18.00 TECHNICAL PARTICULARS TO BE FILLED BY TENDERER

01.00	**TECHNICAL PARTICULARS**	
01.01	**General**	
01.01.01	Ash handling capacity of the system operating continuously (t/h) i) Fly ash pneumatic (Dense Phase) conveying	
01.01.02	Velocity in pipes, m/sec - For pneumatic conveying of fly ash - For fluidizing air - For compressed air - For instrument air	
01.01.03	Provided with complete pneumatic conveying piping with different types of valves, accessories, pneumatic panel, oil filter & lubricator, fittings, supports, clamps etc. as indicated in the specification and as necessary.	Yes/No
01.01.04	Provided with complete fluidizing piping, valves, accessories, fittings, supports, clamps, etc. as indicated in the specification and as necessary.	Yes/No
01.01.05	Provided with complete air piping with valves, fittings, supporting members, clamps, filter station, pressure reducing station etc. as indicated/shown in tender specification/drawings and as necessary	Yes/No
01.01.06	Provided with all drainage and miscellaneous piping, fittings, supporting members, clamps, accessories as shown/ indicated in the tender specification/ drawings and as necessary	Yes/No
01.01.07	Provided the initial charge of lubricant for all equipment as necessary	Yes/No
01.01.08	Complete calculations of water	Yes/No

	requirement, service water requirement, air requirement selection of rated capacity, for pneumatic conveying, fluidizing of silo, service& instruments. Also, drive motor rating of all rotating equipment have been furnished	
01.01.09	a. Fly ash storage capacity(between high and low levels) in main silo, t	
	b. Fly ash storage capacity(between high and low levels) in Intermediate silo, t	
01.01.10	Inclusion of all necessary distribution piping including valves, fittings, strainers sight flow indicator, pressure indicators, pressure switches, hangers, supports, fittings, auxiliary steel structures etc. as per requirement of the TS and as necessary	Yes/No
01.01.11	Inclusion of all bed plates, anchor, foundation bolts, inserts, supporting structures etc., as per requirement of the TS and as necessary	Yes/No
15.01.12	Inclusion of all specified Civil & Structural works, construction of silos as per requirement of the TS and as necessary	Yes/No
01.01.13	Inclusion of all electrics and Control & Instrumentation as per requirement of the TS and as necessary.	Yes/No
01.02	**FLY ASH SYSTEM**	
01.02.01	**Hopper Isolation Valves**	
	- Make	
	- Number provided	
	- Type of valve & size	
	- Actuator	
	- Material of construction of components:	
	a. Body	
	b. Side plate	
	c. Gaskets	

	- Weight (Kg)	
	- Drawing of isolation valve enclosed	
01.02.02	**Feeder (For silo) (If provided)**	
	- Make	
	- Model No	
	- Type	
	- Numbers provided	
	- Size (inlet x outlet x rotor dia), mm	
	- Rated capacity (t/h of fly ash)	
	- Rated speed (rpm) of the feeder	
	- Duty requirement	
	- Power consumption at rated capacity (kW)	
	- Bearing & transmission Loss (kW)	
	- Motor rating (kW) corresponding to design ambient	
	- Type of drive arrangement	
	- Pressure differential which the feeder can seal	
	- Quality and pressure of air for sealing, if any	
	- Bearings	
	a. No. provided	
	b. Type	
	c. Type of lubrication	
	d. Lubricant required	
	e. Life in working hours at rated conditions	
	f. Arrangement of cooling	
	- **Material of construction**	
	a. Housing	
	b. End Cover	
	c. Rotor	
	d. Shoe	
	e. Rotor shaft	
	f. Packing ring	
	g. Lantern ring	
	Total weight of each	
	feeder-motor assembly (kg)	

