proposal, shall not be considered.

f. No deviation or exception shall be permitted without the prior written approval of the purchaser.

g. Compliance to this specification shall not relieve the Bidder of the responsibility of furnishing equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified start up and operating conditions.

h. In case, the Bidder considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, the same shall be recommended along with reasons in a separate section and include the same in scope of supply.

i. All accessories, items of work, though not indicated but required to make the system complete for its safe, efficient, reliable and trouble-free operation and maintenance shall also be in supplier's scope unless specifically excluded.

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4.0 PROVENNESS CRITERIA:

The Bidders are required to meet the Qualification Requirement (QR) for Oxidation Blower as per **Annexure-I of TC62674** & necessary documents evidence requirement as per **Annexure-3K of TC62674** along with necessary supporting documents. Bidder's offer will be rejected if the bidder fails to meet the Qualification criteria.

5.0 TECHNICAL INFORMATION

Sl. No	Description	Requirement		
1.	Quantity	2 Nos (1 Working + 1 standby) per unit .Total 4 Nos.		
2.	**Parameters**			
	Operating Points	(1) Design Point	(2) Operating point	(3) Guarantee Point
	Blower capacity	**4735 Nm³/hr-wet.**	**3645 Nm³/hr-wet.**	**2685 Nm³/hr-wet.**
	Discharge pressure	**8540 mmWC**	**8270 mmWC**	**7015 mmWC**
	Relative humadity	60%	60%	60%
	Suction temperature	45.0° C	45.0° C	27.0° C
	Atmospheric pressure	972 hPa		
	Discharge temperature	<70° C		
	Type of Blower	2x100% electric driven, single stage, integrally geared, single or dual vane Centrifugal type/ Positive displacement (Helical lobe) type with VFD drive, oxidation blower complete with integral gearbox, lube oil system, instrumentation and accessories. The blower will be used for supplying a variable volume of air to the absorber reaction tank.		
	Duty	1 Blower continuous at any point of time.		
3.	**Cooling water**			
	Inlet temperature	38° C		
	Outlet temperature	<43° C		
	Pressure loss	<0.05 MPa		
	Supply pressure	0.3 MPa		
4.	**Air Composition (Wet)**	Design point (1)	Operating point-	Guarantee point
	H_2O	5.83 vol%	5.83 vol%	2.17 %
	O_2	19.76 vol%	19.76 vol%	20.54%
	N_2	Balance	Balance	Balance
5.	**Material of construction**			
	Casing	Vendor to provide		
	Shaft	Vendor to provide		
	Impeller	Vendor to provide		
6.	Voltage level for Motors	a) Up to 0.2KW – Single phase 240V AC/ 3phase 415V AC b) Above 0.2 KW and up to 200 KW- 3phase 415V AC c) Above 200 KW and up to 1500 KW- 3phase 3.3kV AC d) Above 1500KW-11 kV		
7.	Air filter filtering efficiency	Vendor to provide along with name of vendor supplying the Air Filter		
8.	Blower Driver	Motor		
9.	Cooling system for reducing the temperature of air at the blower outlet to <70 deg Celsius	Quenching/Cooling arrangement with water injection arrangement to be provided. Heat exchanger should not be provided. Water analysis is given in clause 2B.		

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Sl. No	Description	Requirement
10.	Instrumentation execution	a) All field transmitter like pressure, temperature, flow, level, DP etc. shall be foundation fieldbus or profibus type. The exact type shall be informed during technical offer evaluation. Vendor shall quote foundation fieldbus type transmitter in its base offer. Vendor to include 'price implication' if any, in its commercial offer as a separate line item against heading "Price implication (+ / -) for Profibus type transmitters". In case there is no price implication, vendor to indicate the same in the technical offer. b) Control Valve Actuators: Electrical actuators shall to be of Fieldbus type. c) The following requirements for Transmitter shall overrule relevant requirement specified in standard specifications. a. Accuracy: a) ± 0.060 % of calibrated range (minimum) for calibrated range greater than 400 mmwc. b) ± 0.065% of calibrated range (minimum) for calibrated range greater than 250 kg/cm2. c) ± 0.10 % of calibrated range (minimum) for calibrated range less than 400 mmwc. b. Turn down (minimum): a) 50:1 for greater than or equal to span of 400mmwcl. b) 20:1 for span below 400mmwcl. c) 10:1 for span greater than 250 kg/cm2. c. Stability: a) 0.25 % of calibrated range for 10 years for calibrated range greater than equal to 400 mmwc on standard conditions of manufacturer. b) 0.2 % of calibrated range for 1 years for calibrated range less than 400 mmwc on standard conditions of manufacturer. c) 0.15% of calibrated range for 5 years for static pressure greater than 250 kg/cm2. d) Rotor Vibration Sensors: 02 nos on DE side and 02 nos on NDE side. e) Bearing Temperature Sensors: 02 nos on DE side and 02 nos on NDE side. f) SPARES LIST / Philosophy – As per **Annexure V of TC62674**

11	**POWER SUPPLY**	
	The following voltage levels shall apply:	
	3.3 kV ±6%,50 Hz	Voltage for motors bigger than 200 KW and for power distribution within the plant.
	415 V ±10%, 50Hz	Standard voltage for power supplies to small electric power consumers and motors above 0.2 kW and up to 200 KW.
	Bidder shall design and supply the equipment suitable for satisfactory operation under above mentioned power supply condition.	

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6.0 MATERIAL CODES

Var No	Description	Material Code
01	Motor driven, single stage, integrally geared, Single or dual vane Centrifugal type **OR** Positive displacement (Helical lobe) type with VFD drive, oxidation blowers Complete with integral gearbox, lube oil system, instrumentation and accessories	TC9762674073
02	Impeller assembly/ Rotor	TC9762674022
03	Set of Bearings (Required 1No. each for complete replacement of all bearings in one Blower)	TC9762674030
04	Commissioning spares	TC9762674049
05	Blower instrumentation spare- (Spare list as per Annexure V Philosophy)	TC9762674057

7.0 PACKING INSTRUCTIONS:

1.	Please see **clause 7.0 of TC52545** common specification for detailed packing instructions
2.	Each package or shipping units shall be clearly marked or stenciled on at least two sides as follows. **NSPCL Bhilai 2 X 250 MW,** **NTPC/ NSPCL BHILAI,** **DURG DISTRICT, BHILAI** **CHHATTISGARH, INDIA** **EPC CONTRACTOR: BHARAT HEAVY ELECTRICALS LIMITED, INDIA** In addition, each package or shipping unit shall have the symbol painted in red on at least two sides of the package, covering one fourth of the area of the side.
8.0	**SUPERVISION OF ERECTION, TESTING AND COMMISSIONING**
1.	The erection of Oxidation Blower will be done by owner as per Erection Manual and check List. However, the bidder shall make one visit per FGD system for the supervision of erection, pre-commissioning & post- commissioning check-up, start-up, testing and trial runs of all the items covered under the scope of supply. There will be two visits for two FGD system. The bidder will be informed well in advance for the visit. Bidder shall include 6 working days per visit in the offer with minimum 2 visits. For 2 units 12 working days must be included. BHEL shall conduct performance test of FGD package at site. Vendor shall provide supervision services for site performance test on per diem basis for each unit.
2.	TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in supply portion.

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9.0	INSPECTION AND TESTING
	The General inspection requirements to be considered are as below:
1.	Bidder shall furnish written copies of shop production, fabrication and quality test procedures and drawings to be used on the Blowers for review by BHEL/NTPC prior to manufacture.
2.	The Bidder shall furnish MRT & Performance test procedure in line with international standard. The test procedure will be reviewed and approved by the BHEL/NTPC.
3.	Out of 4 Oxidation Blower, performance test of 1 No will be witnessed by BHEL/ NTPC/ TPI before dispatch of machine at the Bidder's works or where the test facilities are available. A notice of minimum three (3) weeks shall be given for witnessing the test.
4.	The Bidder shall conduct performance test for the remaining blowers and submit the reports.
5.	Final inspection and release by BHEL /NTPC is a mandatory requirement unless specially waived.
6.	A dynamic balancing certificate stating that the rotating assembly has been balanced dynamically shall be sent to BHEL/NTPC/TPI within one (1) week of the successful completion of balancing.
7.	Acceptance tolerance of actual versus guaranteed performance for capacity, Static head, efficiency and power absorbed shall be as per applicable standard.
8.	Vibration levels shall be measured during shop running/performance tests.
9.	Contract shaft seals shall be used during shop tests, unless the seal design is unsuitable for the shop-test condition.
10.	Blower shall not be released for shipment, until shop tests data and performance tests curves have been approved by Owner.
11.	Bidder should furnish performance guarantee as per applicable standard guarantee for the design, manufacture, material and safe operation of the equipment's.
12.	Bidder shall arrange all calibrated gauges, Instruments during testing.
13.	Mechanical running and the performance test shall be carried out. Bidder shall arrange Motor for the shop test and inspection.
14.	The performance test may be carried out using air at shop and shall be converted to the design condition.
15.	Inspection and testing will be done as per NTPC approved Quality Plan. In case of order placed on foreign Vendor, Vendor shall engage and appoint at their cost of any reputed Third-Party Inspection Agencies having international presence for carrying out inspection of equipment's and material at vendor's & sub vendors works. Sample QP(indicative) is attached as **Annexure-V of TC52545.**

