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| **Hindalco Renusagar U5 1 x 80 MW PF Captive Power Plant**  **Flue Gas Desulfurization Project (FGD) with GORETM SO2 Control System**  **`**  **FGD- MCU Flue Gas Cooling Grid and Nozzles – Technical Specification**   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **ISSUED FOR** | APPROVAL  ) | INFORMATION | MANUFACTURING | CONSTRUCTION | AS-BUILT | | | | | | | | |
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| Hindalco Renusagar U5 1 x 80 MW PF Captive Power Plant | | | Drg. / Doc. No*.*: S21001-TS01-05HTH-227212 | | | | |
| Flue Gas Desulfurization Project (FGD) with GORETM SO2 Control System | | | Gore Doc. No.: RPDU5.PG.043 | | |  | |
| **FGD- MCU Flue Gas Cooling Grid and Nozzles – Technical Specification** | | | GORE Job No.: RPDU5 | | | Rev. : 2 | |
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ANNEXURE-2 : QUALITY CONTROL PLAN

1. **General**  
   1) Hindalco Industries Limited (HIL)-Renusagar intends to install Flue Gas Desulphurisation Project (FGD) in their Unit-5 ,1 x 80 MW captive power Plant using **GORE TM** technology. The flue gas from the existing ID Fan outlet shall be taken to new Booster Fan suction and the discharge of the fan shall be taken to Mist Cooling Unit (MCU) where water shall be sprayed in atomised form to cool the hot flue gas and also saturate the same. The cold and moisture saturated flue gas shall be further taken for desulpharisation.

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2) This specification covers the design, engineering, manufacture, assembly, testing at manufacturer's works, supply and delivery to project site properly packed for transportation, including shop painting, freight, transit insurance, all taxes, duties, octroi, other charges/levies as applicable, testing and commissioning at site of all materials and equipment inclusive of accessories as specified and as required for **MCU Main & Emergency Nozzles and accessories** for safe and trouble-free operation of same.

1. **Codes and Standards** : The design, manufacture, inspection and testing of the equipment covered under this specification shall conform, in general, to the standards and codes (latest editions) mentioned below:
2. International Organisation for Standardisation (ISO);ISO3585/3586/3587/4704
3. Bureau of Indian Standards (BIS)
4. British Standards (BS); BS EN 1595
5. American National Standards (ANSI).
6. ASTM. Standards for materials
7. ASME: American Society of Mechanical Engineers
8. In case of any contradiction between the above standards and data specification sheets, the stipulations in the data sheets shall prevail and shall be binding on the Supplier/ Bidder.
9. **System Description** : The flue gas is taken from the discharge duct of existing ID Fans and transferred to the inlet of new Booster Fan. The discharge of booster fan shall be sent to the inlet of Mist Cooling unit for moisture saturation and reduction in temperature. In the Mist cooling unit water will be sprayed in mist form for evaporative heat exchange and thereby reducing flue gas temperature and achieving saturated condition. After the mist cooling unit, the flue gas is conveyed to the Reactor Tower to trap SOx.

The Mist Cooling Unit is vertical type with flue gas moving from top to bottom and water spray shall be arranged strategically along / across the path of flue gas movement.

For spraying in mist form Main nozzles shall be installed suitably in the Mist Cooling Unit. During power outage condition, to maintain cooling of the gas, water will be sprayed through separate header from Emergency Overhead Tank and also with separate set of Emergency Nozzles for spraying water for a certain time.

Excess un-evaporated water is collected in hoppers below the MCU tower. The collected water in the hopper/s will be drained out time to time.

1. **Scope of supply , and supervision of erection and commissioning :**

The scope for MCU Main & Emergency Nozzles & accessories shall consist of :

1) All Misting Spray Main Nozzles with adapter if required.

2) All Misting Spray Emergency Nozzles with adapter.

3) Any special adaptor weldable bush (inside threaded for nozzle fixing), if required.

4) Set of special tools and tackles.

5) Mandatory spares if specified. Price of same shall be evaluated.

6) Erection and commissioning spares.

7) List of recommended spares with Unit Rate for three (3) years of trouble-free operation. The Price of Recommended spares shall not be evaluated.

1. **Scope of services** :

The following services shall be provided by the bidder for all equipment and accessories listed above:

1) Complete design and engineering required for nozzles selection.

2) Submission of all necessary documentation, drawings, and operation and maintenance manuals.

3) Inspection and testing of all equipment at manufacturer's shop.

4) Packing for road transportation as applicable.

5) Transportation of all equipment including transit insurance up to site.

6) Witnessing of Performance test of equipment at site and fulfilment

of Guaranteed Data /Parameters.

1. **Exclusions :**

Following items are out of scope of Bidder:

1. MCU duct.
2. Erection at site.
3. Piping.
4. **Terminal Point :**

The terminal point shall be as follows.

1. Inlet of Weldable bush, if any and Nozzle outlet.
2. **Design and construction requirements and important considerations**

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1)For selection and sizing of equipment the technical data sheet (Annexure-1) may be referred.

2) Material of construction – The material of construction shall be minimum as indicated in the technical datasheet. However the bidder may select higher grade based on requirement of the specific function as deemed suitable.

3) **In case of power failure the catalyst is intended to be protected by water from a overhead tank. Separate emergency nozzles are provided for this purpose.**

5) Not used.

6) Not used.

7) Not used.

8) **PG Test and** **Performance Guarantee** – Supplier shall demonstrate PG test for and following shall be the minimum items :

a) Nozzle capacity at given upstream pressure– As per Technical datasheet annexed.

b) Nozzle coverage area and Mist droplet size.

1. **Not used**
2. **Not used**
3. **Documents/Drawings to be submitted along with the bid as “Must Items” for a responsive bid.**

**E-1 Along with Bid**

1. Scope of supply without any ambiguity.
2. Brief Datasheet, Technical Particulars of offered item(s).
3. Nozzle Datasheet & drawings.
4. MOC of all items.
5. QAP.
6. Guaranteed Performance Data.
7. Price Schedule.
8. Delivery Schedule.
9. Details of Commissioning manpower.
10. Document submission schedule as per Deliverable List (post order) in Annexure.
11. Terms of Payment.
12. **Deviation List if any. Without any deviation list, bid shall be construed exactly as per requirement of Scope Document / Technical Data Sheet.**
13. Catalogue of all equipment.
14. List of commissioning and maintenance spares.
15. Recommended Spare parts list for Three (3) year’ operation.

**E-2 Post Order**

1. Operation & Control Philosophy,Technical Datasheet, Technical Particulars of offered item(s) along with its constructional features and Performance detail.
2. Dimensional General arrangement Drawings.
3. Cross sectional Drawings with partlist and MOC.
4. Nozzle layout drg, Piping and support structure General arrangement and detail drawings.
5. Operation & Maintenance Manual.
6. QAP showing the Customer / Third Party Inspector (TPI) Hold Points.
7. Weight data for erection & loading data (static & dynamic) for civil design by other.
8. Material certificates shall be furnished.