	Drawing for feeder enclosed	
01.03	**ASH EVACUATION & CONVEYING PIPES, FITTINGS, EXPANSION JOINTS & COUPLINGS**	
01.03.01	PIPES	
	- Manufacturer	
	- Size (Inside dia x thk.), mm	
	- Quantity, metre	
	- Material of construction and hardness (Indicate standard, schedule, grade etc.)	
	- Manufacturing and testing code/standard	
	- Design velocity (M/sec.)	
	- Type of jointing and interval of jointing	
	- Working pressure, Kg/Sq. cm(g), Normal and maximum	
	- Hydrostatic test pressure, Kg/Sq. cm(g)	
01.03.02	FITTINGS	
	- Manufacturer	
	- Size (Inside dia x thk.), mm	
	- Quantity(Nos.)	
	- Material of construction & hardness (BHN)	
	- Manufacturing standard, schedule etc.	
	- Type of wear back (Integral/ renewable) and thickness,(mm)	
	-Working pressure, Kg / Sq .cm (g)	
	i) Normal	
	ii) Maximum	
	-Hydrostatic test pressure, Kg/Sq.cm(g)	
	Type of jointing	
01.03.03	EXPANSION JOINTS	
	- Manufacturer	
	- Type	
	- Manufacturing standard	
	- Qty. (Nos.) for each size	
	- Type of joints with pipe	
	- Material of construction, hardness and thickness of major parts	

	- Working pressure, Kg/Sq.cm(g)	
	- Cycle life	
	- Special features, if any	
01.03.04	COUPLINGS	
	- Manufacturer	
	- Type	
	- Size, mm	
	- Quantity, Nos.	
	- Material of Construction	
	i) Sleeve	
	ii) Flanges	
	iii) Bolts and nuts	
	iv) Gaskets	
	- Maximum allowable deflection (degree) between two consecutive pipe axes	
	- Hydrostatic test pressure, Kg/Sq.cm(g)	
01.03.05	GENERAL	
a.	- All tests & inspection shall be carried out as per specification requirement and/or approved standard	Yes/No
b.	- All steel hangers, supports, clamps, saddles, inserts, etc. shall be supplied	Yes/No
01. 04	**FLUIDIZING AIR-BLOWER** (For each type of blower)	
01.04.01	**AIR BLOWER**	**For Intermediate Silo Main Silo**
	- Manufacturer	
	- Type	
	- Total Nos. offered	
	- Capacity, N Cu. M/h (Referred to NTP Condition)	
	- Discharge Pressure, mmwg	
	- Efficiency at rated point, %	
	-Guaranteed Power at rated capacity and rated discharge reassure, at motor in put terminal, KW	
	-BHP, maximum in the operating range, at Blower input shaft terminal, KW	
	- Material of Construction	

	(Indicate Code/Std. No.)	
	a) Casing	
	b) Rotor	
	c) Shaft	
	d) Base Plate	
	e) Bearing	
	- Speed of blower, RPM	
	- Type of coupling	
	- Type of shaft sealing	
	- Relief value details	
	- Air filter details	
	-Pressure drop across air filter, mmwg	
01.04.02	List of accessories as per specification included ?	Yes/No
01.04.03	Drawings as listed in specification enclosed	Yes/No
01.04.04	Agreeable to conduct test as per specification ?	Yes/No
	a) Code/Standard of testing	
	b) Whether testing at Full/ part Load	
	c) Suction condition	
01.04.05	Discharge air temperature (Minimum), Deg. C	
01.05	**CONVEYING AIR COMPRESSOR (centrifugal compressor)**	
01.05.01	GENERAL	
	- Manufacturer and Model Number	
	- Designation	
	- Type	
	- Quantity furnished per unit (Working/stand by)	
01.05.02	PERFORMANCE	
	- Guaranteed Design capacity at blower suction (Also indicate tolerance), N Cu. m/h	
	- Discharge Pressure, mm Hg/ Kg/Cm^2 (g) at after cooler outlet	
	- Pressure rise across the blower	
	- Efficiency at design point	
	- Guaranteed BHP at design capacity and discharge Pressure	