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10.0	**PAINTING**
1.	**Surface Preparation : Blast cleaned conforming to sa2-1/2 swiss standard**
2.	**PRIMER COAT:** Epoxy resin based Zinc phosphate Primer with minimum DFT of 100 **µm** **INTERMEDIATE COAT:** Epoxy resin based paint pigmented with titanium dioxide with minimum DFT 100 **µm** **FINISH COAT:** One coat of epoxy paint pigmented of DFT of 75 microns. Additionally, Finish coat of polyurethane of minimum DFT of 25 microns. Final shade as per approved quality plan. The above painting is just a tentative schedule. Painting details will be informed during contract stage. a. Base: To be informed during contract stage b. Lettering: To be informed during contract stage preventive paint after inspection at shop floor before dispatch shall be in bidder's scope
3.	Rust preventive paint after inspection at shop floor before dispatch shall be in bidder's scope
4.	Corrosion protection, coating and galvanizing, painting shall be taken care by the bidder. Bidder shall submit the painting scheme during detail Engg in line with the specification and shall be subject to approval of BHEL / NTPC.
11.0	**SPARES,TOOLS & TACKLES**
11.1	**START UP & COMMISSIONING SPARES**
	Start-up & Commissioning Spares shall be part of the main supply of Oxidation blowers. Start-up & commissioning spares are those spares which may be required during the start- up and commissioning of the equipment/system. All spares required for successful operation till commissioning of Oxidation blowers shall come under this category. Bidder shall provide an adequate stock of such start up and commissioning spares to be brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipment's are energized. These start-up & commissioning spare part list shall not be included in "Initial Spare Parts List".
11.2	**INITIAL SPARE PARTS (MANDATORY SPARES):**
	Bidder to quote for below mentioned mandatory spares with break up price: a. Bearings - 1 nos. of each type b. Impeller assembly – 1 nos. c. Blower instrumentation spare – 1 set (As per **annexure V of TC62674**) Bidder shall quote for the "Initial Spares Part List", and it will be considered for L1 evaluation. Initial spare parts items shall be handed over separately and shall not be mixed with the supply of the main equipment parts. Spares shall be sent in pre-decided lots in containers/secure boxes. All boxes/containers are to be distinctly marked in red color with boldly written "S" mark on each face of the containers. Spares shall not be dispatched before dispatch of corresponding main equipment's. Each item shall be labelled in English and be packed against damage and sealed to prevent deterioration from corrosion. All spares supplied under this contract shall be strictly inter-changeable with the parts for which they are intended for replacements. All the Initial spares shall be manufactured along with the main equipment components as a continuous operation as per same specification and quality plan.

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11.3 RECOMMENDED SPARES

Bidders shall also furnish the **Final Spares Part List** (i.e. recommended spares list) along with the offer required for 3 years of normal operation of the plant and should be independent of the list of the mandatory spares. Prices of recommended spares will not be used for evaluation of the bids. The price of these spares will remain valid up to 6 months after placement of Notification of Award for the main equipment.

11.4 SPECIAL TOOLS & TACKLES:

Any special tools & tackles required for the entire equipment to disassemble, assemble or maintain the units (**One set for each unit**), they shall be included in the quotation and furnished as part of the initial supply of the machine. List of special tools & tackles shall be decided by bidder as per his proven practice. When special tools are provided, they shall be packaged in separate, boxes with lugs and marked as "Special Tools for (tag / item number)." Each tool shall be stamped or tagged to indicate its intended usage. Levers and eye bolts for the removal of parts to be serviced shall be submitted with special tools.

12.0 PERFORMANCE GUARANTEE

All performance tests for blowers shall be carried out in accordance with any latest international codes/standards.

1) Bidder shall furnish Performance guarantee for the design, manufacture, material, safe and trouble-free operation of the Oxidation Blower and its accessories

2) Capacity and head of the blower to be guaranteed as per **Annexure-I of TC62674**.

3) The bidder shall guarantee 98% availability of equipment for a continues period of 120 days

4) The Bidder shall ensure a design of the equipment to achieve an average target availability of 90%.

5) Noise level-≤85 dB (A) at 1m horizontal distance from equipment/enclosures and 1.5m above operating floor is to be guaranteed.

6) The overall vibration levels measured on the non-rotating parts of either centrifugal compressor or positive displacement compressor shall be as per ISO 10816-1 Class A/B<=2.3mm/s, however for Integrally geared type centrifugal compressor the shaft vibration shall also be measured and it shall be as per ISO7919-3. The overall shaft vibration for zone A/B shall be as per following equation

   In SI units: A = 4800/SQRT(N)
   Where,
   A = amplitude of unfiltered vibration, in µm true peak to peak,
   N = maximum continuous speed, in rpm.

7) Acceptance tests to be carried out as per the procedure defined by the bidder which shall be submitted for NTPC's approval.

8) In the event that the performance test is unsuccessful in meeting performance guarantees, bidder shall take necessary remedial action at his cost and the performance test shall be repeated.

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13.0	**BID EVALUATION CRITERIA FOR POWER CONSUMPTION:**
1.	**POWER GUARANTEE** Bidder to specify the guaranteed Shaft power per blower operating at the Guarantee point (Operating point 3) of clause 5.0 of this specification in their offer. This power value shall be used for penalty criteria.
2.	**BID EVALUATION CRITERIA FOR POWER CONSUMPTION:** Guaranteed power consumption of blower/ motor rating quoted by bidder shall be considered for loading purpose. Criteria for ceiling value/ base value for loading is given at point 2.1. 2.1) The lowest of the power consumption/ motor rating quoted by technically qualified bidder shall be taken as the base or ceiling value. Bid prices of other bidders will be loaded for every KW excess over the ceiling value as per the formula given at 2.2. Following two criteria will be there for loading based on the offers received. Case 1: In case, all the technically accepted bidders' motor rating is of similar nature i.e motor rating <=200 kW **OR** motor rating >200 kW: Guarantee point power consumption shall be used for loading purpose. Case 2: In case all the technically accepted bidders' motor ratings are of different nature, i.e some bidders motor rating is <=200 kW and some bidders motor rating is >200 kW: Motor rating shall be used for loading purpose. 2.2) Loading value in INR = (GP-CV) X PL X 4 No's of Blowers GP- Guaranteed power consumption/ motor rating quoted by bidder in KW CV- Lowest of the power consumption/ motor rating quoted by any bidder PL- Power Loading @ 136930 INR /KW
14.0	**LIQUIDATED DAMAGES FOR POWER CONSUMPTION**
1.	If actual Power Consumption of blower during shop PG Test measured at compressor coupling for the Guarantee point exceeds the value guaranteed by the bidder., liquidated damages for shortfall in performance shall be deducted from contract price as per the formula given below Liquidated damage deductible in USD = (GPC-APC) X P X 4 No's of Blowers • GPC- Guaranteed Power Consumption quoted by bidder in KW • APC- Actual Power Consumption in KW • P- Penalty @ 136930 INR/ KW Penalty for shortfall in performance as mentioned above shall be deducted from contract price, however the penalty shall be limited to 25% of contractual value.

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	Since performance test is witnessed for the first blower, LD charges are applicable for remaining 3 Nos of blowers based on performance result of first blower.
2.	Minimum Acceptance Level: 105% of Functional Guarantee Value. NTPC/BHEL reserves the right to reject the equipment if actual power consumption exceeds the minimum acceptance level.
15.0	**WARRANTY/ DEFECT LIABILITY**
1.	The warranty period shall be 24 months from the date of supply or 18 months from the date of commissioning whichever is earlier. Provided that the successful bidder shall extend the provisions of this warranty to cover all repaired and replacement parts furnished under the warranty obligations hereunder, subject to the warranty period for the same being for a period of 24 months from the date on which replacement or renewal work is completed. The Defect Liability Period shall be eighteen (18) months from the date of successful Completion of the Facilities or twelve (12) months from the date of Operational Acceptance of the Facilities. At the end of the Defects Liability Period, the contractor liability ceases except for latent defects. The contractor's liability for latent defects warranty shall be limited to a period of five (5) years from the end of Defects Liability Period. For the purpose of this clause, the latent defects shall be the defects inherently lying within the material or arising out of design deficiency which do not manifest themselves during the Defects Liability Period.
2.	In case of failure of the equipment to meet the guarantee, NTPC/BHEL reserves the right to reject the equipment. However, NTPC/BHEL reserves the right to use the equipment until new equipment supplied by bidder meets the guaranteed requirement.
16.0	**FIRST FILL OF CONSUMABLES:**
1.	Bidder's scope shall also include supply and filling of all chemicals, reagents, resins, lubricants, grease, filters and consumable items for operation up to COD including top up requirements at the time of issuance of PAC/declaration of COD. All lubricants proposed for the plant operation shall be suitable for all operating and environmental conditions that will be met on site consistent with good maintenance procedures as instructed in the maintenance manuals.
2.	Detailed specifications for the lubricating oil, grease, gases, servo fluids, control fluids, chemicals including items qualities and quantities required per month of the plant operation for the NTPC/BHEL's approval herein shall be furnished. On completion of erection complete list of bearings/equipment giving their location and identification marks shall be furnished to NTPC along with lubrication requirements. All types of chemicals, consumables, lubricants and grease shall be readily obtainable locally and the number of different types shall be kept to a minimum. For each type and grade of lubricant recommended, bidder shall list at least three equivalent lubricants manufactured by alternative companies.
17.0	**TRAINING**
	Successful bidder shall provide comprehensive training for NTPC Engineering, O&M, Erection & Commissioning staffs at site covering all aspects of the Oxidation blower- Operation & Maintenance, Troubleshooting etc. Cost of training is to be included in base price.
18.0	**CONFLICT**
	Bidder's equipment shall be designed for and shall meet the service, performance and minimum level of quality requirements specified. Bidder shall be solely responsible for advising BHEL in writing of any conflicts between the specifications and Bidder's design, including performance and levels of quality. Bidder agrees that its obligations, liabilities and warranties shall not be diminished or extinguished due to its meeting the requirements of the Specification.

