



Radhe Renewable Energy Development Pvt. Ltd.

(Sister Concern : RADHE ENGINEERING CO.)

D-111, Rajdoot Industrial Estate, 4-Umakant Pandit Udhyanagar, Near Mavdi Plot, Rajkot - 360 004. (Gujarat-India)
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April 29, 2003

To
M/s H & R JOHNSON (INDIA) LIMITED
Plot No. 1 to 12, KIADB Indl. Area,
Near Anchepalya Village,
Kurigal - 572 126

Attn: Mr Hari Nair

Subject: **Techno-commercial offer for 1 No. Fluidized Bed Hot Air Generator System for your Spray Dryer with capacity 180 MT/Day.**

Dear Sir

In reference to our personal discussions, and subsequent we are forwarding to your kind self the attached brief **TECHNO-COMMERCIAL** offer for your consideration.

The offer consists of the following

<input type="checkbox"/> Annexure-1	.....	System description
<input type="checkbox"/> Annexure-2	.....	Technical description
<input type="checkbox"/> Annexure-3	.....	Flow Chart
<input type="checkbox"/> Annexure-4	.....	Scope of RREDA
<input type="checkbox"/> Annexure-5	.....	Scope of PURCHASER
<input type="checkbox"/> Annexure-6	.....	Commercial offer & Terms.

We believe that you will find our offer in order to suit your requirement of advancements in existing process.

Kindly feel free to ask for any further information.

We shall be delighted to send you a detailed and specific offer on hearing from you.

Looking forward to your positive response.

Truly yours,

For Radhe Renewable Energy Development Pvt. Ltd.

Dr. S.V. MAKADIA

Annexure - 1

SYSTEM DESCRIPTION

FLUIDIZED BED [General]

Fluidized Bed is a major & unique element in the development of advanced, improved, renewable energy systems. It is a high efficient and interesting technology which gives combustion efficiency up to 95% and it is best and ideal technology to utilized waste fuel like agriculture waste saw dust, G. shell and Husks.

FLUIDIZED BED (Principal)

Inside a fluidized bed, fuels mixed with inert solids such as ash or sand is combusted. High velocity air is passed into the bed. Creating strong turbulence inside the bed and causing the solid particles to behave like a fluid and mix uniformly. Fluidized bed reactors are capable of combusting solid fuels at 95% efficiency or high, generating heat at a high rate, which can produce gaseous fuel & firing take place at above combustion zone to produce Hot Air, which utilize for special purpose like spray drying of Ceramic Slurry. But the limitation of the system is that it can produce Hot Air up-to 700 C max.

FLUIDIZED BED TECHNOLOGY

The development of fluidized bed combustion technology over the past 20 years has significantly increased the use of various biomass and waste products in power and heat generation & it's a novel technology. It converts agriculture and biomass waste fuels & any type of husk into highly efficient energy.

☐ **Applicable Bio-mass Fuel:**

:: Saw Dust

:: Ground Nut Shell

:: Husk

☐ **Bio-mass Data:**

:: Fuel Size

: 0 to 6 mm

:: Moisture content

: < 15 %

:: Ash content

: Up-to 40%

FEATURES & ADVANTAGES

The fluidized Bed Gasifier (HAG) system is capable of combusting several types of fuel such as , comcobs, wood scraps, and precipitates from waste water treatment, at high efficiency. In addition, the emission control system of toxic gases such as sulfur dioxide and oxides of nitrogen in this technology is easy to operate, inexpensive, and efficient.