	(power input at shaft)	
	- Relieving Valve set Pressure at package outlet at site condition	
	- Pressure rise across the blower Corresponding to above relief valve set pressure	
	- Bhp (Kw) maximum in the operating range	
	- Speed, rpm	
01.05.03	MATERIAL OF CONSTRUCTION (INDICATE CODE/STANDARD ETC.)	
	- Casing	
	- Rotor	
	- Shaft	
	- Shaft sleeve	
	- Base plate	
	- Bearing	
01.05.04	DESIGN AND CONSTRUCTION	
	- Type of coupling	
	- Type of shaft sealing	
	- Details of relief valve	
	- Air Filter details	
	- Pressure drop across the Air Filter/Suction Silencer, mm of water	
	- Suction and discharge silencer details	
	- Non return valve details	
	- List of accessories included as per specification ?	Yes/No
01.05.05	TESTING AND INSPECTION	
	- Shop testing shall be carried out as per specification	Yes/No
	- Testing shall be carried out as per the code (Mention the code No.)	Yes/No
	- Cooling water requirement for Each Blower m^3/h	
	- Discharge Air Temperature above ambient, deg. C	
	- Design Air Temperature at the after cooler outlet Deg. C	
	- Noise level at rated duty point	
	- Slip at design operating point	
01.05.06	DRIVE DATA	
	- Motor rating selected at design	

	ambient temperature, KW	
	- Motor speed , RPM	
01.05.07	GEAR BOX DETAILS	
	- Manufacturer and model Number	
	- type	
	- Gear Ratio	
01.06	**FLY ASH REMOVAL SYSTEM**	
01.06.01	- Ash Evacuation Equipment Under each ESP path)	
	- Type and size	
	a) Inlet opening size,mm	
	b) Outlet opening size, mm	
	c) Vent opening size, mm	
	d) Air inlet opening size, mm	
	- Manufacturer	
	- Method of operation (Furnish write-up)	
	a) Handling Capacity,t/h (dry ash basis)	
	b) Water capacity of the vessel, cu.m	
	- Number offered	
	a) For the unit	
	- Mounted on Floor/Hanging from Hopper	
	- Material of Construction and hardness	
	a) Feeder Vessel/tank (thickness)	
	b) Diffuser inlet and outlet (if required)	
	- Details of pneumatic control box (if required)	
	- Fluidising arrangement provided	Yes/No
	a) Expansion joint furnished before/after the assembly ?	Yes/No
	b) Adopters furnished ?	Yes/No
	c) Surge pots furnished ?	Yes/No
	d) All supports/hangers/ Platforms furnished ?	Yes/No
	- Accessories provided for each feeder assembly ? (indicate	Yes/No

	type and quantity)	
	- Dimensional general arrangement drawing enclosed ?	Yes/No
	a) Design Code/Standard of the Vessel	
	b) Test Pressure, Kg/Sq.cm(g	
	i) Body	
	ii) Gate seat	
	- Weight of each feeder assembly with accessories, Kg.	
01.06.02	Branch Isolation /Header Valves (if applicable)	
	- Total numbers offered	
	- Type and size of each valve	
	- Method of operation	
	- Air Pressure required, Kg/Sq.cm(g)	
	- Material of construction and hardness of	
	a) Body	
	b) Slide plate	
	c) Valve seat	
	d) Gaskets	
	- Provided with limit switches and local position indicator as specified ?	Yes/No
	- Dimensional general arrangement drawing enclosed ?	Yes/No
01.06.03	Pneumatic ash line diverting arrangement as required for transferring conveyed ash from one line to the other	
	- Type	
	- Make and Model No.	
	- Line size (mm)	
	- Capacity of diverted/ conveyed material	
	- Total numbers provided	
	- Locations and numbers	
	- Material of Construction	
	a) Enclosure	
	b) Conveying path	
	c) Liner (if any & thk.)	
	- Type of actuation	