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19.0	DOCUMENTATION
A	**DOCUMENTS TO BE SUBMITTED ALONG WITH THE OFFER**
	The Bidder shall submit all documents including drawings, diagrams and all such information, which are necessary to fully understand the offer for techno-commercial evaluation. As a minimum requirement, document as per **Annexure-III of TC52545** shall be furnished to fully describe the scope of work and services offered. The Bidder shall also submit duly filled in Technical data sheets and guarantee schedule as per **Annexure II of TC62674** and **Annexure III of TC62674.**
B	**DOCUMENTS TO BE SUBMITTED AFTER AWARD OF CONTRACT**
	The Successful bidder shall submit necessary data, documents, reports (including lateral analysis report) and drawings for review, approval with requirements specified as per **Annexure-IV of TC52545.** Drawings that are reviewed by the NTPC/BHEL will be returned to bidder with a transmittal letter with any comments and / or questions marked on the drawings or noted in the letter. All comments and questions must be resolved before a resubmission of drawings / documents. If the design has not developed enough to resolve some of the comments or questions, bidder shall place a "hold" on those items or areas of design. NTPC / BHEL reserves the right to return drawings unprocessed to bidder if there exists any evidence that bidder has not acknowledged all comments and questions. All necessary GA drawings, sections, sub-assembly drawings, specifications of main and sub components and necessary set of operation & maintenance manual as asked by NTPC must be furnished by bidder in soft and hard copy forms. For all document's softcopy format shall be searchable pdf, however in addition all drawings, diagrams like P&IDS shall be supplied in ACAD or other editable format and all lists in Excel format. Further break up of technical documents will be discussed during finalization of the purchase contract. Unless agreed otherwise, ten (10) hard copies and five (05) sets of electronic copies of all documents are to be submitted in the English language. Electronic Copies shall be submitted in primary original data format (e.g. DOC, XLS, DWG) as well as in a printable non-proprietary document format (e.g. PDF). Especially P&IDs shall be submitted as DWG files and PDF files. Bidder to ensure submission of hard copies as per NTPC's requirement for all engineering drg/doc and for all subsequent revisions along with a soft copy through email to concerned project team. However all the engineering related information shall be furnished in soft form to BHEL.

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20.0	PRICE SCHEDULE				
Sl No	**Description**	**Material Code**	**Quantity**	**Unit Price**	**Total Price**
01	Motor driven, single stage, integrally geared, Single or dual vane Centrifugal type **OR** Positive displacement (Helical lobe) type with VFD drive, oxidation blowers Complete with integral gearbox, lube oil system, instrumentation and accessories	TC9762674073	4 set		
02	Impeller assembly/ Rotor	TC9762674022	1 Set		
03	1 set of Bearings (required1No. each for complete replacement of all bearings in one Blower)	TC9762674030	1 Set		
04	Commissioning spares- 1 set for each Blower	TC9762674049	4 Set		
05	Blower instrumentation spare -1set (Spare list as per Annexure V Philosophy)	TC9762674057	1 Set		
06	Pre-commissioning / Commissioning supervision		Per Diem		
07	Motor price (If motor rating is <=200KW)				
Total price for evaluation					

Remarks:

Vendor shall provide Per Diem rate for supervision of commissioning. This is inclusive of travel, boarding and lodging. 12 no of working days at site will be considered for evaluation purpose. Refer clause no. 8.0 for details

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21. ANNEXURES

ANNEXURE –I QUALIFICATION REQUIREMENT.

The Bidders are required to meet the Qualification Requirement (QR) for Oxidation Blowers as per criteria stipulated below and necessary documents evidence requirement as per Annexure-3K.

System offered by the bidder shall be only from such manufacturer(s) who has previously designed (either by itself or under collaboration/ licensing agreement), manufactured/ got manufactured the equipment of the type, application and minimum equipment rating as stipulated below such that the equipment should have been in successful operation in at least 1 plant for a period not less than 1 year reckoned as on date 20.02.2020

Sl. No.	Name of Equipment	Type of Equipment	Application	Equipment Rating
(c)	Oxidation Blowers	Centrifugal/ positive displacement type blower	Wet Limestone based FGD application in Coal fired power plant or any process application	Unit size of 250 MW & Below-Flow 5000 Nm^3/hr dry basis (min) with Head 6500 mmwc (min) for spray tower process

SIGNATURE OF BIDDER ----------

NAME ----------

DESIGNATION ----------

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ANNEXURE –II- TECHNICAL DATA SHEET

Sl. No	Description			Data
1.0	**GENERAL**			
	a. Client		:	BHEL-HPEP Hyderabad
	b. Project		:	NSPCL Bhilai (2X250 MW)
	c. Ultimate Customer		:	NTPC
	d. Location		:	Durg district, Bhilai Chhattisgarh, India
	e. Service		:	Continuous
	f. Installation		:	In-door
	g. No of Blowers for each unit		:	1 Working + 1 Standby
	h. Total number of Blowers		:	Unit-1 - 2 No's Unit-2 - 2 No's
2.0	**MANUFACTURER DETAILS**			
	a. Model		:	
	b. Type		:	Centrifugal / Positive displacement type
	c. Type of Driver		:	As per specification
	d. Area classification		:	Safe
	e. No of Stage		:	Applicable/ Not Applicable
3.0	**OPERATING CONDITION**			
	a. Gas composition % by weight / Mole percent	%	:	Atmospheric air
	b. Solids at suction	g/m^3	:	As per ambient condition
	c. Relative humidity at suction	%	:	As per ambient condition
	d. Molecular weight		:	As per ambient condition
	e. Specific weight at suction	Kg/m^3	:	As per ambient condition
	f. Capacity at suction	Nm^3/ Hr	:	As per clause 5.0
	g. Suction pressure	KPa	:	As per clause 5.0
	h. Discharge pressure	mmWc	:	As per clause 5.0
	i. Differential Pressure		:	Bidder to confirm
	j. Suction temperature	Deg C	:	Ambient
	k. Discharge temperature	Deg C	:	<70
4.0	**PERFORMANCE DATA**			
	a. Capacity	Nm^3/Hr	:	#
	b. Static efficiency	%	:	#
	c. BKW Normal / Maximum	KW	:	#
	d. BKW at minimum suction temperature	KW	:	#
	e. Motor rating	KW	:	#
	f. Motor Speed	rpm	:	#
	g. Discharge pressure static (inclusive of losses)	mmWc	:	#
	h. Differential pressure (inclusive of losses)	mmWc	:	#
	i. Speed Maximum/ Normal/Minimum		:	#
	j. Noise level		:	#
	k. Performance curve		:	#
5.0	**CONSTRUCTION DATA**			

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	a. Manufacturer	:	
	b. Model No.	:	#
	c. Suction	:	Single
	d. Suction Rating / Size	:	#
	e. Discharge Rating / Size	:	#
	f. Type of rotor	:	#
	g. Size of rotor Dia mm	:	#
	h. Journal bearing: Type / Size:	:	#
	i. Thrust bearing: Type / Size:	:	#
	j. Bearing cooling required	:	Yes / No - Bidder to confirm
	k. Cooling water required	:	Bidder to confirm the quantity
	l. Type of drive	:	As per specification
	m. Shaft seal	:	Packing / Rubber seal
	n. Size / Code	:	#
	o. Type of coupling	:	#
	p. Service factor	:	#
	q. GD^2 at drive shaft end	:	#
	r. Rotation viewed from coupling end	:	Clock wise / Counter clock wise
	s. Fluid Coupling	:	Yes / No - Bidder to confirm
	t. Fluid Coupling make	:	#
	u. Fluid Coupling control	:	#
	v. Suction filter	:	Required
	w. Degree of filtration	:	#
	x. Base plate common to Blower. Inboard bearing housing and fluid coupling & Motor	:	Yes / No - Bidder to confirm
	y. Total weight kg	:	#
	z. Maximum Erection weight kg	:	#
6.0	**MATERIALS**		
	a. Casing	:	#
	b. Rotor	:	#
	c. Shaft	:	#
	d. Packing Seal	:	#
	e. Suction filter elements/ housing	:	#
	f. Base frame	:	#

Note - Vendor to full up the columns marked with " # "

SIGNATURE OF BIDDER ----------

NAME ----------

DESIGNATION ----------

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ANNEXURE III- SCHEDULE OF GUARANTEES

Sl. No	Description			Data
1.	Rated capacity of Blower	Nm^3/hr	:	
2.	Total head at design capacity	mmWc	:	
3.	Guaranteed power consumption at rated capacity & head	kW	:	
4.	Noise level at a distance of 1.0 meter from the equipment at site and 1.5 m above operating floor	dB(A)	:	
5.	Maximum vibration (peak to peak amplitude at site)	microns	:	
6.	Equipment Availability (%)		:	

SIGNATURE OF BIDDER ----------

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ANNEXURE IV- VENDOR TO PROVIDE THE LIST OF COMMISSIONING SPARES

Sl. No.	Description	Quantity
1.		
2.		
3.		
4.		
5.		

Qty will be Number or Set as applicable

- Vendor to identify each and every item which they consider as commissioning spares. Each and every part that is considered to fall under guarantee clause shall be indicated in this list.
- Rubber items which are having a **Shelf-Life** will also be considered as wear item.

SIGNATURE OF BIDDER ----------

NAME ----------

DESIGNATION ----------

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ANNEXURE V- VENDOR TO PROVIDE MANDATORY INSTRUMENTATION SPARE LIST AS PER FOLLOWING SPARE INSTRUMENTATION PHILOSPHY:

Vendor shall submit the bill of material of each item on mandatory spare, indicating the quantity used in main as well as spares.

