

7. In case of Award, in addition to the Contract Performance Security for the Contract, the Qualified Equipment Manufacturer 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 10 Million (Indian Rupees Ten 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.
 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	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 ... (Qualified Indian Manufacturing 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 ...

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.



**TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM
NTPC DADRI 2X490MW TPS**

DADRI:FGD:GDS:R00

24.2

ANNEXURE – II- TECHNICAL DATA SHEET (to be submitted along with bid)

GYPSUM DEWATERING SYSTEM	BIDDER'S DATA
i) No. of Streams ii) No. of Streams Stand-by	
iii) Primary Hydro-cyclone a) Make / Model b) Number working c) Flow Capacity (m3/hr) d) Inlet Solid Concentration (% w/w) e) No. of Hydro-cyclone in each set f) No. of spare hydro-cyclone in each set	
iv) Vacuum Belt Filters (VBF) a) Manufacturer b) Model c) Dimensions (W x L x H) (m x m x m) d) Cloth Width (m) e) Cloth Length (m) f) No. Working / Stand-by g) Capacity (Guaranteed) Gypsum (Dry) (kg/hr) Gypsum (Slurry) (m3/hr) h) Inlet Flow Volume (m3/hr) Solid Concentration (% w/w) i) Gypsum Flow (Dry) kg/hr	



**TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM
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j) Moisture Removed (%) k) No. of stages of cake washing / water flow (m3/hr) l) No. of stages of cloth washing / water flow (m3/hr) m) Design Pressure of Vacuum Chamber (kgf/cm2/a) n) Operating Pressure of Vacuum Chamber (kgf/cm2/a) o) Material / Thickness (mm) Casing Cloth Gypsum Discharge Hopper Vacuum Box p) Life of Cloth (hrs.) q) Type /Material of Carrying Belt r) Type / Material of Sealing Belt s) Life of Carrying Belt (hrs.) t) Life of Sealing Belt (hrs.) u) Automatic Cloth Tensioning Mechanism Provided YES/NO	
v) Vacuum Receiver Tank a) No. of Tank for each VBF b) Capacity (m3) c) Dimensions (Dia x Height) (mm x mm) d) Material / Thickness (mm) e) Lining Material / Thickness (mm)	
vi) Vacuum Pumps a) Make / Model	



TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM
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b) Type c) No. of Pumps for each Vacuum Belt Filter d) Rated Capacity Flow/ Head/ Power (m3/hr/mWCI/KW) e) Power Consumption (KW) f) Pump Speed (rpm) g) Motor Rating (KW) h) Motor Speed (rpm) i) Margins (Flow / Head) (% / %) j) Operating Pressure (kgf/cm2/a) k) Design Pressure (kgf/cm2/a) l) Material / Thickness (mm) of - Base/Lining - Casing - Shaft - Impeller m) Type of Seal n) Sealing Water Flow (m3/hrs) o) Bearing - No. of Bearings - Type of Bearings p) Type of coupling q) Whether Silencer Provided at Outlet YES/NO	
vii) Slurry Pipes i. Pipe size (mm) ii. Type of Joints a) Pipe to Pipe/Pipe to Fittings b) Fittings iii. Material / Thickness (mm) of Pipe	



**TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM
NTPC DADRI 2X490MW TPS**

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iv. Material Thickness of lining v. Estimated Life of liners (hrs.) vi. Slurry Solid concentration (w/w %) vii. Slurry Settling Velocity (m/s) viii. Pipe Velocity (m/s)	
viii) Cake wash pump a) No. for each VBF b) No. of stand-by pumps for each VBF c) Make / Model d) Impeller Type e) Material / Thickness (mm) of Impeller and lining f) Casing Type g) Material/Thickness of Casing/Lining h) Rated Flow/Head (m³/hr./mWCI)	
ix) Belt filter cloth wash pump a) No. for each VBF b) No. of stand-by pumps for each VBF c) Make / Model d) Impeller Type e) Material / Thickness (mm) of Impeller and lining f) Casing Type g) Material/Thickness of Casing/Lining h) Rated Flow/Head (m³/hr./mWCI)	
x) Secondary Waste Water Hydro-cyclone a) Make / Model	