Advantages:

- ☐ Operating Flexibility:
- ☐ Low Emission.
- ☐ Environmentally Sound Energy Production from Waste:

Features:

- ☐ No ash slagging problem.
- ☐ Low Nox Formation.
- ☐ High Gasification / Combustion Efficiency.
- ☐ Fast Start-up and Shut Down time

Annexure - 2

TECHNICAL SPECIFICATION

Complete Fluidized Bed Furnace/Gasifier system to be utilized in your HAG:

BIOMASS FLUIDIZED BED GASIFER/FURNACE SYSTEM

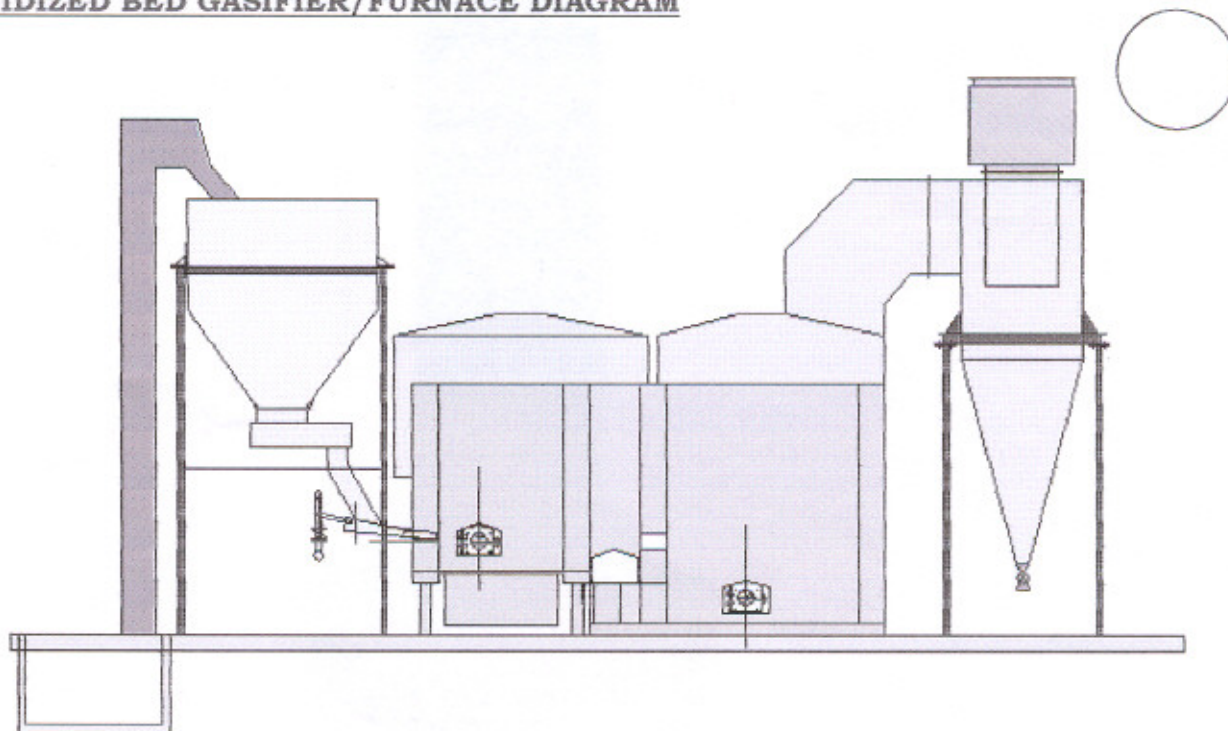
- ❑ **Model** : RF-4500
- ❑ **Installed capacity (thermal)** : 4500 Kilowatts
- ❑ **Thermal Output** : 35 – 40 *10⁵ K.Cal/Hr.
- ❑ **Liquid Fuel Replacement capacity** : 375 - 425 Liters/Hr.
- ❑ **Hot Air Temperature at Spray Dryer**: 650 – 675 deg C.
- ❑ **Output of Spray Dryer** : 7.5 to 8.5 tons per hour depending on input moisture.

SOLID FUEL CONSUMPTION RATIO (Approx.)

- ❑ Saw Dust / G.Shell / Husk : 1.5 to 2 Kg/ kg Coal

Complete Fluidized Bed system to be utilized in thermal application for exciting Spray dryer. System will automatically control with your requirement of Hot Air at particular volume and temperature.