SIGNATURE OF BIDDER ----------

NAME ----------

DESIGNATION ----------

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ANNEXURE V

SL NO	OXIDATION BLOWER INSTRUMENT SPARE ITEM DESCRIPTION / SPARE PHILOSOPHY	QTY
a	Transmitters of all types and model no. (for measurement of pressure, differential pressure, flow, level, temp, etc.). This shall include magnetic/ electromagnetic flow meter, mass flow meter also.(10% or 1 no. of each type and model, whichever is more)	1 set
b	Temp Elements along with thermo well (except winding temp elements of motor)- 10% or 2 no. of each type, model & length, whichever is more.	
c	(i) Process Actuated Switches (Pressure, Differential pressure, flow, level, temp) (ii) Limit switches (for pneumatic and manual valves) - 10% or 2 no. of each type and model, whichever is more.	
d	Local Gauges for Pressure, Differential pressure, flow, level, temp - 5% or 1 no. of each type, model and range, whichever is more.	
e	Vibration Sensors - 10% or Minimum 2 Nos. of each type, make and model whichever is more. *if prefab cable or prefab extension cable is used same should be supplied in proportion.	
f	**PROCESS CONNECTION PIPING (For Impulse Piping / Tubing and Air Supply Piping as Applicable)** 1. Valves of all types and models - 10% or 1 no. of each type, class, size and model whichever is more. 2. 2 way, 3way, 5way valve manifolds - 10% or 1 no. of each type, class, size and model whichever is more. 3. Fittings - 10% or 1 packet of each type, class, size and model whichever is more. 4. Filter regulators - 20% of each model or 2 nos. whichever is more.	
g	**CONTROL VALVES, ACTUATORS & ACCESSORIES (Following items shall be provided under this clause for all modulating control valves being supplied under this package** 1. Pneumatic and electro-hydraulic actuator assembly - 10% or 1 no. of each type, model and rating, whichever is more. 2. Valve trim (including cage, plug, stem, seat rings, guide bushings etc.) - 1 set for each type of control valve. 3. Diaphragms, O' rings, seals etc. of all types make etc. -1 4. Pressure Gauges of all types, make, rating etc. - 10% or 2 nos. of each type whichever is more 5. Solenoid valves (if applicable) - 10% or 2 nos. of each type whichever is more 6. Positioner units (complete unit)& accessories (link assembly) - 10% or 1 no. of each type whichever is more 7. Pneumatic air-filter/Regulator of each type, make rating etc. - 10% or 2 Nos., whichever is more 8. Air lock relays - 10% or 2 nos. of each type whichever is more	

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BHEL-HYD SAP INFORMATION SYSTEM

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ANNEXURE VI- MOTOR SPECIFICATION

CLAUSE NO.	TECHNICAL REQUIREMENTS
	MOTORS
1.00.00	**GENERAL REQUIREMENTS**
1.01.00	For the purpose of design of equipment/systems, an ambient temperature of 50 deg. Centigrade and relative humidity of 95% (at 40 deg C) shall be considered. The equipment shall operate in a highly polluted environment.
1.02.00	All equipment's shall be suitable for rated frequency of 50 Hz with a variation of +3% & -5%, and 10% combined variation of voltage and frequency unless specifically brought out in the specification.
1.03.00	Contactor shall provide fully compatible electrical system, equipment's, accessories and services.
1.04.00	All the equipment, material and systems shall, in general, conform to the latest edition of relevant National and international Codes & Standards, especially the Indian Statutory Regulations.
1.05.00	Paint shade shall be as per RAL 5012 (Blue) for indoor and outdoor equipment.
1.06.00	The responsibility of coordination with electrical agencies and obtaining all necessary clearances for Contactors equipment and systems shall be under the Contactor scope.
1.07.00	Degree of Protection Degree of protection for various enclosures as per IEC60034-05 shall be as follows :- i) Indoor motors - IP 54 ii) Outdoor motors - IP 55 iii) Cable box-indoor area - IP 54 iv) Cable box-Outdoor area - IP 55 CW motors shall be provided with canopy.
2.00.00	**CODES AND STANDARDS** 1) Three phase induction motors : IS/IEC:60034 2) Single phase AC motors : IS/ IEC:60034 3) Crane duty motors : IS:3177, IS/IEC:60034 4) DC motors/generators : IS:4722, IS/IEC:60034 5) Energy Efficient motors : IS 12615, IEC:60034-30

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CLAUSE NO.	TECHNICAL REQUIREMENTS
3.00.00	**TYPE**
3.01.00	**AC Motors:** a) Squirrel cage induction motor suitable for direct-on-line starting. b) Continuous duty LT motors upto 200 KW Output rating (at 50 deg.C ambient temperature), shall be **Premium Efficiency class-IE3**, conforming to IS 12615, or IEC:60034-30. HT motors shall have minimum design efficiency of 95 %. Tolerance on efficiency value applicable as per IEC 60034 c) Crane duty motors shall be slip ring/ squirrel cage Induction motor as per the requirement. d) Motor operating through variable frequency drives shall be suitable for inverter duty with VPI insulation. Also these motors shall comply the requirements stipulated in IEC: 60034-18-41 and IEC: 60034-18-42 as applicable. e) Motors operating through variable frequency drives shall also meet the requirements mentioned in subsection for VFD.
3.02.00	DC Motors Shunt wound.
4.00.00	**RATING** (a) Continuously rated (S1). However, crane motors shall be rated for S4 duty, 40% cyclic duration factor. (b) Whenever the basis for motor or driven equipment ratings are not specified in the corresponding mechanical specification sub-sections, maximum continuous motor ratings shall be at least 10% above the maximum load demand of the driven equipment under entire operating range including voltage and frequency variations.
5.00.00	**TEMPERATURE RISE** **Air cooled motors** 70 deg. C by resistance method for both thermal class 130(B) & 155(F) insulation. **Water cooled** 80 deg. C over inlet cooling water temperature mentioned elsewhere, by resistance method for both thermal class 130(B) & 155(F) insulation.
6.00.00	**OPERATIONAL REQUIREMENTS**
6.01.00	**Starting Time**

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CLAUSE NO.	TECHNICAL REQUIREMENTS
6.01.01	For motors with starting time upto 20 secs. at minimum permissible voltage during starting, the locked rotor withstand time under hot condition at highest voltage limit shall be at least 2.5 secs. more than starting time.
6.01.02	For motors with starting time more than 20 secs. and upto 45 secs. at minimum permissible voltage during starting, the locked rotor withstand time under hot condition at highest voltage limit shall be at least 5 secs. more than starting time.
6.01.03	For motors with starting time more than 45 secs. at minimum permissible voltage during starting, the locked rotor withstand time under hot condition at highest voltage limit shall be more than starting time by at least 10% of the starting time.
6.01.04	Speed switches mounted on the motor shaft shall be provided in cases where above requirements are not met.
6.02.00	**Torque Requirements**
6.02.01	Accelerating torque at any speed with the lowest permissible starting voltage shall be at least 10% motor full load torque.
6.02.02	Pull out torque at rated voltage shall not be less than 205% of full load torque. It shall be 275% for crane duty motors.
6.03.00	**Starting voltage requirement** (a) Up to 85% of rated voltage for ratings below 110 KW (b) Up to 80% of rated voltage for ratings from 110 KW to 200 KW (c) Up to 85% of rated voltage for ratings from 201 KW to 1000 KW (d) Up to 80% of rated voltage for ratings from 1001 KW to 4000 KW (e) Up to 75 % of rated voltage for ratings above 4000KW
7.00.00	**DESIGN AND CONSTRUCTIONAL FEATURES**
7.01.00	Suitable single phase space heaters shall be provided on motors rated 30KW and above to maintain windings in dry condition when motor is standstill. Separate terminal box for space heaters & RTDs shall be provided. However for flame proof motors, space heater terminals inside the main terminal box may be acceptable.
7.02.00	All motors shall be either Totally enclosed fan cooled (TEFC) or totally enclosed tube ventilated (TETV) or Closed air circuit air cooled (CACA) type. However, motors rated 3000KW or above can be Closed air circuit water cooled (CACW). The method of movement of primary and secondary coolant shall be self-circulated by fan or pump directly mounted on the rotor of the main motor as per IEC 60034-6. However VFD driven motors can be offered with forced cooling type with machine mounted fan or pump driven by separate electric motor. Motors and EPB located in hazardous areas shall have flame proof enclosures conforming to IS:2148 as detailed below

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CLAUSE NO.	TECHNICAL REQUIREMENTS
	(a) Fuel oil area : Group – IIB (b) Hydrogen generation : Group - IIC or (Group-I, Div-II as per plant area NEC) or (Class-1, Group-B, Div-II as per NEMA /IEC60034)
7.03.00	Winding and Insulation (a) Type : Non-hygroscopic, oil resistant, flame resistant (b) Starting duty : Two hot starts in succession, with motor initially at normal running temperature. (c) 11kV & 3.3 kV AC motors : Thermal class 155 (F) insulation. The winding insulation process shall be total Vacuum Presure Impregnated i.e resin poor method. The lightning Impulse & interturn insulation surge withstand level shall be as per IEC-60034 part-15. (d) 240VAC, 415V AC & 220V DC motors : Thermal Class (B) or better
7.04.00	Motors rated above 1000KW shall have insulated bearings/housing to prevent flow of shaft currents.
7.05.00	Motors with heat exchangers shall have dial type thermometer with adjustable alarm contacts to indicate inlet and outlet primary air temperature.
7.06.00	Noise level for all the motors shall be limited to 85 dB(A) except for BFP motor for which the maximum limit shall be 90dB(A). Vibration shall be limited within the limits prescribed in IS:12075 / IEC 60034-14 . Motors shall withstand vibrations produced by driven equipment. HT motor bearing housings shall have flat surfaces, in both X and Y directions, suitable for mounting 80mmX80mm vibration pads.
7.07.00	In HT motors, at least four numbers simplex / two numbers duplex platinum resistance type temperature detectors shall be provided in each phase stator winding. Each bearing of HT motor shall be provided with dial type thermometer and minimum 2 numbers duplex platinum resistance type temperature detectors.
7.08.00	Motor body shall have two earthing points on opposite sides.
7.09.00	11 KV motors shall be offered with Separable Insulated Connector (SIC) as per IEEE 386. The offered SIC terminations shall be provided with protective cover and trifurcating sleeves. SIC termination kit shall be suitable for fault level of 25 KA for 0.17 seconds.
7.10.00	3.3/6.6 KV motors shall be offered with dust tight phase separated double walled (metallic as well as insulated barrier) Terminal box. Contractor shall provide termination kit for the offered Terminal box. The offered Terminal Box shall be

