Plasma Pyrolysis Technology for Bio-Medical Waste

Introduction

Plasma pyrolysis technology is a non-incineration thermal process that uses extremely high temperature in an oxygen starved environment to completely dissociate waste in to their elemental constituents. It uses heat generated by graphite electrode based plasma arc system. Graphite electrode based plasma arc system converts the electrical energy into heat energy with more than 90% efficiency. It is an ultimate waste management technology for safe disposal of any kind of organic wastes including municipal solid waste, bio-medical waste, hazardous waste, etc. and can also be further disposed-off or converted them to commercially usable by-product.

Applications

Plasma pyrolysis technology is an ultimate waste management technology for safe disposal of all kind of organic waste streams. Important features of the technology are:

- Safe disposal of bio-medical waste.
- The technology has been approved by CPCB and MoEF & CC and included in the Gazzette of India 28th March 2016
- Environment friendly technology, all emissions used to be as per CPCB norms.
- Completely indigenous technology (Make in India)

Specifications

Sr. No.	Items	Specification
1.	Capacity	15 -50 kg/hr
2.	Power Requirement	30 kW – 75 kW
3.	Space Required	60 – 200 Sq. Meter
4.	Manpower required (to operate plant)	2 **ITI** persons + 1 helper
5.	Water requirement	2000 Ltrs/week
6.	Consumables	Graphite electrodes

Plasma pyrolysis plant mainly comprises of

(i) Feeder (ii) Primary chamber (iii) Graphite electrode based plasma torch (iv) Power supply with automations and control (v) Secondary chamber (optional) (vi) Gas generators, Gas genset (optional) (vii) Gas cleaning systems and heat exchanger (viii) Effluent Treatment Plant (ix) ID fan & chimney.
(note: the system configuration depends on the type of waste to be disposed.)

Infrastructure Required

Mechanical Fabrication Workshop with the following facilities

Semi-automatic hacksaw cutting machine, CNC/Conventional turning lathe machine, milling machine, TIG welding machine, Welding consumables, Table mounted mechanical vice, Tool grinding machine, Portable grinder, spanner tool kit, etc.

Test Facilities Space

The space required for testing the complete assembled plasma pyrolysis system of capacity 50kg/hr is 10m x 20m.

Power Supply

Power supply required such as: Single phase and three phase power connection required for manufacturing the plasma pyrolysis plant.

Material Availability

Most of the components are available within the country and some components need to be imported through local agents.

Manpower

A mechanical engineer, 2 trained technicians to operate the machineries related to fabrication and 3 skilled labors will be required for the production of the plant. Electrical and Electronics Engineer with knowledge in automation and control and programming along with a helper will be required to make power supply for the plasma pyrolysis plant.