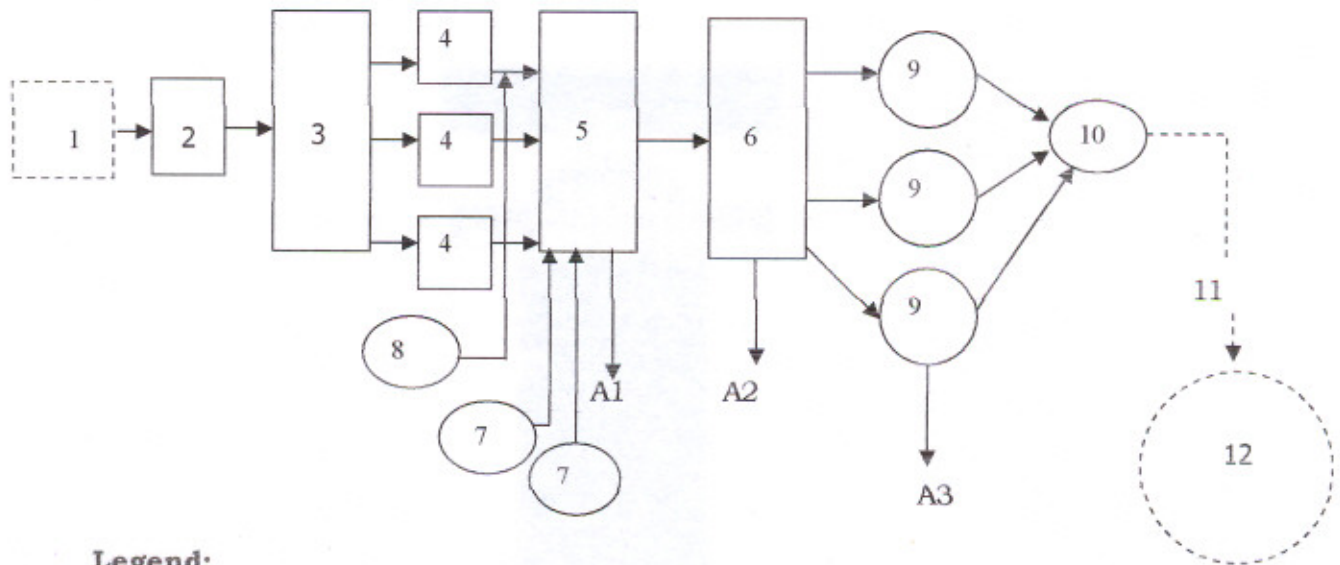
FLUIDIZED BED GASIFIER/FURNACE DIAGRAM



Annexure - 3

FLOW CHART

Purchaser Scope: _____
RREDA Scope : _____



Legend:

1. Fuel Storage & Roll Crusher
2. Elevator
3. Fuel Feeding Hooper for system
4. Atomized Screw Feeder
5. Fluidized bed Gasifier / Furnace
6. Dust Settling Chamber
7. Main Fluidization Fan
8. SFD Fan for Pneumatic Fuel Spreading
9. High Efficiency Cyclone
10. Hot Air Junction Duct
11. Main Hot Air Duct with Insulation to Spray Dryer
12. Spray Dryer.

A1=Main Ash Removal
A2=Heavy Ash Particles
A3=Fine Ash Particles

Annexure - 4

SCOPE OF SUPPLIER

As mentioned in the Schematic Diagram, the scope of supply shall be designing, development, fabrication, erection, testing, and commissioning of fluidized Bed system comprising of

