

NTPC NABINAGAR 4x250 MW FGD – TECHNICAL INFORMATION OF MIST ELIMINATORS

			- sd -	- sd -
00	11-03-2020	Fresh Release	Abhishek Kumar	P Naveen Reddy
REV	DATE	DESCRIPTION	Prepared	Checked & Approved

1.0 TECHNICAL INFORMATION

Sl. No.	Description	Requirement
1.	End Customer	NTPC is setting up the project for Bhartiya Rail Bijlee Company Ltd.
2.	Project Name	NABINAGAR 4X250 MW Located at Nabinagar, Aurangabad, Bihar
3.	Type	Three stage chevron type (a) Flat type for 1 st stage and Roof Type for 2 nd , 3 rd stage (or) (b) Roof Type for all the three stages
4.	Quantity	
i.	Quantity of Mist Eliminators for Unit-1,2,3,4	4 sets (1 set for each unit) 1 set means Complete Mist Eliminators, Washing systems and accs.
5.	MOC	
i.	ME Panel	Polysulfone
ii.	Washing Pipe	a) Glass fiber reinforced plastics b) Polypropylene or PVC is also acceptable provided bidder has proven experience for the same. Supporting documents to be produced.
iii.	Wash Pipe Supports	Alloy 59/C276
iv.	Washing Nozzles	PVDF or PP as per bidder's proven practice.
v.	Hardware inside absorber	a) Alloy 59/ C276 for load bearing applications b) All metallic fasteners provided shall be of Alloy 59/C276 c) For pipe clamps, C276 Bolt, C276 Nut, C276 washer and C276 spring washer to be provided.
6.	Parameters	
i.	Gas flow	Vertical
ii.	Casing Dimension	Length : 7900 mm Width:13900 mm
iii.	Design Pressure of Mist Eliminator Panel	660 mmH ₂ O (G)
iv.	Max Allowable Pressure drop across Mist Eliminator element	20 mmH ₂ O (G) at Design point 16 mmH ₂ O (G) at Guarantee point
v.	Design Temperature	• 70 Deg C (Continuous) • 80 – 90 Deg C (30 minutes) • 90 – 110 Deg C (5 min)
7.	Gas condition at ME Inlet	Guarantee Point Design Point

Sl. No.	Description	Requirement	
i.	Gas Flow Rate (Nm ³ /s-wet)	298.40	329.60
ii.	Gas Flow Rate (m ³ /s-wet)	361.54	403.96
iii.	Gas Temperature (Deg C)	57.8	61.6
iv.	Density (kg/m ³)	1.03177	1.00502
v.	Operating Pressure at Mist Eliminator inlet (mm H ₂ O (G))	56	77
vi.	Gas Flow Distribution	+ or - 20%	
8.	Gas Composition at ME Inlet		
i.	SO ₂ (Vol%-wet)	0.0021	0.0020
ii.	H ₂ O (Vol%-wet)	17.57	20.98
iii.	O ₂ (Vol%-wet)	5.92	5.67
iv.	CO ₂ (Vol%-wet)	9.44	9.05
v.	N ₂ (Vol%-wet)	67.06	64.3
vi.	HCl (ppm-Dry)	<2	<2
9.	HF (ppm-Dry)	<1	<1
i.	Dust (mg/Nm ³ -wet)	<50	<200
10.	Entrained Mist Condition:		
i.	Mist Concentration at Inlet –at Guarantee & Design Point	200 g/Nm ³ -dry	
ii.	Mist Concentration at Outlet –at Guarantee & Design Point	≤20 mg/Nm ³	
11.	Mist Composition		
i.	Solid	30 wt.%	
ii.	Cl ⁻	18383.4 ppm	
iii.	Mg ²⁺	7956.0 ppm	
iv.	Ca ²⁺	824.12 ppm	
v.	Na ⁺	2340.32 ppm	
vi.	SO ₄ ²⁻	12267.0 ppm	

1.1 WASHING ARRANGEMENT

I.	Washing water condition	
a.	Flow rate - Average	13.77 m ³ /hr *1)
b.	Flow rate at M/E Inlet – Instantaneous Allowable Max	96 m ³ /hr
c.	Flow rate at M/E Inlet – Instantaneous Min	80 m ³ /hr
d.	Feed Pressure (at inlet flange of ME Wash header)	0.2 MPa (Max)
e.	Spray Nozzle –Top washing	90 °, Full Cone(recommended)
f.	Spray Nozzle –Bottom washing	120 °, Full Cone(recommended)
g.	Spray pipe level from ME Panel	< 700 mm

II.	Washing Method						
		First Stage		Second Stage		Third Stage	
		Front Surface	Back Surface	Front Surface	Back Surface	Front Surface	Back Surface
a.	Total Washing Area m ²	7.9x13.9	7.9x13.9	7.9x13.9	7.9x13.9	7.9x13.9	7.9x13.9
b.	Washing Water Source	Refer Clause 1.2					
c.	Washing Water Average Flow rate m ³ /h	*	*	*	*	*	**
d.	Instantaneous Max Water Flow rate m ³ /h	*	*	*	*	*	**
e.	Duration of One washing for One Divided Section Sec	*	*	*	*	*	**
f.	Time of One washing Cycle (min)	*	*	*	*	*	**
*Washing method shall be confirmed by the vendor. ** Only for Maintenance *1) shall be finalized by vendor							

1.2 WATER ANALYSIS

Process water is envisaged for Mist Eliminator washing. Process water analysis is provided below.