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- | | |
|---|--|
| b) Number (working + standby) | |
| c) Flow Capacity (m ³ /hr.) | |
| d) Inlet Solid Concentration (% w/w) | |
| e) No. of Hydro-cyclone in each set | |
| f) No. of spare hydro-cyclone in each set | |

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----



TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM NTPC DADRI 2X490MW TPS

DADRI:FGD:GDS:R00

1.12.2 Data Sheet

BELT FILTER DATA SHEET (1/2)										Dwg. No.	1 2 3 4								
										Rev.									
										Date									
										Designed									
										Checked									
										Approved									
										Date									
										Designed									
										No. Req'd									
										Working									
										Total									
										Location									
										Indoor									
										Out door									
Regulation										Codes/Standards									
Process Data										Refer to process flow 2/5									
Design Data																			
Vacuum Belt Filter										Vacuum Pump									
Type										Type									
Width										Capacity									
Length										Vacuum									
Filter Area										Dia x T.L (H)									
Vacuum										No.									
Cake Thickness Max.										Feed Valve									
(on Operation) Min.										Yes No									
Nor.																			
Filtrate Rate																			
Filtrate Area																			
Cake Wash Area																			
Filtrate Time																			
Filtrate Area																			
Cake Wash Area																			
Materials																			
Vacuum Belt Filter										Vacuum Pump									
Structure										Body									
Drive Belt										Lining									
Cloth										Apex Valve									
Drive Pulley										Vortex Valve									
Motor																			
Vacuum Belt Filter										Vacuum Pump									
Type										Support Fan									
Rated Output										kW									
Pole										kW									
Volt										V									
Phase										V									
Cycle										Hz									
Scope of Supply										Accessories									
Belt Filter										Anchor Bolt									
Vacuum Pump										Cake Thickness Sensor									
Vacuum Receiver										Vacuum Header Pipe									
Hydrocyclone Package										Chute									
										Hopper									
										Piping									
										Valves									
										Control Panel									
										Vinyl Hose									
										Rubber Hose									
Weight (kg)																			
Vacuum Belt Filter										B/F Drive Unit									
Vacuum Pump										Vacuum Receiver									
Hydrocyclone																			
Guarantee																			
Allowable Sound Level										dB(A) at									
Moisture content in by-product gypsum										m distance									
Chloride content in by-product gypsum										Suspended solids in filtrate									
Information																			
Blanks shall be filled out by the Vendor.																			
Minimum interval (operation stop to start up) : hr																			



TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM
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DADRI:FGD:GDS:R00

Dwg. No										2	2		
Rev.										1	2	3	4
BELT FILTER DATA SHEET (2/2)										Date			
Designed													
Checked													
Approved													
Date												Checked	
Designed												Approved	
No. Req'd											Working		Spare
Total													
Location.											☐ Indoor	☐ Outdoor	
Regulation													
Codes/Standards													
This stream data is for 1 vacuum belt filter													
Condition : Min. Feed Flow Rate													
Stream No.										1	2	3	4
Fluid										Hydrocyclone Feed Slurry	Hydrocyclone Overflow	Belt Filter Feed Slurry	By-product Gypsum
Total Flow (m ³ /h)													
Total Flow (kg/h)													
Temp (°C)													
Solids (wt%)													
Solids Comp. (wt%)													
CaSO ₄ ·2H ₂ O													
CaCO ₃													
Fly Ash													
Other													
Total													
pH													
Cl ⁻ (mg/l)													
Stream No.										9	10	11	12
Fluid										Vacuum Pump Seal Water	Cake Wash Water	Filter Wash Water	Water + Solids
Total Flow (m ³ /h)													
Total Flow (kg/h)													
Temp (°C)													
Solids (wt%)													
Solids Comp. (wt%)													
CaSO ₄ ·2H ₂ O													
CaCO ₃													
Fly Ash													
Other													
Total													
pH													
Cl ⁻ (mg/l)													
Stream No.										6	7	13	
Fluid										Air with mist	Air	Instrument Air	
Total Flow (m ³ /h-d)													
Total Flow (m ³ /h-w)													
Temp (°C)													
Press (Pa)													
Stream No.										14	15		
Fluid											Secondary HC underflow		
Total Flow (m ³ /h)													
Total Flow (kg/h)													
Temp (°C)													
Solids (wt%)													
Solids Comp. (wt%)													
CaSO ₄ ·2H ₂ O													
CaCO ₃													
Fly Ash													
Other													
Total													
pH													
Cl ⁻ (mg/l)													