- | | |
|---|--|
| <input type="checkbox"/> Main Furnace (Fluidized Bed) with MS Structure | - MS (1 Nos) |
| <input type="checkbox"/> Furnace Top cover with Insulation Module | - MS & 9" Cerawool
HTZ-128 with SS
Anchoring |
| <input type="checkbox"/> Furnace refractory Works - 14" Thickness Bricks | - IS-8 & Insulation |
| <input type="checkbox"/> Fuel Hopper | - MS (1 Nos) |
| <input type="checkbox"/> Atomized Screw Conveyor with Gear & Motors | - Elecon Gear (3 Nos) |
| <input type="checkbox"/> Air Blast Blower with Motor 30 H.P. + 20 H.P. (Crompton Greaves) | - Standard (2 Nos) |
| <input type="checkbox"/> Pneumatic Fuel Feeding System with Blower & Motor 7.5 HP (Crompton Greaves) | - Standard (1 Nos) |
| <input type="checkbox"/> Settling Chamber with IS-8 14" Refractory with Top Cover MS & MS Inside 9" Cerawool Module. | - Cerawool Top Cover
& Module refractory |
| <input type="checkbox"/> High efficiency Cyclone with 6" insulation and aluminum Cladding with inside Special castable Coating. | - SS-310 |
| <input type="checkbox"/> Expansion Bellow between Settling Chamber and Cyclone (Nos) | - Metallic SS-310 (1 |
| <input type="checkbox"/> Rotary Airlock Valve with Elecon Gear & Motor (1 HP) | - Standard (3 Nos) |
| <input type="checkbox"/> Highly Atomized PLC & Invertors Base Control Panel Components | - Standard
Drive ABB |
| <input type="checkbox"/> Elevator with 3 HP Motor | - Standard |

Annexure - 5

SCOPE OF PURCHASER

Indicative idea about the scope of consumer has been given. However, following are the activities, which fall under the scope of clients.

- ☐ Foundations & Civil works of all equipment as per our design.
- ☐ Fuel Storage Space / Yard.
- ☐ Crusher as per requirement
- ☐ Dust proof room for Control Panel.

Note:

This is a very highly sensitive control panel with fully atomization system. So it's requires separate control room to prevent dusting and high temperature.

- ☐ Power connection up to panel board & Cabling work on sight from Panel board to HAG.
- ☐ Main Hot Air Duct Line (Material SS-310) with insulation from last common outlet to your spray dryer.
- ☐ Un-skilled Labor Help & lodging and boarding facilities for labor on site during erection and commission.

Please Note:

Any modification or Changes, if required in your Existing ID Fan of Spray Dryer will be the Purchaser Scope as per actual

This system run with suction of ID fan of your existing spray dryer, so you have to increase 70-100 mm suction capacity of ID fan, otherwise you will loose production accordingly.

Annexure - 6**COMMERCIAL OFFER**

To the cost of Design, Development, Procurement of materials, Fabrication, Inspection during construction, Safe storage on site, Erection, Testing, & Commissioning of our **Fluidized Bed system** for thermal application.

Sr.	Particular	Qty	Rate	Amount
01	Fluidized Bed Furnace / Gasifier HAG System (RF-4500) as per description with Erection, Commissioning and after sales service	01	38,00,000	38,00,000
Rupees : Thirty Eight Lakhs Only			Total	38,00,000

**** Terms & Conditions ******Price schedule**

- ☐ 30% of the ordered value in advance along with the purchase order
- ☐ 70% of the ordered value prior to dispatch upon inspection and completion at our works at the time of delivery.

Sales tax

- ☐ Shall be charged at actual (**Whatever applicable**).
 - ☐ At Present **CST @ 1%** against "C" Form.
 - ☐ At Present **GST @ 4%**.

Excise duty

- ☐ Shall be charged extra, however, at present it is nil.

Octroi

- ☐ If any applicable shall be borne by you.

Transportation

- ☐ Our offer is ex-factory. Freight, Transportation, Unloading, Transit Insurance, **Crain Charges** during Erection to be pay by your selves.

Delivery Schedule

- ☐ 60-75 days from the date of purchase order along with advance Payment as Indicated above

Validity

- ☐ The offer is valid for 30 days / any major changes in Govt. rules or in changes of price in Raw Material will be applicable.

Payments

- ☐ All payments to be made by DEMAND DRAFT/CHEQUE payable in favor of "**Radhe Renewable Energy Development Pvt. Ltd.**" Payable at **Rajkot (Gujarat)**.

Force Majeure

- ☐ The offer is subject to usual "force majeure" clause.
- ☐ All arbitration subject to **RAJKOT** jurisdiction only.