

**REF:MISTEL:NNG660 TECHNICAL INFORMATION OF MIST ELIMINATOR FOR NABINAGAR 3X660MW**

|     |            |               |             |                    |
|-----|------------|---------------|-------------|--------------------|
| 00  | 31-03-2020 | Fresh Release | -sd-        | -sd-               |
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| REV | DATE       | DESCRIPTION   | Prepared    | Checked & Approved |

## 1.0 TECHNICAL INFORMATION

| Sl. No. | Description                                 | Requirement                                                                                                                                                                                                    |
|---------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.      | <b>End Customer</b>                         | NTPC                                                                                                                                                                                                           |
| 2.      | <b>Project Name</b>                         | Nabinagar STPP 3X660 MW                                                                                                                                                                                        |
| 3.      | <b>Location</b>                             | Nabinagar, Aurangabad District, Bihar State, India.                                                                                                                                                            |
| 4.      | <b>Type</b>                                 | Three stage chevron type<br>(First Stage shall be Flat or Roof Type, Second and Third stages shall be Diamond/Roof type)                                                                                       |
| 5.      | <b>Quantity</b>                             |                                                                                                                                                                                                                |
| i.      | Quantity of Mist Eliminators for Unit-1,2,3 | 3 sets (1 set for each unit)<br>1 set means Complete Mist Eliminators, Washing systems and accessories.                                                                                                        |
| 6.      | <b>MOC</b>                                  |                                                                                                                                                                                                                |
| i.      | ME Panel                                    | Polysulfone (Or)<br>Super austenitic stainless steel (254 SMO)                                                                                                                                                 |
| ii.     | Washing Pipe                                | a) Glass fiber reinforced plastics<br>b) Polypropylene or PVC is also acceptable provided bidder has proven experience for the same. Supporting documents to be produced.                                      |
| iii.    | Wash Pipe Supports                          | Shall be lined with min 2mm thk Alloy 59/C276 or entire Material in 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<br>b) All metallic fasteners provided shall be of Alloy 59/C276<br>c) For pipe clamps, C276 Bolt, C276 Nut, C276 washer and C276 spring washer to be provided. |
| vi.     | Enclosure Plate                             | Same as that of ME Panel if it is part of Mist Eliminator (or) C276 material.                                                                                                                                  |
| 7.      | <b>Parameters</b>                           |                                                                                                                                                                                                                |
| i.      | Gas flow                                    | Vertical                                                                                                                                                                                                       |
| ii.     | Casing Dimension                            | Length : 10900 mm    Width : 23900 mm                                                                                                                                                                          |
| iii.    | Design Pressure of Mist Eliminator Panel    | 660 mmH <sub>2</sub> O (G)                                                                                                                                                                                     |

