|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A picture containing icon  Description automatically generated | | Owner:  HINDALCO INDUSTRIES LIMITED  Ahura Centre, 1st Floor, B Wing, Mahakali Caves Road, Andheri (East), Mumbai - 400 093, India | | | | | |
|  | | EPCM Contractor:  W. L. GORE & ASSOCIATES (Pacific) Pte, Ltd. India Branch  703, A-Wing, 215 Atrium, Andheri Kurla Road, Mumbai 400059, India | | | | | |
|  | | Nominated Subcontractor - Engineering, Quality Control, Supervision:  SMARTLuth Solution and Service Pvt. Ltd.  Unit No: 503, 5th Floor, ECO Centre,. EM-4 Sector-V, Salt Lake City, Kolkata - 700091, India | | | | | |
| **Hindalco Renusagar U5 1 x 80 MW PF Captive Power Plant**  **Flue Gas Desulfurization Project (FGD) with GORETM SO2 Control System**  **`**  **FGD – FGTR Effluent Ash Filters - Technical Specification**   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **ISSUED FOR** | APPROVAL | INFORMATION | MANUFACTURING | CONSTRUCTION | AS-BUILT | | | | | | | | |
|  |  |  |  |  |  |  | |
|  |  |  |  |  |  |  | |
| 01 | 24-03-2022 | Inlet Fluid quality in Annexure 1 revised | IR | IR |  | BCB | |
| 00 | 04-03-2022 | First Submission | IR | IR |  | BCB | |
| Rev. | Date | Description of revision | Prepared | Checked | | Approved | |
| Hindalco Renusagar U5 1 x 80 MW PF Captive Power Plant | | | Drg. / Doc. No*.*: S21001-TS01-05HSM-227209 | | | | |
| Flue Gas Desulfurization Project (FGD) with GORETM SO2 Control System | | | Gore Doc. No.: RPDU5.PGA.038 | | | |  |
| **FGD – FGTR Effluent Ash Filters -Technical Specification** | | | GORE Job No.: RPDU5 | | | | Rev. : 01 |
|  | | | File: TS 05\_Ash Filters -R1 24-03-22 | | | | |
| This document is a property of W.L. GORE & ASSOCIATES (Pacific) Pte, Ltd. and it may contain trade secrets or privileged, undisclosed or otherwise confidential information.  If you have received this document in error, you are hereby notified that any review, copying or distribution of it is strictly prohibited*.* | | | | | | | |

`

CONTENTS – SECTION-1

**CLAUSE. NO. DESCRIPTION PAGE NO.**

A. GENERAL 3

A-a CODES AND STANDARDS 3

A-b SYSTEM DESCRIPTION 3

A-c SCOPE OF SUPPLY 4

A-d SCOPE OF SERVICES 4

A-e EXCLUSIONS 5

A-f TERMINAL POINT 5

B. DESIGN & CONSTRUCTION REQUIREMENT 5

C. NOT USED 6

D. NOT USED 6

E. DRAWINGS / DOCUMENTS TO BE SUBMITTED 6

F. LIST OF PREFERRED MAKE 7

**ANNEXURES**

ANNEXURE-I : TECHNICAL DATA SHEET

ANNEXURE-II : TENDER SCHEME DRG

ANNEXURE-III : 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 and saturated with water and then passed through Flue Gas Treatment System where SOx shall be entrapped and 10% H2SO4 acidic solution will be generated as by-product of the process.Treated flue gas shall be discharged to atmosphere through new wet stack. The generated acid solution shall have suspended ash particles which needs to be filtered out while being circulated and transferred to other systems. For these filtration reuirement **Ash Filters** shall be used as detailed elsewhere.

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, supervision of erection, testing and commissioning at site of all materials and equipment inclusive of accessories as specified and as required for **Ash Filters ( with PP lined FRP vessels ) (1w+1s) Frontal** **Piping, All Valves with Pneumatic Actuators and accessories** complete with all materials 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)
3. Bureau of Indian Standards (BIS)
4. British Standards (BS); BS EN 1595
5. American National Standards (ANSI).
6. Steel Pipe Flanges & Flanged Fittings (ASME B 16.5)
7. ASTM. Standards for materials
8. API : American Petroleum Institute.
9. ASME: American Society of Mechanical Engineers; ASME SEC VIII
10. 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.
11. **System Description** :

b-1) **Not used**.

b-2) **Not used**.

b-3) **Ash Filter (1w+1s) for FGTR Effluent Transfer Pump**. These filters shall be installed at the discharge line of transfer pumps. These pumps shall transfer same acid solution through the filters to the FGTR Effluent storage tank from where this will be taken to Acid Concentration Plant for producing high concentration acid. These filters shall also be suitably backwashed after getting clogged and inlet water shall be switched over to stand-by filter.

