



**TENUGHAT VIDYUT NIGAM LIMITED**  
2x210 MW Tenughat Thermal Power Station  
Jharkhand  
Dry Fly Ash Collection & Disposal System



## 07.00 DESIGN DATA INFORMATION

The various details of coal and ash generated are as follows:-

### a. Coal analysis (Proximate analysis, as received, % by weight)

#### A. PROXIMATE

Sl.No.	Characteristics	
1.1	Total Moisture	10%
1.2	Ash	35%
1.3	Volatile Matter	18%
1.4	Fixed Carbon	37%
	<b>Total %</b>	<b>100</b>

#### B. ULTIMATE ANALYSIS

1.1	Carbon	43.56%
1.2	Hydrogen	2.86%
1.3	Sulphur	0.4%
1.4	Nitrogen	0.83%
1.5	Oxygen	7.35%
1.6	Carbonates	0.00%
1.7	Phosphorous	0.00%
1.8	Total Moisture	10%
1.9	Ash	35%
	<b>Total</b>	<b>100</b>
1.10	GCV (kCal/kg)	4200
1.11	Grindability index (HGI)	50
1.12	Size of Coal to mill ( mm)	25

### b. Ash analysis (%)

#### A. CHEMICAL PROPERTIES

1.1	Copper	74.72 ppm
1.2	Zinc	104.85 ppm
1.3	Ferrous	2345 ppm
1.4	Cromium	37.32 ppm
1.5	Cobalt	29.52 ppm
1.6	Cadmium	1.7 ppm
1.7	Lead	6.7 ppm
1.8	Silica (SiO <sub>2</sub> )	59.20%
1.9	Alumina (Al <sub>2</sub> O <sub>3</sub> )	29.43%



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



1.10	Iron Oxide (Fe <sub>2</sub> O <sub>3</sub> )	5.97 %
1.11	Titania (TiO <sub>2</sub> )	0.40%
1.12	Lime ( CaO)	1.10%
1.13	Magnesia (MgO)	1.00%
1.14	Sulphuric Anhydride (SO <sub>4</sub> )	0.80%
1.15	Balance Alkalies (by difference)	2.1
	Total	100

**B.PHYSICAL PROPERTIES**

1.1	Loss on ignition or unburnt carbon	2.1%
1.2	pH	6.02
1.3	Electrical conductivity	0.39 mmhos
1.4	Porosity	55.24%
1.5	Water holding capacity	68.00%
1.6	Bulk Density	0.92 g/c.c.
1.7	Radioactive element	Not showing positive response
1.8	Comprehensive strength	1.03 Kg/ cm <sup>2</sup>

**c. Ash characteristics (under mildly reducing atmosphere)**

Initial deformation temp.	:	1200 – 1250 deg.C
Softening temp.	:	1300 – 1400 deg.C
Fusion temp.	:	above 1400 deg.C

**d. Site Design Data**

The following meteorological data shall be considered for design:

- Elevation above the mean sea level :
- Ambient temperature : 50 °C (max.) , 7 °C (min.)
- Relative humidity : 100% max.
- Wind velocity :As per IS : 875
- Earth quake data :seismic zone, as classified in IS :1893.

07.02 Following ash density will be considered for designing of the Ash handling system.

- |    |                                        |   |                        |
|----|----------------------------------------|---|------------------------|
| a. | Dry ash density for volume calculation | - | 600 kg/m <sup>3</sup>  |
| b. | Dry ash density for weight calculation | - | 1600 kg/m <sup>3</sup> |
| c. | Wet ash density for volume calculation | - | 800 kg/m <sup>3</sup>  |
| d. | Wet ash density for weight calculation | - | 1600 kg/m <sup>3</sup> |



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



07.03 **Ash Generation Data**

- a. Coal consumption per unit at MCR of steam generating unit is 147 t/h. Ash content in coal for ash handling plant design shall be considered be 35 %.
- b. Ash generation rate per unit will be 52 t/h.
- c. Fly ash generation at the rate of 90% of total ash will be 47 t/h for each unit. However Fly ash evacuation and disposal from ESP of each unit will be designed at 67 t/h in case of worst coal.

07.04 Plant & equipment of ash handling system will run continuously i.e. 8 hours in a shift of 8 hours. However, Bidder will take special care that entire ash evacuation can be done in 4 hours in a shift of 8 hours. Selection of conveying compressors, transport vessels, blowers, heaters, etc and all other associated plant & equipment will be designed accordingly.

***For more clarity, Plant & equipment of ash handling system for Dry fly ash evacuation system at TTPS should be designed at 100 T/Hr.***

07.05 **Fly ash hopper**

Ash collected from the various hoppers from each unit are indicated in the following table.

Sl. No.	Description	No. of hoppers (approx.)	Ash temperature	Storage capacity in hrs for max ash generation
1.	Economiser hopper	4	400	8
3.	APH hopper	6	300	8
4.	ESP hopper		180	
	1 <sup>st</sup> row	4	180	8
	2 <sup>nd</sup> row	4	180	8
	3 <sup>rd</sup> row	4	180	8
	4 <sup>th</sup> row	4	180	8
	5 <sup>th</sup> row	4	180	8
	6 <sup>th</sup> row	4	180	8
	7 <sup>th</sup> row	4	180	8
5.	Stack hopper	1	180	8
6.	Gas duct	2	--	---



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



07.06 The bidder may inspect the site and thoroughly acquaint themselves with the site conditions specifically along the proposed alignment of pneumatic conveying pipe lines for the execution of work including designing of foundations and the supporting structures, etc.

07.07 **Noise Level**

Guaranteed noise level will be limited to 85 dB(A) at 1 m away measured in any direction for all equipment.

07.08 Maximum permissible spacing between pipe supports

Nominal Pipe Size, mm	Maximum span for liquid services, m	Maximum span for other services, m	Maximum span for insulated pipes, m
25	2.1	2.7	2.0
40	2.7	3.2	3.0
50	3.0	4.0	3.5
65	3.4	4.2	4.0
80	4.0	4.7	4.5
100	4.3	5.2	5.0
150	5.2	6.4	6.0
200	5.8	7.3	7.0
250	6.7	8.0	8.0
300	7.0	9.1	9.0
350	7.6	9.8	9.5
400	8.2	10.7	10.5
450	8.5	11.3	11.0
500	9.1	11.9	11.5
600	9.8	12.8	12.0

Vertical pipe work will be clamped at intervals of 3.5 m (approx.) and at the base of each riser. Maximum span at the place of turning will be 0.7 times of normal span.

07.09 **Pollution control**

Pollution control measure will be as per CPCB guidelines and State Govt. guidelines as applicable.

07.10 **Life**

The plant will be designed for a minimum life of twenty five (25) years and a *minimum* operating life of 200000 hours.