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CLAUSE NO.	TECHNICAL REQUIREMENTS
	suitable for fault level of 250 MVA for 0.12 sec. Removable gland plates of thickness 3 mm (hot/cold rolled sheet steel) or 4 mm (non magnetic material for single core cables) shall be provided.
7.11.00	The spacing between gland plate & centre of bottom terminal stud shall be as per Table-I.
7.12.00	All motors shall be so designed that maximum inrush currents and locked rotor and pullout torque developed by them at extreme voltage and frequency variations do not endanger the motor and driven equipment.
7.13.00	The motors shall be suitable for bus transfer schemes provided on the 11kV, 3.3 kV /415V systems without any injurious effect on its life.
7.14.00	For motors rated 2000 KW & above, neutral current transformers of PS class shall be provided on each phase in a separate neutral terminal box.
7.15.00	The size and number of cables (for HT motors) to be intimated to the successful Contactor during detailed engineering and the Contactor shall provide terminal box suitable for the same.
8.00.00	The ratio of locked rotor KVA at rated voltage to rated KW shall not exceed the following (without any further tolerance): (a) From 50KW & upto 110KW : 11.0 (b) From 110 KW & upto 200 KW : 9.0 (c) Above 200 KW & upto 1000KW : 10.0 (d) From 1001KW & upto 4000KW : 9.0 (e) Above 4000KW : 6 to 6.5
10.00.00	**TYPE TEST**
10.01.00	**HT MOTORS**
10.01.01	The Contactor shall carry out the type tests as listed in this specification on the equipment to be supplied under this contract. The Contactor shall indicate the charges for each of these type tests separately in the relevant schedule of Section - VII- (BPS) and the same shall be considered for the evaluation of the bids. The type tests charges shall be paid only for the test(s) actually conducted successfully under this contract and upon certification by the Employer's engineer.
10.01.02	The type tests shall be carried out in presence of the Employer's representative, for which minimum 15 days notice shall be given by the Contactor. The Contactor shall obtain the Employer's approval for the type test procedure before conducting the type test. The type test procedure shall clearly specify the test set–up, instruments to be used, procedure, acceptance norms, recording of different

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CLAUSE NO.	TECHNICAL REQUIREMENTS
	parameters, interval of recording, precautions to be taken etc. for the type test(s) to be carried out.
10.01.03	In case the Contactor has conducted such specified type test(s) within last ten years as on the date of bid opening, he may submit during detailed engineering the type test reports to the Employer for waival of conductance of such test(s). These reports should be for the tests conducted on the equipment similar to those proposed to be supplied under this contract and test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. The Employer reserves the right to waive conducting of any or all the specified type test(s) under this contract. In case type tests are waived, the type test charges shall not be payable to the Contactor.
10.01.04	Further the Contactor shall only submit the reports of the type tests as listed in "LIST OF TESTS FOR WHICH REPORTS HAVE TO BE SUBMITTED" and carried out within last ten years from the date of bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. However if the Contactor is not able to submit report of the type test(s) conducted within last ten years from the date of bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the Contactor shall conduct all such tests under this contract at no additional cost to the Employer either at third party lab or in presence of client/Employers representative and submit the reports for approval.
10.01.05	**LIST OF TYPE TESTS TO BE CONDUCTED** **The following type tests shall be conducted on each type and rating of HT motor** (a) No load saturation and loss curves upto approximately 115% of rated voltage (b) Measurement of noise at no load. (c) Momentary excess torque test (subject to test bed constraint). (d) Full load test(subject to test bed constraint) (e) Temperature rise test at rated conditions. During heat run test, bearing temp., winding temp.,coolant flow and its temp. shall also be measured. In case the temperature rise test is carried at load other than rated load, specific approval for the test method and procedure is required to be obtained. Wherever ETD's are provided, the temperature shall be measured by ETD's also for the record purpose.
10.01.06	**LIST OF TESTS FOR WHICH REPORTS HAVE TO BE SUBMITTED**

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CLAUSE NO.	TECHNICAL REQUIREMENTS
	The following type test reports shall be submitted for each type and rating of HT motor (a) Degree of protection test for the enclosure followed by IR, HV and no load run test. (b) Terminal box-fault level withstand test for each type of terminal box of HT motors only. (c) Lightning Impulse withstand test on the sample coil shall be as per clause no. 4.3 IEC-60034, part-15 (d) Surge-withstand test on inter-turn insulation shall be as per clause no. 4.2 of IEC 60034, part-15
10.02.00	**LT Motors**
10.02.01	LT Motors supplied shall be of type tested design. During detailed engineering, the Contactor shall submit for Employer's approval the reports of all the type tests as listed in this specification and carried out within last *ten* years from the date of bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.
10.02.02	However if the Contactor is not able to submit report of the type test(s) conducted within last ten years from the date of bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the Contactor shall conduct all such tests under this contract at no additional cost to the Employer either at third party lab or in presence of client/Employers representative and submit the reports for approval.
10.02.03	**LIST OF TESTS FOR WHICH REPORTS HAVE TO BE SUBMITTED** **The following type test reports shall be submitted for each type and rating of LT motor of above 100 KW only** 1. Measurement of resistance of windings of stator and wound rotor. 2. No load test at rated voltage to determine input current power and speed 3. Open circuit voltage ratio of wound rotor motors (in case of Slip ring motors) 4. Full load test to determine efficiency power factor and slip 5. Temperature rise test 6. Momentary excess torque test.

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CLAUSE NO.	TECHNICAL REQUIREMENTS
	7. High voltage test 8. Test for vibration severity of motor. 9. Test for noise levels of motor(Shall be limited as per clause no 7.06.00 of this section) 10. Test for degree of protection and 11. Overspeed test. 12. Type test reports for motors located in fuel oil area having flame proof enclosures as per IS 2148 / IEC 60079-1
10.03.00	All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price.
10.04.00	The type test reports once approved for any projects shall be treated as reference. For subsequent projects of NTPC, an endorsement sheet will be furnished by the manufacturer confirming similarity and "No design Change". Minor changes if any shall be highlighted on the endorsement sheet.

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CLAUSE NO.	TECHNICAL REQUIREMENTS

TABLE - I

DIMENSIONS OF TERMINAL BOXES FOR LV MOTORS

Motor MCR in KW	Minimum distance between centre of bottom terminal stud and gland plate in mm
UP to 3 KW	As per manufacturer's practice.
Above 3 KW - upto 7 KW	85
Above 7 KW - upto 13 KW	115
Above 13 KW - upto 24 KW	167
Above 24 KW - upto 37 KW	196
Above 37 KW - upto 55 KW	249
Above 55 KW - upto 90 KW	277
Above 90 KW - upto 125 KW	331
Above 125 KW-upto 200 KW	385/203 (For Single core cables only)

For HT motors the distance between gland plate and the terminal studs shall not be less than 500 mm.

PHASE TO PHASE/ PHASE TO EARTH AIR CLEARANCE:

NOTE: Minimum inter-phase and phase-earth air clearances for LT motors with lugs installed shall be as follows:

Motor MCR in KW	Clearance
UP to 110 KW	10mm
Above 110 KW and upto 150 KW	12.5mm
Above 150 KW	19mm

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ANNEXURE –3K

Provenness Criteria/Qualification Requirement (SUB-QR) for Oxidation Blower

Project Project: NTPC/ NSPCL BHILAI (2X250 MW)

NTPC Clause No.

4.00.00 **QUALIFYING REQUIREMENTS FOR EQUIPMENTS/SYSTEMS**

4.01.00 **Provenness criteria for critical equipment, auxiliaries, systems and bought out items:**

The Bidder/ Bidder's sub-vendor(s) is required to meet the proveness criteria and/ or qualification requirement for oxidation blower as per criteria stipulated below:

4.01.01 Oxidation Blowers for the Wet Limestone based Flue Gas Desulphurisation (FGD) System offered by the Bidder shall be only from such manufacturer(s) who has previously designed (either by itself or under collaboration / licensing agreement), manufactured the oxidation blower of the type, application and minimum equipment rating as stipulated below such that the respective equipment(s) should have been in successful operation in at least one (1) plant for a period not less than one(1) year reckoned as on 20.02.2020.

Sl. No.	Name of Equipment	Type of Equipment	Application	Equipment Rating
(c)	Oxidation Blowers	Centrifugal/ positive displacement type blower	Wet Limestone based FGD application in Coal fired power plant or any process application	Unit size of 250 MW & Below-Flow 5000 Nm^3/hr dry basis (min) with Head 6500 mmwc (min) for spray tower process or

4.01.03 A JV / Subsidiary Company formed for manufacturing and supply of equipment(s) as listed at clause no. 4.01.01 above in India, shall also be considered qualified for manufacturing 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 clause 4.01.01 above (or the technology provider of the qualified equipment manufacturer) for the oxidation blower. Before taking up the manufacturing of such equipment(s), the bidder/ his sub-vendor(s) must create /have created manufacturing facilities at his works as per collaborator's/licenser's design, manufacturing and quality control system for such 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

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Joint Venture/ Subsidiary or upto the end of defect liability period of the contract, whichever is later.

4.01.04 In case the Bidder or the proposed sub-vendor is not manufacturer of proven Oxidation Blowers as per clause 4.01.01(c) above but is a manufacturer of Blowers/compressors for minimum 50 NM3/min capacity, the Bidder or the proposed sub-vendor can also manufacture Oxidation Blowers, provided it has collaboration or valid licensing agreement for design, engineering, manufacturing, supply of such Oxidation Blowers in India with such manufacturer who meet the requirements stipulated at clause 4.01.01(c) above for the Oxidation Blowers. Before taking up the manufacturing of such equipment, the bidder/ his sub-vendor must create /have created manufacturing facilities at his works as per collaborator's /licenser's design, manufacturing and quality control system for such equipments.

4.01.08 Before taking up the manufacturing of oxidation blower as per clause 4.01.01, 4.01.03, 4.01.04 above, the Bidder must create (or should have created) manufacturing and testing facilities at its works as per Collaborator / licenser's design, manufacturing and quality control system for such equipments duly certified by the Collaborator / licensor. Further, the Collaborator / Licenser 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 equipments.