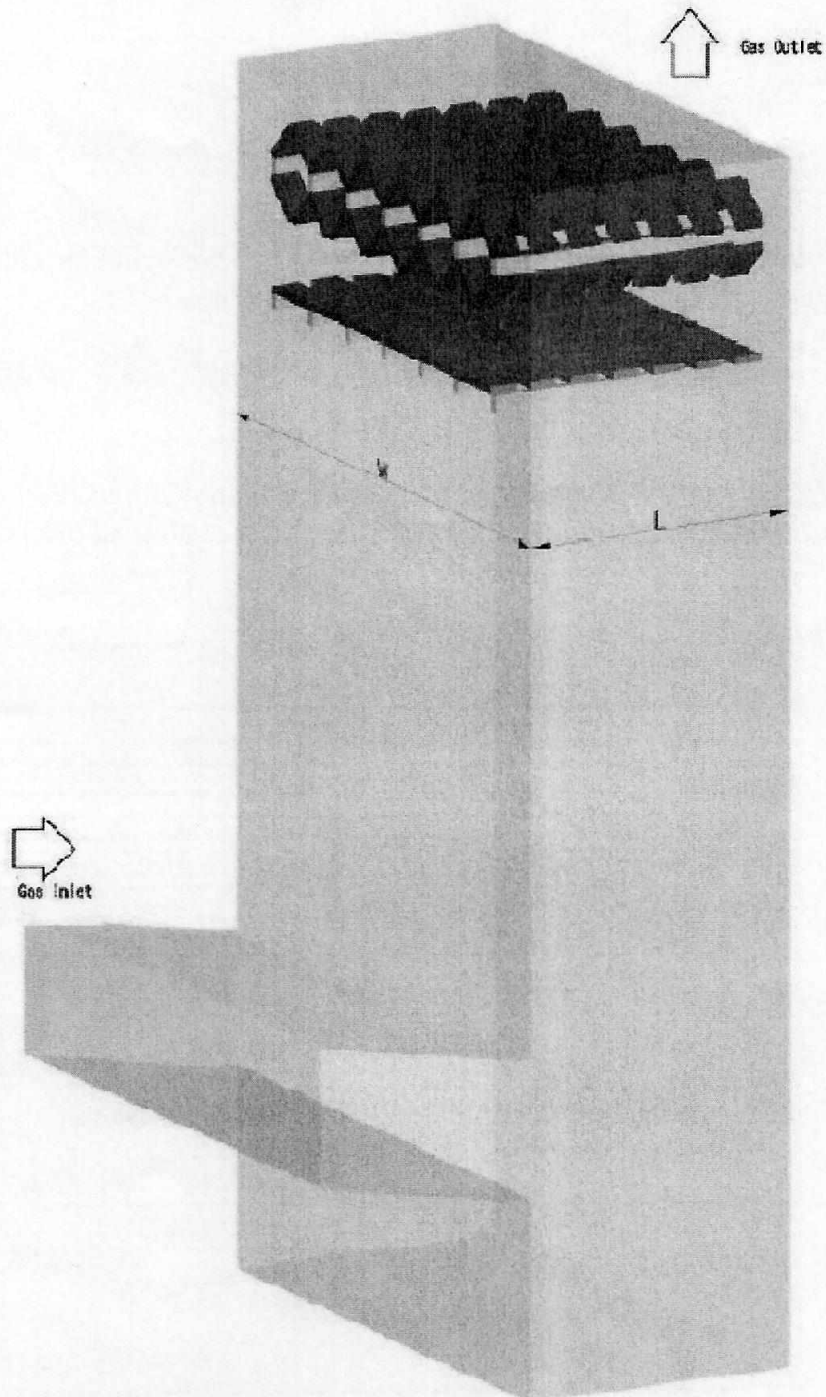
S.No	Constituent	As	mg/l (except pH & turbidity)
1.	Calcium	CaCO ₃	131
2.	Magnesium	CaCO ₃	52
3.	Sodium + Potassium	CaCO ₃	65
4.	Total Cations	CaCO ₃	248
5.	Chloride	CaCO ₃	20
6.	Sulphate	CaCO ₃	93
7.	Nitrate	CaCO ₃	10
8.	Alkalinity	CaCO ₃	125
9.	Total Anions	CaCO ₃	248
10.	Iron(total)	Fe	0.3
11.	Total Silica	SiO ₂	22
12.	pH value	---	7.0-8.2
13.	Turbidity	NTU	10

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 dosing. As CW blow down water is tapped from CW system, the water quality of CW blow down shall accordingly be arrived by the bidder.

- Water Quality shall be arrived by the bidder considering the COC – 5.5

1.3 MIST ELIMINATOR ARRANGEMENT AND MIST PARTICLE SIZE DISTRIBUTION:

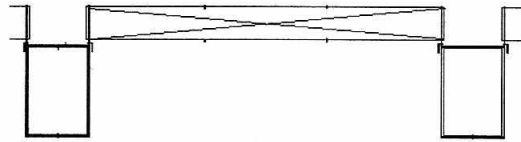
Typical Sketch



L-Length-7900 mm, W-Width-13900 mm

Only typical arrangement is shown above.

If flat type Mist Eliminator Modules are offered for 1st stage, Mist Eliminator modules shall be provided with non-slipping end stopper as given below:



Note:

- a) Bidder to decide and supply the spray washing arrangement considering the water flow rate mentioned above.
- b) Bidder can offer
 - (i) Flat type for 1st stage and Roof Type for 2nd, 3rd stage as per the typical sketch (or)
 - (ii) All three stages Roof type.
- c) **Two level of beams** will be provided by BHEL. Elevation difference between the beams is 2.6 meter. Bidder shall design the Mist Eliminator considering the same.

Fig. 2 Mist Particle Size Distribution (EXPECTED VALUE)

