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Department of Metallurgical and Materials Engineering
Indian Institute of Technology, Madras
I.I.T. P.O., CHENNAI – 600 036.

Date: 23.02.2018

Ref. No.

MM	SABI	2018	005
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Due Date: 09.03.2018

To,

Email-

Dear Sir,

1. Quotations are invited **in duplicate** for the fabrication of the following items with accessories, Department of Metallurgical and Materials Engineering, IIT Madras details of which are shown in overleaf.
2. The Quotations **duly sealed and superscribed on the envelope** with the reference No. and due date, should be addressed to the undersigned so as to reach her on or before the due date stipulated above.
3. The Quotations should be **valid for ninety days** from the due date and the period of delivery required should also be clearly indicated.
4. If the item is under DGS&D Rate Contract, Rate Contract Number and the price must be mentioned. It may also please be indicated whether the supply can be made direct to us at the Rate Contract price. If so, please send copy of the R. C. (Please note that we are not Direct Demanding Officers).
5. Relevant literature pertaining to the items quoted with full specifications (and drawing, if any) should be sent along with the Quotations, wherever applicable. Samples if called for should be submitted free of charges, and collected back at the supplier's expenses.
6. **Local Firms:** Quotations should be for free delivery to this Institute, if Quotations are for Ex-Godown delivery charges should be indicated separately.
7. **Firms Outside Madras:** Quotations should be F.O.B. Madras. If F.O.B. consignor station, freight charges by passenger train / lorry transport must be indicated. If Ex-Godown, packing, forwarding and freight charges must be indicated.
8. The rate of Sales / General Taxes and the percentage of such other taxes legally leviable and intended to be claimed should be distinctly shown along with the price quoted. Where this is not done, no claim for Sales / General Taxes will be admitted at any stage and on any ground whatsoever. **The taxes leviable should take into consideration that we are entitled to have Concessional Sales Tax applicable to non-Government Educational Institutions run with no profit motive for which a concessional. Sales Tax Certificate will be issued at the time of final settlement of the bill.**
9. Goods should be supplied carriage paid and insured.
10. Goods shall not be supplied without an official supply order.
11. **Payment:** Every attempt will be made to make payment within 30 days from the date of receipt of bill / acceptance of goods, whichever is later.

Yours faithfully,

Project Co-ordinator,
Department of Metallurgical and Materials Engineering,
Indian Institute of Technology, Madras
CHENNAI – 600 036

Technical Specifications for fabrication of the items & Accessories

Reactor: A cylindrical fluidized bed reactor has to be fabricated as shown in figure 1 for working temperature up to 1000 °C. Refractory material of thickness about 20 cm has to be used to maintain the working temperature. Air jacket provisions will be made in the reactor bed in order to pass preheated air into the chamber. There will be 10 temperature measurement points. There will be 4 water cooled pressure measurement points. There will be a provisions for a top feeder and a bottom screw feeder. There will be a gas sampling point at the top.