	- Complete with all accessories and actuators as required ?	Yes/No
01.06.04	**Bag type vent filter of Fly ash silo**	**For Intermediate Silo** **Main Silo**
	- Type of vent filter provided on top of the silo	
	- Total number of vent filters offered	
	- Make, Model Number	
	a) Capacity, Nm^3/h air flow	
	b) Guaranteed (dust) Ash content of the effluent air,gm/Nm^3	
	c) Air flow direction (whether outside to inside or vice versa)	
	d) Pressure drop across the bag filter , mm of H_2O	
	e) Whether there is walk-in Plenum for Bag Maintenance inside the filter ?	Yes/No
	- Material of Construction	
	a) Body	
	b) Filter tube sheet element	
	- Total filtering area of bags per vent filter (Sq.M); Bag diameter (mm); Bag length(mm); Total numbers	
	a) Net air to cloth ratio selected M/Min.	
	b) Gross air to cloth ratio selected, M/Min.	
	c) Filtering Bag Material Indicate material, woven/ felted; specified weight (gm/Sq. cm.); trade name ; where used previously in similar condition; temperature with standability (Sustained; peak); pH tolerance range; what is the "Bubble" test pressure as per ASTM E - 128/61 for the cloth material selected ? etc.	
	d) Average expected life of Bags between installation and failure	
	e) Whether bags are sewn with electric "earth" wire; how many wires/bag.	
	- All accessories as required	Yes/No

	provided ?	
	a) Whether Pressure/vacuum relief system furnished ?	
	b) In case of compressed air cleaning of filter (bags)	Yes/No
	i) Whether pulse-jet type (provide a brief write-up)	Yes/No
	ii) Quantity of cleaning air	
	iii) Pressure of "cleaning" (Compressed) air	
	iv) Name of the Manufacture of solenoid operated "pulse" valve used in pulse cleaning system and his experience	
	- All accessories as required for bag cleaning arrangement provided ?	Yes/No
	- Leaflet/Catalogue enclosed ?	
	- Weight(Kg.) of each filter assembly	
	- Overall dimension of the Bag Filter assembly, mm x mm x mm	
	- In case exhaust fan required	
	a) Numbers of fan per vent filter	
	b) Fan capacity, M^3/h	
	c) Static Pressure, mm H_2O	
	d) Motor rating, KW	
	- Description of bag catching arrangement, furnished for maintenance of filter elements ?	Yes/No
01.07	**MAIN ASH SILO**	
01.07.01	General	
	- Fly ash RCC SILO to be designed for	Main Silo
	a) Maximum vacuum of	
	b) Maximum pressure of	
	- Recommended inside diameter of each type of silo	
	- Recommended inside height of each type of silo	
	- Estimated elevation of roof top ofeach type of fly ash silo	
	- Elevation of intermediate level floor on which unloaders are to be located	

	- Effective storage capacity of the silo	
	a) Tonnes of fly ash	
	b) Cubic metres of fly ash	
	- Silo openings envisaged, their sizes	
	- Total dead weight of the silo excluding concrete work to be considered for foundation design	
	- Recommended inside lining material, thickness(if any)	
	- Number of road trucks for the silo can accommodate simultaneously for silo unloading purpose	
	- If the Silo bottom "flat" ? if so, schematic layout of silo fluidising pads, location of diffuser hoods etc shall be indicated in a sketch. Whether furnished ?	Yes/No
	- The silo bottom has multiple openings. Sub-Contractor to confirm that there shall be no "cementation" flow problem (like sand volume etc.) for any combination of openings being used for unloading the silo	
	- All works of Silo is under the scope of supply of the tenderer	Yes/No
	- Access door for the silo	
	- Numbers provided	
	- Size of opening	
	- Silo is fitted with Pressure	Yes/No
	- All silo instruments provided	Yes/No
	- Any other special feature recommended for silo design for storing hot ash, unloading silo ash or any other consideration	Yes/No
01.07.02	**Fly ash silo fluidising**	
	- Number of air slides for the silo	
	- Fluidising air required for the silo (m^3/min)	

	- Size of air slide	
	- Material of air slide	
	- Rotary Drum Unloader	
	Total numbers furnished (for the silo)	
	- Rated capacity each t/h (dry ash basis)	
	- Size of drum (diameter x length)	
	- Water requirement for each rotary unloader, capacity (Cu.m/hr) and Pressure, Kg./Sq.cm.g	
	- Rated speed	
	- Power consmption, KW	
	- Motor rating, Kw	
	- Drive arrangement	
	- Material of construction and thickness	
	a) Inlet/outlet chutes	
	b) Drum	
	c) Scrapper plate (BHN)	
	d) Spray nozzles (BHN)	
	- Provided with liner ?	Yes/No
	a) Liner material & thickness	
	b) Type and Nos. of bearing	
	c) Mounting arrangement	
	d) Expansion joint provided ?	Yes/No
	e) Details of expansion joint with material of construction	
	- Total weight of assembly (kg)	
	- Expected time required to load	
	a eight (8) tonnes truck	
01.07.03	Dust Unloading chutes	
	a) Size of blanked chute (mm)	
	b) Number of blanked chutes	
	c) Material of chute & thickness	
	d) Each chute fitted with blanking plate & also knife gate valve	Yes/No
01.07.04	Silo Unloading Feeder	
	- Type and make	
	- Number offered for the silo	
	- Rated capacity each, T/hr. (dry ash)	
	- Full Shut-off possible ?	Yes/No