SIGNATURE OF BIDDER

NAME

DESIGNATION



**TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM
NTPC DADRI 2X490MW TPS**

DADRI:FGD:GDS:R00

24.3 ANNEXURE III- SCHEDULE OF GUARANTEES

Sl. No.	Description	Data
1.	Rated capacity of Vacuum Belt Filter (VBF) TPH	: Bidder to Provide
2.	Guaranteed power consumption at rated capacity kW	: Bidder to Provide
3.	Guaranteed	
	a) gypsum cake moisture content %	: Bidder to Provide
	b) gypsum cake chloride content ppm	: Bidder to Provide
4.	Guaranteed life of filter cloth hrs	: Bidder to Provide
5.	Guaranteed life of liners in hydrocyclone hrs	: Bidder to Provide
6.	Noise level at a distance of 1.0 meter horizontally from the equipment and 1.5m above operating floor dB(A)	: Bidder to Provide
7.	Maximum vibration (peak to peak amplitude at site) microns	: Bidder to Provide
8.	Equipment Availability (%)	
	Equipment Availability for 120 days %	: Bidder to Provide
	Equipment Availability for 1 year %	: Bidder to Provide

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

SIGNATURE OF BIDDER _____

NAME _____

DESIGNATION _____



TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM
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24.4

ANNEXURE – IV- LIST OF DEVIATIONS/EXCEPTIONS TO THE ENQUIRY DOCUMENT

Sl No	Clause No	Page No	Description of Deviation

Note: Enlarge the table to incorporate items

SIGNATURE OF BIDDER

NAME

DESIGNATION



TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM
NTPC DADRI 2X490MW TPS

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24.5 ANNEXURE -V

A) DOCUMENTS TO BE SUBMITTED ALONG WITH THE OFFER:

Sl. No.	Description	No of copies With proposal
1.	Enquiry Specification (signed)	1
2.	Price Sheet	1
3.	Anchor Plan & Civil foundation Loading details	1
4.	Data Sheet	1
5.	Performance curve	1
6.	P & I Diagram	
7.	Terminal point details.	
8.	Annexure to qualification requirement- Attachment 3K.	1
9.	Proforma Packing List	1
10.	Shortest Manufacturing Time	1
11.	Approximate weight of each skid	1
12.	Required Electric power & other Utility List	1
13.	Deviation List	1
14.	General Assembly Drawing indicating dimension and civil loading details	1
15.	Gypsum dewatering building GA	1
16.	VBF Sizing Calculation	1
17.	Cross-sectional Drawing	1
18.	Scope of Supply	1
19.	Spare List (Recommended)	1
20.	Start-up & Commissioning Spares	1
21.	List of Special Tools	1
22.	Test Arrangement & Test procedure	1
23.	Rotor GD2 (kg-m2)	
24.	T-S curve	1
25.	Hoist/Crane requirement	1
26.	Catalogue	1
27.	Calculation of Motor rating, Bearing capacity and selection of coupling	1



TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM
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28.	Bill of material along with material and code	1
29.	Overall space and headroom requirement with details of handling during Erection, operation & maintenance of the equipment.	1
30.	Erection, Operation & Maintenance manual with lubrication schedule	1
31.	Procedure for shop / site performance tests	1
32.	Time schedule for delivery.	1
33.	Quality Assurance Plan.	1
34.	Make of all bought out items.	1
35.	Deviation list	1
36.	Spares list.	1
37.	Hoist / Crane requirement.	1
38.	Reference list of similar projects executed.	1
39.	List of proposed makes and vendors	1
40.	Training program and schedule for BHEL/NTPC personnel	1
41.	Equipment maintenance schedules	1