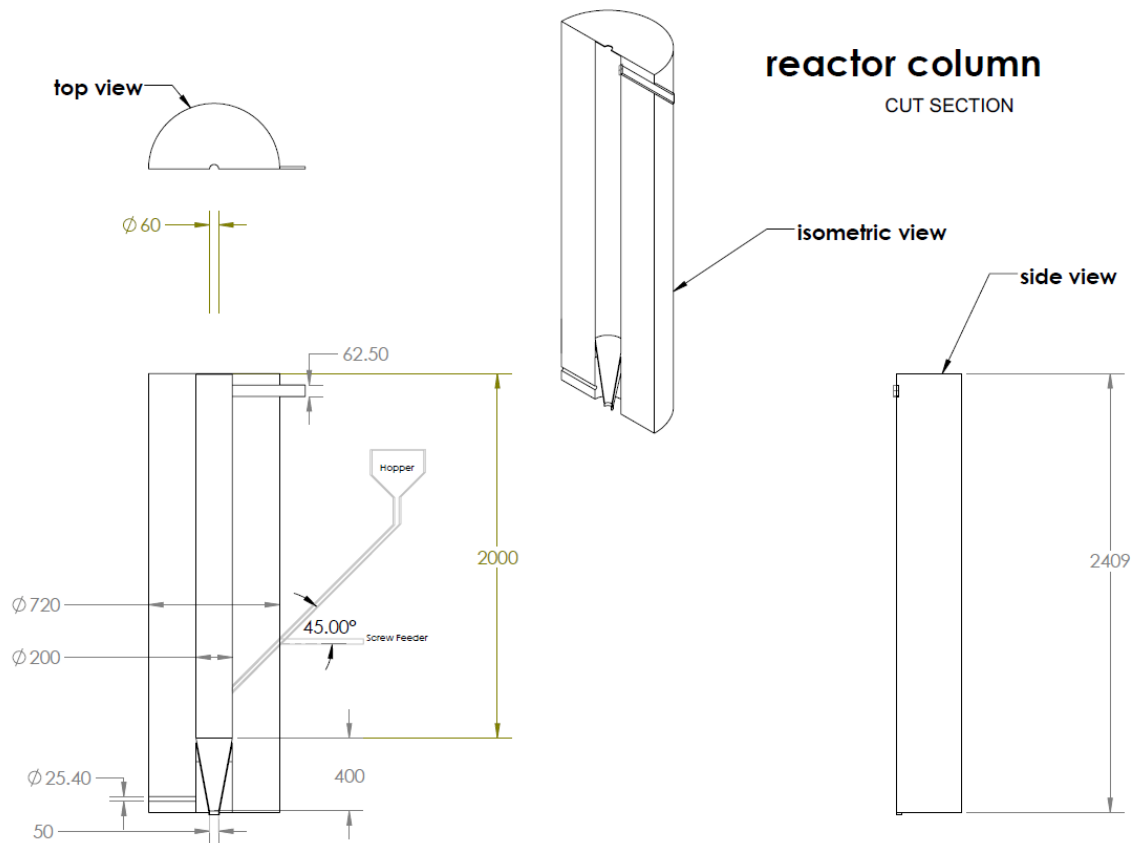


Figure 1. Cylindrical fluidized bed

Cyclone separator: Cyclone separator as shown in the figure 2, with water jacket has to be fabricated in such a way that the particles in the outlet flue gas mixture are collected properly and cooled to the required temperature. The filtered flue gas will be taken care by dust filter and wet scrubber for further cooling and also to avoid hazardous emissions. Pipeline connections are to be made of SS310 material grade with auxiliary couplings for service and maintenance convenience.

Cyclone Separator

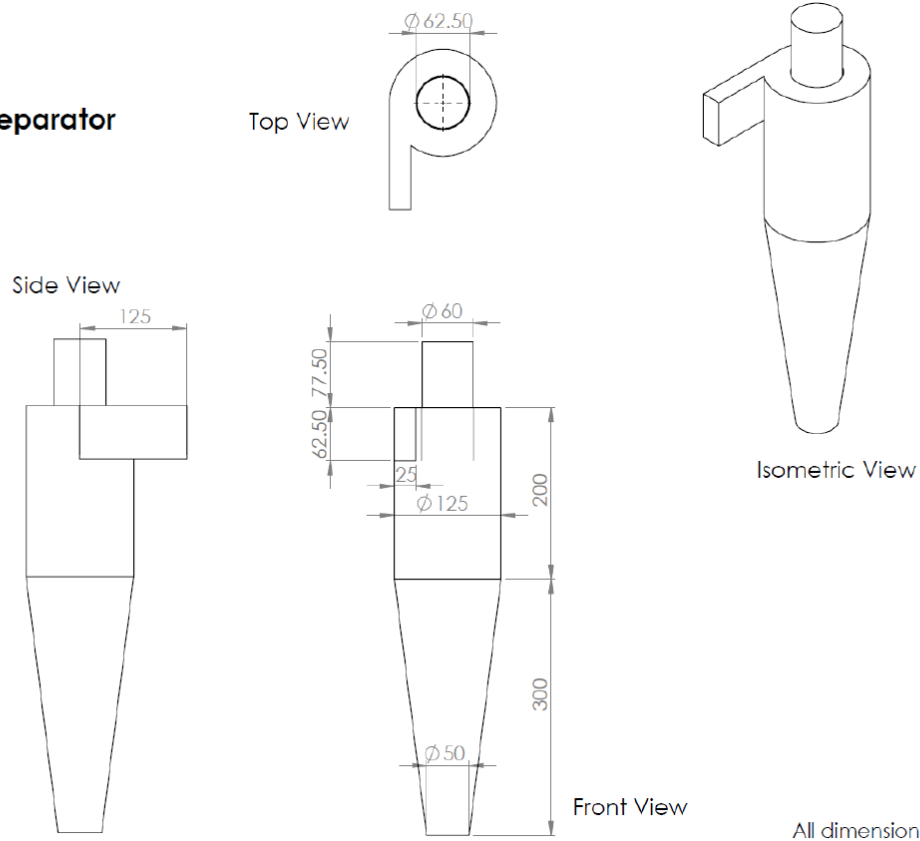


Figure 2. Cyclone separator

Dust filter: A Dust Filter has to be fabricated according to figure 3 below using SS310 material with provisions for the sheet filter for separating out very fine particles.