	- Actuation	
	- Material of Construction and thickness	
	a) Feeding element	
	b) Gate & seat/enclosure (As applicable)	
01.08	**AIR CONSUMPTION DATA**	
01.08.01	Oil free air requirement for the complete systemt,m3/h	
	a. Maximum	
	b. Normal	
	c. Minimum	
01.08.02	Services air requirement for the complete systemt,m3/h	
	a. Maximum	
	b. Normal	
	c. Minimum	
01.08.03	Air pressure requirement at terminal point, kg/cm2 (g)	
	a. Maximum	
	b. Normal	
	c. Minimum	
01.09	**PAINTING**	
01.09.01	Initial	
	- Type	
	- DFT of each coat, microns	
	- No. of coats to be provided	
	- Make of primer	
01.09.02	**Final**	
	- Type	
	- DFT of each coat, microns	
	- No of coats to be provided	
01.09.03	**Make of final paints**	
01.09.04	Detailed painting schedule will be furnished for the Purchaser's approval	Yes/No
01.10	Detailed lubrication	Yes/No
	schedule furnished	Yes/No
01.11	**GUARANTEED & PERFORMANCE DATA**	**To be furnished by Contractor in a sealed and separate envelope .**

Performance Guarantee under Demonstration and Liquidated Damage (LD) :				
Sl.	**Description of equipment**	**No. of**	**Rating of**	**Guaranteed aux.**

No.		equipments (W+SB)	each equipment in kW	Power consumption for all working equipment at rated capacity (kW)
a.	Pneumatic Conveying Compressor			
b.	Fluidizing Air Blower (Main Silo)			
c.	Fluidizing Air Blower (intermediate silos and ash hoppers)			
d.	Air Heater for Fluidizing Blowers (Main Silo)			
e.	Air Heater for Fluidizing Blowers (Intermediate Silo)			
f.	Rotary feeder for main silos unloading			
g.	Rotary ash conditioners			
h.	Vent air fan of main silos			
i.	Air dryers			
k.	CW Pumps			
l.	Booster pumps			
m.	Dosing pumps			
n.	Fans used in cooling tower, if any			
o.	Any other equipment not specified above			
p.	Total			

Items Under Guarantee and Correction

Sl.No	Capacity & Pressure of the following equipment	Tenderer to Indicate
a)	Pneumatic Conveying Compressor	
	Capacity in Nm3/min.	
	Discharge Pressure in kg/cm2 (g)	
b)	Fluidizing Air Blower (Ash hoppers & Intermediate silos)	
	Capacity in Nm3/min.	

	Discharge Pressure in kg/cm2 (g)	
c)	Fluidizing Air Blower (Main Silo)	
	Capacity in Nm3/min.	
	Discharge Pressure in kg/cm2 (g)	
d)	Air dryer	
	Capacity in Nm3/min.	
	Discharge Pressure in kg/cm2 (g)	
e)	Cooling water pump	
	Capacity in cum/hr	
	Discharge Pressure in kg/cm2 (g)	
2.	Rated ash evacuation capacity of each stream from Hoppers to intermediate silos line (t/h)	
3.	Rated ash conveying capacity of each stream from intermediate silos to main silos (t/h)	
4.	Temperature of the fluidizing air at the outlet of air heaters, deg.C	
5.	Maximum air temperature at outlet of air dryer, deg.C	
6.	Dust content at vent filter outlet at fly ash silo in mg/Nm3	
7.	Noise level for all equipment, dBA	