4.01.09 Bidder shall offer and supply only the type of the above equipment(s) for which he himself / Collaborator(s) / Licenser(s) proposed by the Bidder for the above equipment(s) is qualified.

4.01.10 The Employer (NTPC) reserves the right to fully satisfy himself regarding capability and capacity of the bidder and the proposed arrangement and may prescribe additional requirement before allowing manufacture of the equipment listed above for this contract.

Note to clause 4.01.01

(1) Whenever the term 'coal fired' is appearing above, "Coal" shall be deemed to also include bituminous coal/brown coal/lignite.

Bidder shall submit the Attachment 3K enclosed along with Supporting Documents. Also, Bidder has to submit Reference list of Plants where Oxidation Blowers have been supplied.

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Bidder means BHEL
Bidder's Sub vendor means Oxidation Blower Manufacturer
Employer/Owner means NTPC

ANNEXURE - 3K

FLUE GAS DESULPHURISATION (FGD) SYSTEM PACKAGE
FOR
NTPC/ NSPCL BHILAI (2X250 MW)
BIDDING DOC NO. CS-0011-109(2)-9

Bidder's Name and Address:

To
Contract Services-II
NTPC Limited
Noida-201301

Summary of Critical Equipment indicated under clause 4.01.00, sub-section-I, Part-A of Section-VI.

Equipment Name	Sub-Vendor Name	Collaborator's Name, if applicable	Seeking Qualification as per clause..... Sub-Section-I, Part-A of Section-VI
~~Booster Fans~~			~~*4.01.01 /*4.01.02 /*4.01.03~~
~~*Slurry Recirculation Pumps~~			~~*4.01.01 /*4.01.02 /*4.01.04 /*4.01.08~~
Oxidation Blowers			*4.01.01 /*4.01.03 /*4.01.04
~~Wet limestone Grinding mills~~			~~*4.01.01 /*4.01.02/4.01.04/*4.01.06/~~
~~Slurry Pumps~~			~~*4.01.01/*4.01.02/*4.01.04/*4.01.08~~
~~Agitators~~			~~*4.01.01 /*4.01.02/*4.01.04 /*4.01.07~~
~~Vacuum Belt filters~~			~~*4.01.01 /*4.01.02/*4.01.04~~

Note : *Strike-off whichever is not applicable.

1. If qualification sought as per clause 4.01.01, sub-section-I, Part-A of Section-VI then the details of the sub vendor (manufacturer) shall be filled by the bidder in the format C(format given at 1.00.00).

2. If the qualification sought as per the clause 4.01.01, sub-section-I, Part-A of Section-VI then the details of JV/Subsidiary Company formed for manufacturing of such equipments in India shall be furnished individually for each equipment by the bidder such as,

   i) Copy of document of incorporation of JV/Subsidiary company in India

   ii) Copy of valid ongoing collaboration and technology transfer agreement for design, engineering, manufacturing, supply of such equipment in India with the collaborator who meets the requirement stipulated at 4.01.01, sub-section-I, Part-A of Section-VI.

   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 company /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.

   Further, the details of collaborator or technology provider of the qualified equipment manufacturer who meets the requirement stipulated at 4.01.01, sub-section-I, Part-A of Section-VI shall be filled by the Bidder in the format C (format given at 1.00.00). In addition to that, the sub vendor along with the Indian JV company/subsidiary company, qualified equipment manufacturer and its holding company/subsidiary company as applicable shall furnish the DJU.

   *** strike out whichever is not applicable.**

1.00.00 (Applicable for Bidder/his sub vendors seeking qualification as per clause no. 4.01.01, Sub section-I, Part-A of Section-VI. Bidder shall furnish the required data only for those equipments / auxiliaries which are proposed to be sourced under this route.)

We, hereby furnish the data on proveness criteria of Oxidation Blower which have been designed (either by self-manufacturer or under valid ongoing collaboration and technology transfer agreement), *manufactured/ *got manufactured and supplied by us /Manufacturer (or manufactured/ got manufactured & supplied by our proposed sub-vendors) and these are in successful operation in at least one (1) plant for a period not less than one year reckoned as on date 20.02.2020. The details of type and minimum equipment rating of such equipment are given below :

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C. **Oxidation Blowers:** We declare that, we/our Sub-Vendor, have designed (either by itself or under collaboration / licensing agreement), *manufactured/ *got manufactured and supplied at least one (1) number of Oxidation Blower of minimum flow of 5000 Nm^3/hr dry basis & minimum head of 6500 mmwc for spray tower process working in FGD application in Coal fired power plant and which has been in successful operation for minimum one (1) year reckoned as on date 20.02.2020 as per the details furnished below:

Sl. No.	Description	Reference Work
1.	Name of the reference plant & location:	
2.	Client name and his address: Oxidation	
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.	Flow-	.....Nm³/h
11.	Head-	..... mmWC
12.	Whether the equipment(s) are in successful operation in at least 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
13.	Flue gas Desulphurization system details:	*Technical extract/ *paper letter/ *email/ *Drawing from user or *contract document or *scheme or *any document in public domain enclosed at annexure....to Attachment-3K
14.	Scope of Work:	*Letter of Award or *Contract or *P.O. enclosed at Annexure___to Attachment-3K
15.	Performance details:	*Certificate/*Letter/*E-mail from End user enclosed at Annexure___to Attachment-3K

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

Signature of authorized signatory...

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FORM OF DEED OF JOINT UNDERTAKING TO BE PROVIDED
FOR OXIDATION BLOWERS
AS PER CLAUSE 4.01.03 OF SUB-SECTION-I, PART A, SECTION VI
(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY THE BIDDER/CONTRACTOR, INDIAN JV/SUBSIDIARY COMPANY MEETING THE REQUIREMENTS SPECIFIED AT CLAUSE NO. 4.01.03 OF SUB-SECTION-I, PART A, SECTION VI AND THE QUALIFIED EQUIPMENT MANUFACTURER & ITS *HOLDING/*SUBSIDIARY COMPANY(IES), AS APPLICABLE, MEETING THE REQUIREMENTS AS PER CLAUSE 4.01.01(C) OF SUB-SECTION-I, PART A, SECTION VI FOR OXIDATION BLOWERS IN WHICH EXECUTANT OF THE DJUs ARE JOINTLY AND SEVERALLY LIABLE FOR THE SUCCESSFUL PERFORMANCE OF THE OXIDATION BLOWERS.

The DEED OF UNDERTAKING executed this ……day of ……Two thousand ……by M/s ……a Company incorporated under ……having its Registered Office at …… (hereinafter called the "Bidder/Contractor", which expression shall include its successors, administrators, executors and permitted assigns) AND

**M/s ……, a JV / SUBSIDIARY COMPANY as per the requirement of clause 4.01.04 of sub-section-I, Part-A, Section-VI, incorporated under …… having its Registered Office at …… (hereinafter called the " Indian JV/ SUBSIDIARY Manufacturing Company"), which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s ……having its Registered Office at …… (hereinafter called the "Qualified Equipment Manufacturer", which expression shall include its successors, administrators, executors and permitted assigns) AND

*M/s ……A Company registered under ……having its Registered Office at …… , hereinafter called holding/ subsidiary company of the qualified equipment manufacturer in favour of NTPC Limited, A Government of India Enterprise, incorporated under the Companies Act, 1956, having its Registered Office at NTPC Bhawan, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi-110003 INDIA (hereinafter called "NTPC" or "Employer" which expression shall include its successors, administrators, executors and assigns).

WHEREAS, the Employer invited Bids for design, engineering, manufacture, supply, transportation to site, construction, installation, testing, commissioning and conductance of guarantee tests for the **Flue Gas Desulphurisation (FGD) System Package** for **NSPCL BHILAI (2X250MW)** (hereinafter referred to as "Plant") vide its Bidding Document No. **CS-0011-109(2)-9**.

AND WHEREAS vide clause 4.01.03 of Sub-Section-I, Part A, Section VI of bidding documents, it has been specified that a Qualified Indian Manufacturing Company has a valid ongoing collaboration and technology transfer agreement for design, engineering, manufacturing of OXIDATION BLOWERS in India who meets the requirements stipulated at clause 4.01.01(C) of Sub-Section-I, Part-A, Section-VI of bidding documents. Before taking up the manufacturing of **OXIDATION BLOWERS**, the bidder/ his sub-vendor(s) must create /have created manufacturing facilities at his works as per collaborator's/ licenser's design, manufacturing and quality control system. In addition, the Bidder/Contractor along with the Qualified Indian JV/SUBSIDIARY Manufacturing Company, qualified equipment manufacturers and its holding/subsidiary company shall furnish DJU for each equipment in which executant of the DJU shall be jointly and severally liable for the successful performance of the equipment.

WHEREAS M/s …… (Bidder/Contractor) has submitted its proposal in response to the aforesaid Invitation for Bid by the Employer bearing No. …… dated …… for **Flue Gas Desulphurisation (FGD) System Package** for **NSPCL BHILAI (2X250MW)** (hereinafter referred to as "Plant") vide its Bidding Document No. **CS-0011-109(2)-9**.

AND WHEREAS M/s …… (Indian JV/SUBSIDIARY Company) meets the requirement of clause 4.01.03 of sub-section-I, Part-A, Section-VI and has a valid ongoing collaboration*/licensing* agreement for design, engineering, manufacturing of Oxidation Blower in India with M/s ……who meets the requirements stipulated at clause 4.01.01 (c) Sub-Section-I, Part A, Section-VI of bidding documents.

AND WHEREAS M/s …… (Qualified Equipment Manufacturer) meets the requirements of clause 4.01.03 of sub-section-I, Part-A, Section-VI for Oxidation Blower.

AND WHEREAS M/s…… directly*/indirectly through its holding/subsidiary company M/s ……* have atleast 26% equity participation in the Indian JV/SUBSIDIARY Company which shall be maintained for a lock in period of seven (7) years from the date of incorporation of the Indian JV/ SUBSIDIARY Company or upto the end of defect liability of the contract whichever is later.