All the above filters shall have Complete Frontal Piping with Valves having Pneumatic Actuators for suitable switch-over to stand-by filters when the differential pressure drop of the running filter has gone high due to clogging. Filters shall also have standard vent and drain lines. Backwash water inlet line shall be there for individual filters for the same purpose.

Separate Backwash Pump (not in scope of this spec) is envisaged for backwashing of above filters one-by-one and also for other purpose of the plant.

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

The scope for Ash Filters & accessories shall consist of :

1. Not used.
2. Not used
3. Ash Filter (1w+1s) for FGTR Effluent transfer pump.
4. If required Air Scouring blowers with Motor alongwith Piping (1w), for Filters.
5. Complete set of frontal piping, backwash piping and pneumatic actuated valves and manual valves for all filters above as indicatively shown in tender scheme drawing. Bidder shall provide any additional line and valves as may be required for automatic operation.
6. All filters’ vessels shall be complete with Manholes, Ladders, other fittings etc as required.
7. Complete Filter media and internals for all the above.
8. Air piping within battery limit for pneumatic valves.
9. Complete Instrumentation and Control panel for automatic operation of filters.
10. If Air Scouring blower is provided Control Panel should suitably complete with motor starters.
11. All flanges with counter flanges at battery limit.
12. Set of foundation bolts.
13. Set of special tools and tackles.
14. Mandatory spares if specified. Price of same shall be evaluated.
15. Erection and commissioning spares.
16. 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 Filter Vessel and Filter Media selection.

2) Detail engineering for all filters, headers, supports etc & 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) Supervision of Erection and commissioning of items supplied.

7) 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. Civil Foundation work.
2. Erection at site.
3. Process and Backwash Piping beyond battery limit.
4. Instrument Air piping beyond battery limit.
5. **Terminal Point :**

The terminal point shall be as follows.

1. Process water – At common inlet header to filters and at common outlet header from filter.
2. Backwash Water – At common inlet to filters and individual drain lines’ outlet.
3. Instrument Air Piping – At inlet to common header near filters.
4. Control Power – At inlet to Control Panel.
5. If Air Scouring Blower is provided Control Panel should be complete with motor starters and in that case Electrical power 415V, 3-ph 4-wire, 50Hz power supply at the incomer of Panel shall be provided. Any other voltage level power supply requirements will be arranged by the vendor in scope.
6. **Design and construction requirements and important considerations**

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) The vessel shall be vertical shell type with dished ends Material of construction of shell shall be FRP ( Fibre Reinforced Plastic ) with PP ( Polypropylene ) lining. Dished ends shall be of FRP with PP lining.

4) All materials including FRP materials and sealant in contact with contained water shall be non-toxic.

5) Backwashing once in a day is preferable. However bidder to suitably select to optimize filter selection. Backwashing flow and frequency shall be indicated by the bidder.

6) The maximum flow velocity through the filter shall be suitably considered.

7) Suitable (at least 30%) free board shall be provided to allow expansion during backwashing.

8) All valves used with the pressure filters shall be suitably arranged in the front in accessible position for manual operation.

R1

9) Valves / Piping / Fittings shall be PP / suitable material based on duty condition.

10) One (1) no. manhole 500 mm size (minimum) and One (1) no. hand-hole of 150 mm size shall also be provided for the filter vessels.

11) Filtering medium shall be suitably selected by the bidder and suitably supported inside the vessels. Bidder to specify details for each media.

12) Adequate margin shall be considered for selection and sizing of equipment.

13) **PG Test and** **Performance Guarantee** – Supplier shall demonstrate PG test for stipulated time as agreed with Purchaser and following shall be the minimum items :

a) Inlet and outlet TSS – As per Technical datasheet annexed.

b) Flow through filters – As per Technical datasheet annexed.

c) Pressure drop across filters in clean and clogged condition shall be guaranteed by bidder.

d) Backwash flow, frequency and time shall be guaranteed by bidder

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

**E-2 Post Order**

1. Design Calculation, P&ID , 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. Filter 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 Test certificates shall be furnished.

R1

**F : List Of Preferred Make:**

1. M/s. Aquatreat Engineering Pvt. Ltd.,

Kolkata- 700006

& As per Hindalco’s List