B) DOCUMENTS TO BE SUBMITTED AFTER CONTRACT:

Sl. No.	Description	No of copies After award of contract	Delivery Time
1.	Utility Consumption	1	2 weeks after contract
2.	Foundation Data including Anchor plan	1	2 weeks after contract
3.	Performance curve	2	2 weeks after contract
4.	Assembly drawings of each equipment	1	1 month after contract
5.	Cross section detail drawing	1	1 month after contract
6.	Data Sheet	1	2 weeks after contract
7.	Annexure to qualification requirement- Attachment 3K.	1	2 weeks after contract
8.	Lubricating oil list	1	2 months after contract
9.	Special tools list	1	2 months after contract



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Sl. No.	Description	No of copies After award of contract	Delivery Time
10.	Installation and assembly procedure	1	4 months after contract
11.	Inspection and Test Procedure	1	1 month after contract
12.	Inspection & Test record	1	In 2 weeks after test
13.	Inspection Certificate	1	In 2 weeks after test
14.	Sub vendors List	1	2 weeks after contract
15.	Manufacturing Schedule	1	2 weeks after contract
16.	Progress report	1	Every month
17.	Proforma Packing List	1	2 months prior to shipping
18.	Approximate weight of each skid	1	2 months after contract
19.	Required Electric power	2	2 weeks after contract
20.	VBF Sizing Calculation	1	2 weeks after contract
21.	Material Test Certificates	2	In 2 weeks after test
22.	Pre Commissioning Check List	2	4 months after contract
23.	Scope of Supply	2	2 weeks after contract
24.	Quality Plan	4	1 month after contract
25.	Operation and Maintenance Manual	10 hardcopies and 5 electronic copies in English	4 months after contract
26.	Spare List (Mandatory, Recommended)	1	1 month after contract
27.	Start-up & Commissioning Spares	2	1 month after contract
28.	List of Special Tools	1	1 month after contract
29.	Delivery Schedule	1	2 weeks after contract
30.	Test Arrangement & Test procedure	2	1 month after contract
31.	T-S curve	2	2 weeks after contract
32.	P & I Diagram	2	2 weeks after contract
33.	Catalogue	2	2 weeks after contract
34.	Gypsum Dewatering Building GA	1	1 month after contract
35.	Motor Data	1	1 month after contract
36.	Recommended repair procedure etc.	1	1 month after contract
37.	Any unique installation instructions shall be noted on the	1	1 month after contract



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Sl. No.	Description	No of copies After award of contract	Delivery Time
	submitted drawings or be provided as a separate document prior to the submission of the Operation and Maintenance Manual		
38.	Erection schedule and component list.	1	1 month after contract

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----



**TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM
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24.6 ANNEXURE-VI TECHNICAL SPECIFICATION FOR SEAWORTHY PACKING

Refer to Specification No: PE-TS-888-100-A001 for detailed specification on Seaworthy packing.

SIGNATURE OF BIDDER _____

NAME _____

DESIGNATION _____



**TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM
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DADRI:FGD:GDS:R00

24.7 ANNEXURE-VII INSPECTION & TESTING

Refer to all clauses for Inspection & testing requirements.

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----



**TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM
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24.8 ANNEXURE-VIII HEALTH & SAFETY MANAGEMENT MANUAL

Refer to all clauses for Health & Safety requirements.

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----



TECHNICAL SPECIFICATION OF GYPSUM DEWATERING SYSTEM
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ANNEXURE – I(a) - 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 50 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.
7. High voltage test.
8. Test for vibration severity of motor.
9. Test for noise levels of motor:
 - Noise level for all the motors shall be limited to 85dB (A) except for BFP motor for which the maximum limit shall be 90 dB(A). Vibration shall be limited within the limits prescribed in IS/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.
10. Test for degree of protection
11. Over speed test.
12. Type test reports for motors located in fuel oil area having flame proof enclosures as per IS 2148 / IEC 60079-1
 - 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.
 - 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.