AND WHEREAS the Bidder/Contractor along with the *Qualified Indian Manufacturing Company , Qualified Equipment Manufacturers along with its holding/subsidiary company are required to jointly execute and furnish prior to the placement of order for 0xidation blower, an irrevocable Deed of Joint Undertaking and be jointly and severally responsible and bound unto the Employer for successful performance of the oxidation blower for **NSPCL BHILAI (2X250MW) Project** fully meeting the stipulated technical requirements, guaranteed parameters and characteristics as per the Bidding Documents, in the event the bid is accepted by the Employer resulting into a Contract.

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NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. We the Qualified Equipment Manufacturer and the Indian JV/SUBSIDIARY Company and the Bidder/Contractor, do hereby declare and undertake that we shall be jointly and severally responsible to the Employer for the successful performance of the Oxidation blower.

2. In case of any breach of the Contract committed by the Indian JV/SUBSIDIARY, we the Bidder/Contractor and Qualified Equipment Manufacturer do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of the Oxidation blower and undertake to carry out all the obligations and responsibilities under this Deed of Joint Undertaking in order to discharge the Indian JV/SUBSIDIARY Company obligations stipulated under the Contract. Further, if the Employer sustains any loss or damage on account of any breach of the Contract for the oxidation blower, we the Bidder/Contractor and Qualified Equipment Manufacturer jointly and severally undertake to promptly indemnify and pay such loss/damages caused to the Employer on its written demand without any demur, reservation, Contest or protest in any manner whatsoever. This is without prejudice to any rights of the Employer against the Contractor/ his Sub-Vendor under the Contract and/or guarantees. It shall not be necessary or obligatory for the Employer to first proceed against the Indian JV/SUBSIDIARY Company / Bidder/Contractor before proceeding against the Qualified Equipment Manufacturer nor any extension of time or any relaxation given by the Employer to the Qualified Indian Manufacturing Company / **Bidder/Contractor shall prejudice any rights of the Employer under this Deed of Joint Undertaking to proceed against the Qualified Equipment Manufacturer.

3. The liability of the Contractor, his sub-vendor and Associate/Collaborator shall be limited to an amount equal to 100% of the value of the contract** between the contractor and the sub supplier for the equipment.

4. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objective set forth in paragraph 1 above shall be as follows:

   (a) We the Qualified Equipment Manufacturer shall ensure that complete design, manufacturing, quality assurance and installation of the oxidation blower is carried out in line with our manufacturing & quality drawings and procedures and shall be fully responsible for its compliance so as to ensure satisfactory, reliable, safe and trouble-free performance of oxidation blower.

   Further, we, the Qualified Equipment Manufacturer shall extend our quality surveillance/ supervision/ quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Qualified Indian Manufacturing Company's works and/ or at Employer's project site.

   Further, the Qualified Equipment Manufacturer shall depute their technical experts from time to time to the Indian JV/SUBSIDIARY Manufacturing Company's works/ Employer's project site as required by the Employer and agreed to by Indian JV/SUBSIDIARY Manufacturing Company to facilitate the successful performance of the oxidation blower as stipulated in the aforesaid Contract.

   Further, the Qualified Equipment Manufacturer shall ensure proper design, manufacture, installation, testing and successful performance of the oxidation blower under the said Contract in accordance with stipulations of Bidding Documents and if necessary, the Qualified Equipment Manufacturer shall advise the Indian JV/SUBSIDIARY Manufacturing Company suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.

   (b) In the event Indian JV/SUBSIDIARY Manufacturing Company /Contractor fail to demonstrate that the oxidation blower meets the guaranteed parameters and demonstration parameters as specified in the contract, the Qualified Equipment Manufacturer shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to the Employer.

   (c) Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the Oxidation blower and payment of financial liabilities and penalties and fulfillment of all other contractual obligations as provided under the contract shall be the joint and severally responsibility of the Contractor and Indian JV/SUBSIDIARY Manufacturing Company and Qualified Equipment Manufacturer.

5. We, the Bidder/Contractor and Qualified Equipment Manufacturer and the Indian JV/SUBSIDIARY Manufacturing Company do hereby undertake and confirm that this Undertaking shall be irrevocable and shall not be revoked till ninety (90) days after the end of the defect liability period of the equipment covered under the Contract and further stipulate that the Undertaking herein contained shall terminate after ninety (90) days of satisfactory completion of such defect liability period. In case of delay in completion of defect liability period, the validity of this Deed of Joint Undertaking shall be extended by such period of delay. We further agree that this Undertaking shall be without any prejudice to the various liabilities of the Contractor including Contract Performance Security as well as other obligations of the Contractor in terms of the Contract.

6. The Bidder/Contractor and Qualified Equipment Manufacturer will be fully responsible for the quality of all the equipment/main assemblies/components manufactured at their works or at their Vendors' works or constructed at site, and their repair or replacement, if necessary, for incorporation in the Plant and timely delivery thereof to meet the completion schedule under the Contract.

7. In case of Award, in addition to the Contract Performance Security for the Contract, the Qualified Equipment Manufacturer, Its holding/subsidiary company (as applicable) and Indian JV/SUBSIDIARY manufacturing company shall furnish 'as security' an on demand Performance Bank Guarantee in favour of the Employer as per provisions of the bidding documents. The value of such Bank Guarantee shall be equal to **INR 1.5 million and** it shall be

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guarantee towards the faithful performance /compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The bank guarantee shall be unconditional, irrevocable and valid till ninety (90) days beyond the end of defect liability period of the last equipment covered under the Contract. In case of delay in completion of the defect liability period, the validity of this Bank Guarantee shall be extended by the period of such delay. The guarantee amount shall be promptly paid to the Employer on demand without any demur, reservation, protest or contest.

8. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Contract Documents. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and the Courts of Delhi shall have exclusive jurisdiction.

9. We, the Bidder/Contractor and Qualified Equipment Manufacturer and the Indian JV/SUBSIDIARY Manufacturing Company shall form an integral part of the Contracts from the date of signing of this Deed of Joint Undertaking. We further agree that this Deed of Joint Undertaking shall continue to be enforceable till its validity.

10. That this Deed of Joint Undertaking shall be operative from the effective date of signing of this Deed of Joint Undertaking.

IN WITNESS WHEREOF, the Bidder/Contractor and Qualified Equipment Manufacturer and its holding/subsidiary company (as applicable) and the Indian JV/SUBSIDIARY Manufacturing Company through their authorised representatives, have executed these presents and affixed common seal of their respective companies, on the day, month and year first mentioned above.

1. WITNESS

For M/s .....
(Bidder/Contractor)

.....
(Signature Name)

(Signature of the Authorised Representative) .....

.....
(Official Address)

Name .....

Designation .....

Common Seal of the Company .....

1. WITNESS

For M/s .....
(Indian JV/SUSIDIARY Company)

.....
(Signature Name)
Representative) .....

(Signature of the Authorised

.....
(Official Address)

Name.....

Designation .....

Common Seal of the Company .....

1. WITNESS

For M/s .....
(Qualified Equipment Manufacturer)

.....
(Signature Name)

(Signature of the Authorised Representative) .....

.....
(Official Address)

Name.....

Designation .....

Common Seal of the Company .....

Signature of authorized signatory.....

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1. WITNESS

For M/s .....
(Holding/subsidiary company to Qualified Equipment Manufacturer)

.....

(Signature of the Authorised Representative) .....

(Signature Name)
.....
(Official Address)

Name.....

Designation .....

Common Seal of the Company

Note : Power of Attorney of the persons signing the said Deed of Joint Undertaking is to be furnished.

* Contractor/Sub-Vendor shall strike out, whichever is not applicable

** copy of priced purchase order for the equipment/system shall be furnished by the Bidder.

Signature of authorized signatory.....

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FORM OF DEED OF JOINT UNDERTAKING TO BE PROVIDED
FOR OXIDATION BLOWERS
AS PER CLAUSE 4.01.04 OF SUB-SECTION-I, PART A, SECTION VI

(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY THE BIDDER/CONTRACTOR, QUALIFIED INDIAN MANUFACTURING COMPANY MEETING THE REQUIREMENTS SPECIFIED AT CLAUSE NO. 4.01.04 OF SUB-SECTION-I, PART A, SECTION VI ALONGWITH QUALIFIED EQUIPMENT MANUFACTURER OF OXIDATION BLOWERS MEETING THE REQUIREMENTS AS PER CLAUSE 4.01.01 (c) OF SUB-SECTION-I, PART A, SECTION VI FOR SUCCESSFUL PERFORMANCE OF OXIDATION BLOWERS IN WHICH EXECUTANT OF THE DJU ARE JOINTLY AND SEVERALLY LIABLE FOR THE SUCCESSFUL PERFORMANCE OF THE OXIDATION BLOWERS

The DEED OF UNDERTAKING executed this .....day of .....Two thousand .....by M/s .....a Company incorporated under .....having its Registered Office at ..... (hereinafter called the "Bidder/Contractor", which expression shall include its successors, administrators, executors and permitted assigns) AND

**M/s ....., a Oxidation blowers manufacturer as per the requirement of clause 4.01.04 of sub-section-I, Part-A, Section-VI, incorporated under ..... having its Registered Office at ..... (hereinafter called the "Qualified Indian Manufacturing Company"), which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s .....a **OXIDATION BLOWERS** manufacturer meeting the requirements of clause 4.01.01 (c) of sub-section-I, Part-A, Section-VI incorporated under .....having its Registered Office at ..... (hereinafter called the "Qualified Equipment Manufacturer", which expression shall include its successors, administrators, executors and permitted assigns) AND

in favour of NTPC Limited, A Government of India Enterprise, incorporated under the Companies Act, 1956, having its Registered Office at NTPC Bhawan, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi-110003 INDIA (hereinafter called "NTPC" or "Employer" which expression shall include its successors, administrators, executors and assigns).