Dust Filter

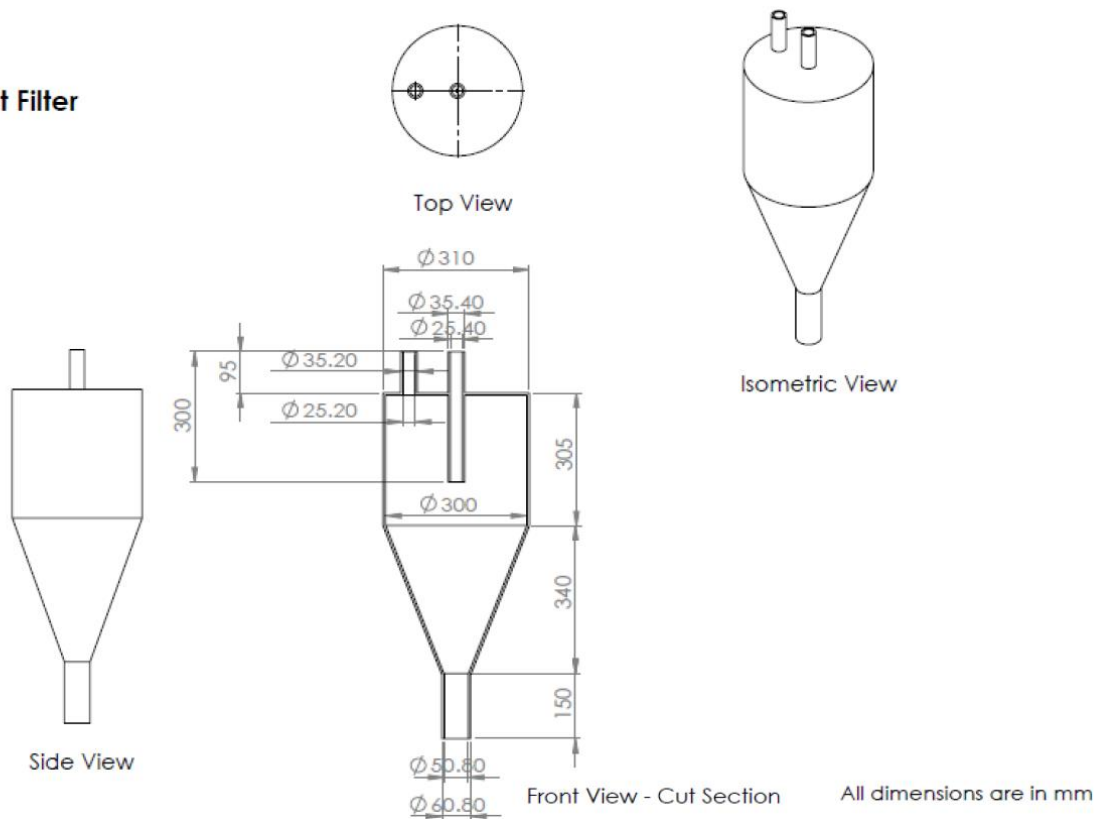


Figure 3. Dust filter

Scrubber: One Scrubber has to be fabricated as shown in figure 4 using SS310 material.