| Sl. No. | Description                                                           | Requirement                                                                                                                                        |                     |
|---------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| iv.     | Max Allowable Pressure drop across Mist Eliminator element            | 20 mmH <sub>2</sub> O (G) at Design point<br>16 mmH <sub>2</sub> O (G) at Guarantee point                                                          |                     |
| v.      | Design Temperature                                                    | <ul style="list-style-type: none"> <li>• 70 Deg C (Continuous)</li> <li>• 80 – 90 Deg C ( 30 minutes)</li> <li>• 90 – 110 Deg C (5 min)</li> </ul> |                     |
| 8.      | <b>Gas condition at ME Inlet</b>                                      | <b>Guarantee Point</b>                                                                                                                             | <b>Design Point</b> |
| i.      | Gas Flow Rate (Nm <sup>3</sup> /s-wet)                                | 734.62                                                                                                                                             | 814.95              |
| ii.     | Gas Flow Rate (m <sup>3</sup> /s-wet)                                 | 891.04                                                                                                                                             | 1000.1              |
| iii.    | Gas Temperature (Deg C)                                               | 58.2                                                                                                                                               | 62.1                |
| iv.     | Density (kg/m <sup>3</sup> )                                          | 1.02907                                                                                                                                            | 1.00164             |
| v.      | Operating Pressure at Mist Eliminator inlet (mm H <sub>2</sub> O (G)) | 45                                                                                                                                                 | 64                  |
| vi.     | Gas Flow Distribution                                                 | + or - 20%                                                                                                                                         |                     |
| 9.      | <b>Gas Composition at ME Inlet</b>                                    |                                                                                                                                                    |                     |
| i.      | SO <sub>2</sub> (Vol%-wet)                                            | 0.0021                                                                                                                                             | 0.0020              |
| ii.     | H <sub>2</sub> O (Vol%-wet)                                           | 17.87                                                                                                                                              | 21.40               |
| iii.    | O <sub>2</sub> (Vol%-wet)                                             | 5.89                                                                                                                                               | 5.64                |
| iv.     | CO <sub>2</sub> (Vol%-wet)                                            | 9.36                                                                                                                                               | 8.96                |
| v.      | N <sub>2</sub> (Vol%-wet)                                             | 66.87                                                                                                                                              | 64.0                |
| vi.     | HCl (ppm-Dry)                                                         | <2                                                                                                                                                 | <2                  |
| vii.    | HF (ppm-Dry)                                                          | <1                                                                                                                                                 | <1                  |
| viii.   | Dust (mg/Nm <sup>3</sup> -wet)                                        | <50                                                                                                                                                | <200                |
| 10.     | <b>Gypsum Slurry Density (t/m<sup>3</sup>)</b>                        | 1.212                                                                                                                                              | 1.216               |
| 11.     | <b>Entrained Mist Condition:</b>                                      |                                                                                                                                                    |                     |
| i.      | Mist Concentration at Inlet –at Guarantee & Design Point              | 200 g/Nm <sup>3</sup> -dry                                                                                                                         |                     |
| ii.     | Mist Concentration at Outlet –at Guarantee & Design Point             | ≤20 mg/Nm <sup>3</sup>                                                                                                                             |                     |
| 12.     | <b>Mist Composition</b>                                               |                                                                                                                                                    |                     |
| i.      | Solid                                                                 | 30 wt. %                                                                                                                                           |                     |
| ii.     | Cl <sup>-</sup>                                                       | 22116 ppm                                                                                                                                          |                     |
| iii.    | Mg <sup>2+</sup>                                                      | 10189 ppm                                                                                                                                          |                     |
| iv.     | Ca <sup>2+</sup>                                                      | 728.28 ppm                                                                                                                                         |                     |
| v.      | Na <sup>+</sup>                                                       | 3003.03 ppm                                                                                                                                        |                     |
| vi.     | SO <sub>4</sub> <sup>2-</sup>                                         | 16453.95 ppm                                                                                                                                       |                     |

## 1.1 WASHING ARRANGEMENT

| I. | Washing water condition                              |                             |
|----|------------------------------------------------------|-----------------------------|
| a. | Flow rate - Average                                  | 32.1 m <sup>3</sup> /hr *1) |
| b. | Flow rate at M/E Inlet – Instantaneous Allowable Max | 120 m <sup>3</sup> /hr      |
| c. | Flow rate at M/E Inlet – Instantaneous Min           | 100 m <sup>3</sup> /hr      |
| d. | Feed Pressure (at inlet flange of ME Wash header)    | 0.2 MPa (Max)               |
| e. | Spray Nozzle –Top washing                            | 90 °, Full Cone             |
| f. | Spray Nozzle –Bottom washing                         | 120 °, Full Cone            |
| g. | Spray pipe level from ME Panel                       | < 700 mm                    |

\*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 | Constituents                          | Unit | PROCESS WATER |
|------|---------------------------------------|------|---------------|
| 1.   | Calcium as CaCO <sub>3</sub>          | ppm  | 720.5         |
| 2.   | Magnesium as CaCO <sub>3</sub>        | ppm  | 286           |
| 3.   | Sodium as CaCO <sub>3</sub>           | ppm  | 357.5         |
| 4.   | Potassium as CaCO <sub>3</sub>        | ppm  | 1364          |
| 5.   | Iron as fe                            | ppm  | 110           |
| 6.   | Total alkalinity as CaCO <sub>3</sub> | ppm  | 511.5         |
| 7.   | Chlorides as CaCO <sub>3</sub>        | ppm  | 55            |
| 8.   | Sulphate as CaCO <sub>3</sub>         | ppm  | 687.5         |
| 9.   | Silica                                | ppm  | 1364          |
| 10.  | pH                                    | -    | 7.0-8.2       |
| 11.  | Turbidity                             | NTU  | 10            |

### 1.3 MIST ELIMINATOR ARRANGEMENT AND MIST PARTICLE SIZE DISTRIBUTION:

- a) Bidder shall note that there are two column tie beams located inside the absorber and separated by 8000 mm. Beams are located on either side of centre line at a distance of 4000 mm from the centre line (Bidder shall refer to Note 01 :B in the typical drawing enclosed). These two tie beams have to be used as Mist Eliminator support beams.
- b) Overall wash arrangement shall be as per the drawing (typical) enclosed. Bidder shall decide the spray washing arrangement accordingly.

The Mist Particle Size Distribution shall be as per below fig

Fig. 2 Mist Particle Size Distribution (EXPECTED VALUE)