WHEREAS, the Employer invited Bids for design, engineering, manufacture, supply, transportation to site, construction, installation, testing, commissioning and conductance of guarantee tests for the **Flue Gas Desulphurisation (FGD) System Package** for **NSPCL BHILAI (2X250MW)** (hereinafter referred to as "Plant") vide its Bidding Document No. **CS-0011-109(2)-9**

AND WHEREAS vide clause 4.01.04 of Sub-Section-I, Part A, Section VI of bidding documents, it has been specified that a Qualified Indian Manufacturing Company can also manufacture equipment listed at clause no. 4.01.01 (c) of Sub-Section-I, Part A, Section VI for which it is qualified, provided that it has a valid ongoing collaboration and technology transfer agreement for design, engineering, manufacturing of **OXIDATION BLOWERS** in India with a qualified equipment manufacturer who meets the requirements stipulated at clause 4.01.01(c) of Sub-Section-I, Part-A, Section-VI of bidding documents. Before taking up the manufacturing of **OXIDATION BLOWERS** , the bidder/ his sub-vendor(s) must create /have created manufacturing facilities at his works as per collaborator's/ licenser's design, manufacturing and quality control system for Oxidation Blower. In addition, the Bidder/Contractor along with the Qualified Indian Manufacturing Company, qualified equipment manufacturers shall furnish DJU for each equipment in which executant of the DJU shall be jointly and severally liable for the successful performance of the equipment.

WHEREAS M/s ..... (Bidder/Contractor) has submitted its proposal in response to the aforesaid Invitation for Bid by the Employer bearing No. ..... dated ..... for **Flue Gas Desulphurisation (FGD) System Package** for **NSPCL BHILAI (2X250MW)** (hereinafter referred to as "Plant") vide its Bidding Document No. **CS-0011-109(2)-9**

AND WHEREAS M/s ..... (Qualified Indian Manufacturing Company) meets the requirement of clause 4.01.04 of sub-section-I, Part-A, Section-VI and has a valid ongoing collaboration and technology transfer agreement for design, engineering, manufacturing, supply of Oxidation Blower in India with M/s .....who meets the requirements stipulated at clause 4.01.01(c) of Sub-Section-I, Part A, Section-VI of bidding documents.

AND WHEREAS M/s ..... (Qualified Equipment Manufacturer) meets the requirements of clause 4.01.04 of sub-section-I, Part-A, Section-VI for Oxidation Blower.

AND WHEREAS the Bidder/Contractor along with the *Qualified Indian Manufacturing Company , Qualified Equipment Manufacturers, are required to jointly execute and furnish prior to the placement of order for Oxidation Blower, an irrevocable Deed of Joint Undertaking and be jointly and severally responsible and bound unto the Employer for successful performance of the Oxidation Blower for **NSPCL BHILAI (2X250MW) Project** fully meeting the stipulated technical requirements, guaranteed parameters and characteristics as per the Bidding Documents, in the event the bid is accepted by the Employer resulting into a Contract.

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. We the Qualified Equipment Manufacturer and the Qualified Indian Manufacturing Company and the Bidder/Contractor, do hereby declare and undertake that we shall be jointly and severally responsible to the Employer for the successful performance of the Oxidation Blower.

2. In case of any breach of the Contract committed by the Qualified Indian Manufacturing Company, we the Bidder/Contractor and Qualified Equipment Manufacturer do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of the Oxidation Blower and undertake to carry out all the obligations and responsibilities under this Deed of Joint Undertaking in order to discharge the Qualified Indian Manufacturing Company obligations stipulated under the Contract. Further, if the Employer sustains any

Signature of authorized signatory.....

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loss or damage on account of any breach of the Contract for the Oxidation Blower, we the Bidder/Contractor and Qualified Equipment Manufacturer jointly and severally undertake to promptly indemnify and pay such loss/damages caused to the Employer on its written demand without any demur, reservation, Contest or protest in any manner whatsoever. This is without prejudice to any rights of the Employer against the Contractor/ his Sub-Vendor under the Contract and/or guarantees. It shall not be necessary or obligatory for the Employer to first proceed against the Indian Qualified Indian Manufacturing Company / Bidder/Contractor before proceeding against the Qualified Equipment Manufacturer nor any extension of time or any relaxation given by the Employer to the Qualified Indian Manufacturing Company / **Bidder/Contractor shall prejudice any rights of the Employer under this Deed of Joint Undertaking to proceed against the Qualified Equipment Manufacturer.

3. The liability of the Contractor, his sub-vendor and Associate/Collaborator shall be limited to an amount equal to 100% of the value of the contract** between the contractor and the sub supplier for the equipment.

4. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objective set forth in paragraph 1 above shall be as follows:

(a) We the Qualified Equipment Manufacturer shall ensure that complete design, manufacturing, quality assurance and installation of the Oxidation Blower is carried out in line with our manufacturing & quality drawings and procedures and shall be fully responsible for its compliance so as to ensure satisfactory, reliable, safe and trouble free performance of Oxidation Blower.

Further, we, the Qualified Equipment Manufacturer shall extend our quality surveillance/ supervision/ quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Qualified Indian Manufacturing Company's works and/ or at Employer's project site.

Further, the Qualified Equipment Manufacturer shall depute their technical experts from time to time to the Qualified Indian Manufacturing Company's works/ Employer's project site as required by the Employer and agreed to by Qualified Indian Manufacturing Company to facilitate the successful performance of the Oxidation Blower as stipulated in the aforesaid Contract.

Further, the Qualified Equipment Manufacturer shall ensure proper design, manufacture, installation, testing and successful performance of the Oxidation Blower under the said Contract in accordance with stipulations of Bidding Documents and if necessary, the Qualified Equipment Manufacturer shall advise the Qualified Indian Manufacturing

Company suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.

(b) In the event Qualified Indian Manufacturing Company /Contractor fail to demonstrate that the Oxidation Blower meets the guaranteed parameters and demonstration parameters as specified in the contract, the Qualified Equipment Manufacturer shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to the Employer.

(c) Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the Oxidation Blower and payment of financial liabilities and penalties and fulfillment of all other contractual obligations as provided under the contract shall be the joint and severally responsibility of the Contractor and Qualified Indian Manufacturing Company and Qualified Equipment Manufacturer.

5. We, the Bidder/Contractor and Qualified Equipment Manufacturer and the Qualified Indian Manufacturing Company do hereby undertake and confirm that this Undertaking shall be irrevocable and shall not be revoked till ninety (90) days after the end of the defect liability period of the equipment covered under the Contract and further stipulate that the Undertaking herein contained shall terminate after ninety (90) days of satisfactory completion of such defect liability period. In case of delay in completion of defect liability period, the validity of this Deed of Joint Undertaking shall be extended by such period of delay. We further agree that this Undertaking shall be without any prejudice to the various liabilities of the Contractor including Contract Performance Security as well as other obligations of the Contractor in terms of the Contract.

6. The Bidder/Contractor and Qualified Equipment Manufacturer will be fully responsible for the quality of all the equipment/main assemblies/components manufactured at their works or at their Vendors' works or constructed at site, and their repair or replacement, if necessary, for incorporation in the Plant and timely delivery thereof to meet the completion schedule under the Contract.

7. In case of Award, in addition to the Contract Performance Security for the Contract, the Qualified Equipment Manufacturer and Qualified Indian manufacturing company shall furnish 'as security' an on demand Performance Bank Guarantee in favour of the Employer as per provisions of the bidding documents. The value of such Bank Guarantee shall be equal to **INR 1.5 Million for each (Indian Rupees One and half Million)** and it shall be guarantee towards the faithful performance /compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The bank guarantee shall be unconditional, irrevocable and valid till ninety (90) days beyond the end of defect liability period of the last equipment covered under the Contract. In case of delay in completion of the defect liability period, the validity of this Bank Guarantee shall be extended by the period of such delay. The guarantee amount shall be promptly paid to the Employer on demand without any demur, reservation, protest or contest.

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8. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Contract Documents. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and the Courts of Delhi shall have exclusive jurisdiction.

9. We, the Bidder/Contractor and Qualified Equipment Manufacturer and the Qualified Indian Manufacturing Company shall form an integral part of the Contracts from the date of signing of this Deed of Joint Undertaking. We further agree that this Deed of Joint Undertaking shall continue to be enforceable till its validity.

10. That this Deed of Joint Undertaking shall be operative from the effective date of signing of this Deed of Joint Undertaking.

IN WITNESS WHEREOF, the Bidder/Contractor and Qualified Equipment Manufacturer and the Qualified Indian Manufacturing Company through their authorised representatives, have executed these presents and affixed common seal of their respective companies, on the day, month and year first mentioned above.

1. WITNESS

.....
(Signature Name)

.....
(Official Address)

For M/s .....
(Bidder/Contractor)

(Signature of the Authorised
Representative) .....

Name .....

Designation .....

Common Seal of the
Company .....

1. WITNESS

.....

(Signature Name)
Representative) .....

.....
(Official Address)

Designation .....

For M/s .....
(Qualified Indian Manufacturing Company)

(Signature of the Authorised

Name.....

Common Seal of the
Company .....

Signature of authorized signatory.....

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1. WITNESS

For M/s .....
(Qualified Equipment Manufacturer)

.....
(Signature Name)

(Signature of the Authorised Representative) .....

.....
(Official Address)

Name.....

Designation .....

Common Seal of the Company .....

Note : Power of Attorney of the persons signing the said Deed of Joint Undertaking is to be furnished.

* Contractor/Sub-Vendor shall strike out, whichever is not applicable

** copy of priced purchase order for the equipment/system shall be furnished by the Bidder.

Signature of authorized signatory.....

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Rev. No.	Date	Revision details	Revised	Approved
00	22-04-2020	New standard prepared	DILEEP	YVRL
01	26-05-2020	Motor specification added as annexure VI & loading criteria changed at clause 13.0	DILEEP	YVRL

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