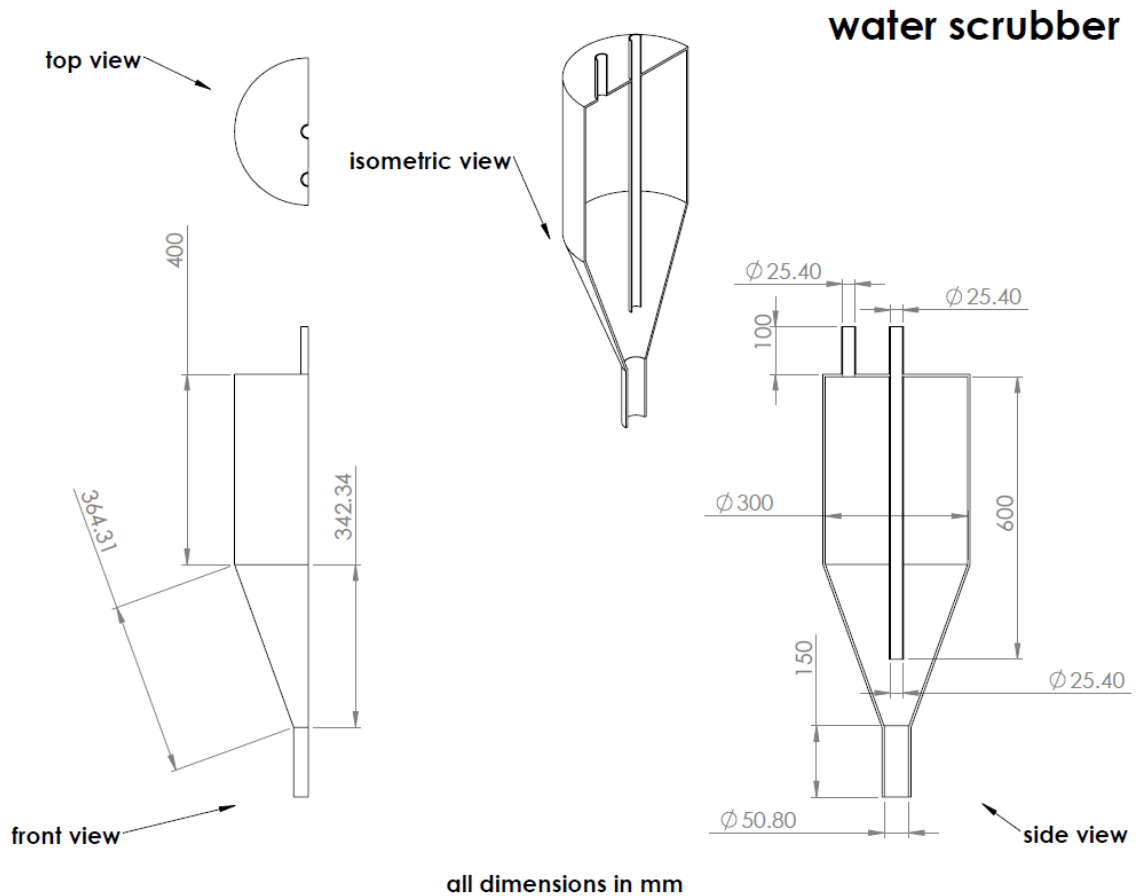


Figure 4. Water scrubber

- **Warranty for 1 year and extendable warranty for 2 years should be provided**
- **Annual maintenance for 3 years should be provided.**

Accessories:

Accessories should include details and pricing information (if applicable) of the following items.

- SS310 material grade pipe lines to connect all the units as shown in installation and commissioning section.
- Preheater connected to the gas line to heat the gas till 600 to 700 °C.
- The overall unit consisting of these various components needs strong structural support to hold them.
- Fixed staircase to access the reactors and its accessories as required.
- Hopper for feeding the material
- Screw feeder
- Global valve
- Provision for flow meter

Installation & commissioning:

All these units has to be connected as in figure 5 below under our supervision in the laboratory.

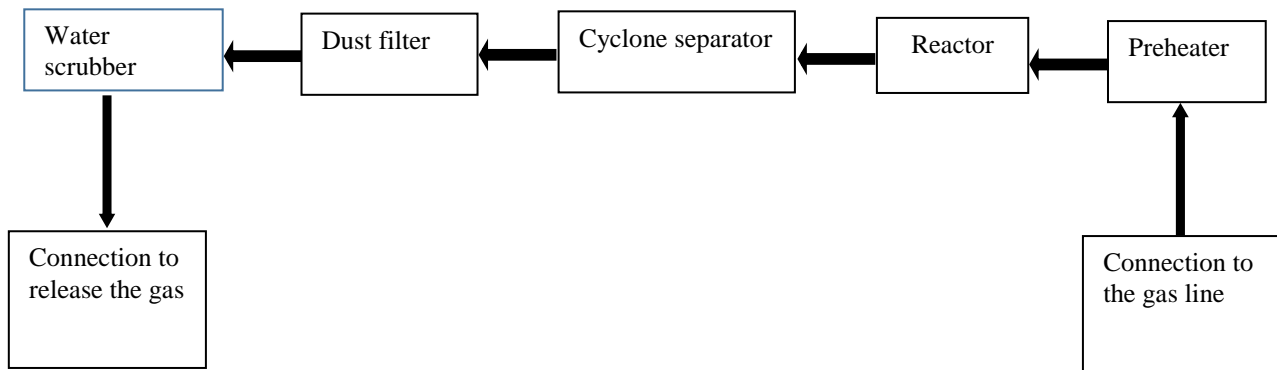


Figure 5. Installation diagram

All these units shall be installed and commissioned at our site by a company specialist and suitable trials shall be undertaken along with the startup training excluding commissioning hours.

In order to get confidence of “after-sale service” of an agent/ supplier, we require that supplier/Indian agent should have had the experience of at least one fabrications of high temperature fluidized bed reactor unit and installations across India in reputed research organizations and CFTI (centrally funded technical institutes) academic institutes (such as IITs or IISc or IISERs or NITs across India) in last 5 years.

Quotations duly sealed and superscribed on the envelope with reference No. and due date should be address to the Undersigned.

Sabita Sarkar

**Project Co-ordinator,
Department of Metallurgical and Materials Engineering,
Indian Institute of Technology, Madras,
Chennai 600036**